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Business Students' Perceptions of AI in Higher Education: An Analysis Using the Technology Acceptance Model

Jade S. Cervantes*, Emmalyn J. Navarro
Davao Oriental State University-Cateel Campus, Cateel, Davao Oriental, Philippines

*Corresponding Author Email: jadecervantes1201@gmail.com

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Abstract. This study explores business students' perceptions of artificial intelligence (AI) in education, utilizing the Technology Acceptance Model (TAM) to assess perceived usefulness (PU), perceived ease of use (PEOU), and intention to use AI. The questionnaire, developed based on key TAM constructs, underwent pilot testing to ensure the validity and reliability of the instrument. Conducted among Bachelor of Science in Business Administration students at Davao Oriental State University-Cateel Campus, the research employed a predictive correlational design and collected data using the validated survey instrument. Findings reveal that students perceive AI tools as intuitive and beneficial to their learning, with ChatGPT being the most popular. However, effective use of AI requires active engagement and critical thinking. Regression analysis indicates that PU significantly predicts students' intention to use AI, while PEOU has a lesser influence. The study highlights the importance of AI literacy programs, ethical frameworks, and institutional guidelines for adopting responsible AI. Recommendations include integrating AI-focused education and further investigating factors such as trust and data privacy concerns in AI acceptance.

Keywords: Artificial intelligence; Technology Acceptance Model; Business students; AI in education; Higher education; Perceptions of AI.

1.0 Introduction

The exceptional evolution of artificial intelligence (AI) is transforming various industries, including education, where AI-powered tools are innovating pedagogical approaches and learning experiences (Luckin et al., 2018). As AI applications are increasingly adopted in education, such as personalized learning applications, automated grading, and intelligent tutoring systems, new opportunities and challenges emerge for students and teachers (Chen et al., 2020). That is why, as AI challenges traditional teaching methods, understanding how students perceive its role in education will be critical to ensuring successful implementation and maximizing its benefits.

However, despite its many advantages, AI is perceived by some students as a controversial or contentious technology, raising concerns regarding its reliability, ethical issues, and potential for abuse (Zawacki-Richter et al., 2019). Some students are less inclined to use AI-powered teaching tools because they are concerned that it will replace human intelligence or lead to academic dishonesty. Such skepticism and varying levels of digital literacy create uncertainty. In this case, it is unclear whether AI will be seen as a threatening disruption in education or a helpful learning resource (Selwyn, 2021). As a result, despite being able to boost learning effectiveness, some learners are still reluctant to adopt AI.

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Since business students will be future workers in a technology-driven economy, they would need to be well-informed about the role of artificial intelligence in education and how it may impact their willingness to use it in terms of perceived usefulness, perceived ease of use, and intention to use. Through its application, the Technology Acceptance Model (TAM), developed by Davis in 1989, offers a theoretical basis to understand how individuals accept and utilize new technology. TAM determines that the most important elements that play a role in driving a person's behavioral intention to use a technology are perceived usefulness (PU) and perceived ease of use (PEOU) (Venkatesh & Davis, 2000). Students' acceptance of AI tools in education may depend on how simple they believe the technology to be, how helpful they believe it is for their academic performance, and whether they have ethical apprehensions.

While the use of this technology in higher education has increased dramatically, specific insights into business students' perceptions remain limited, particularly in developing country contexts. Research shows that, although AI will likely improve the effectiveness of learning and engagement (Zawacki-Richter et al., 2019), students may not be prepared or willing to use AI-based tools as much as possible. As a result, this study examines business students' perceptions of AI in education through the Technology Acceptance Model (TAM) lens. Thus, the study specifically aims to examine the students' perception of perceived usefulness, perceived ease of use, and intention to use AI and whether demographic variables, including type of AI tools used, and frequency of use of AI, will affect the perception. The following study of this output may provide valuable insights on how AI can be utilized in business education and facilitate its adoption strategies.

2.0 Methodology

2.1 Research Design

A predictive correlational research design was used to study the relationship between Perceived Ease of Use, Perceived Usefulness, and Intention to Use AI among business students. Likewise, a descriptive research design was implemented to systematically gather data and describe students' demographic characteristics (including AI tools and frequency of use). Descriptive research answers the "what," "when," "where," and "how" questions related to the study, not "why" (causation) (Chaudhari, 2022). It also employed a correlational research design to explore the associations among variables without direct manipulation. According to Bhandari (2022), this research design assesses the magnitude and type of association between two or more variables. This study performed a correlation analysis to reveal whether PEOU and PU significantly correlate with Intention to use AI. In addition, a predictive approach was used to determine which among the independent variables is the strongest predictor of students' intention to use AI.

2.2 Research Locale

The study was conducted at Davao Oriental State University – Cateel Campus under the Bachelor of Science in Business Administration (BSBA) major in Financial Management program. As a primary institution in the community, the university plays an integral role in professional development through holistic education that combines theoretical knowledge with practical skills essential for each graduate's career path. The research setting was chosen due to the significance of the BSBA program, which accounts for most of the school's student population, with 708 currently enrolled students for the second semester of the 2024-2025 school year.

2.3 Research Participants

The respondents of this study were Bachelor of Science in Business Administration major in Financial Management (BSBA-FM) students. The researchers employed a simple random sampling technique in selecting the 100 respondents for the study. To ensure randomization, the lottery method was used, wherein the names of all qualified students were placed in a container and drawn randomly until the required number was reached. The sample size of 100 was determined using Slovin's Formula with a 10% margin of error, based on a total population of 708 BSBA-FM students enrolled in the second semester of the school year 2024–2025. Although the computed sample size was 88, the researchers increased it to 100 for a more adequate representation. This approach ensured that every student had an equal chance of being selected, thereby enhancing the representativeness and transparency of the sampling process.

2.4 Research Instrument

The survey questionnaire used in this study was developed based on the Technology Acceptance Model (TAM), focusing on its core constructs: Perceived Ease of Use, Perceived Usefulness, and Intention to Use. The initial questionnaire comprised 15 items, each measured using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Additionally, demographic variables such as year level, gender, and frequency of AI usage were included to provide contextual insights into respondents' backgrounds. To ensure the instrument was appropriate, it underwent a comprehensive validation process, including expert validation and statistical testing for construct validity and reliability. Expert validation was sought to assess the relevance and clarity of the questionnaire about the study's objectives. Based on the feedback received, adjustments were made to enhance the instrument's suitability for the business students' context.

Following this, using Principal Component Analysis (PCA) with Varimax Rotation, Exploratory Factor Analysis (EFA) was performed to evaluate the instrument's construct validity and underlying factor structure. Specifically, the analysis examined factor loadings to identify item alignment with the theoretical constructs while assessing the sampling adequacy and data suitability for factor analysis. A meritorious sampling adequacy score of 0.814 was obtained using the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy. Bartlett's Test of Sphericity also showed significant results ($\chi^2 = 296.049$, $df = 105$, $p < 0.001$), indicating that the dataset was appropriate for factor analysis.

The scree plot analysis suggested a three-factor solution, supporting the retention of Perceived Ease of Use, Perceived Usefulness, and Intention to Use as distinct constructs. Factor loadings were examined, and items were retained based on acceptable thresholds (typically ≥ 0.40). However, one item under Perceived Usefulness exhibited weak factor loadings during factor extraction and was consequently removed. This refinement resulted in a final instrument with 14 items. To ensure the reliability of the revised questionnaire, Cronbach's Alpha was computed for the remaining 14 items, yielding a high internal consistency coefficient of 0.934. This indicates excellent reliability, ensuring the instrument consistently measures the intended constructs.

2.5 Data Gathering Procedure

In gathering the needed data for the study, the researchers adhered to proper procedures to collect data from the respondents. The researchers asked permission from the Campus Administrator to conduct the study. After that, the researchers asked for approval from the program head of the chosen program. Then, the researchers randomly selected 100 respondents for the study. The researchers asked the selected respondents for their participation in the survey. The researchers then distributed the survey questionnaire to gather the information needed for the study.

2.6 Statistical Tools

The following statistical tools were used in the study: Frequency analysis was applied to examine the distribution of AI tools used and the frequency of AI tool usage. The mean was calculated to describe the Perceived Ease of Use, Perceived Usefulness, and Intention to Use. Standard Deviation was used to measure the consistency and variability of responses from the respondents. Finally, Multiple Regression Analysis was employed to determine which constructs, Perceived Ease of Use or Perceived Usefulness, best predict Intention to use.

2.7 Ethical Considerations

In conducting this study, the researchers ensured strict adherence to ethical considerations. Participation was entirely voluntary, and respondents were treated with the utmost respect. Any concerns raised were promptly addressed, and personal information was handled with the highest level of confidentiality. Respondents were also free to withdraw from the survey at any time should they experience any inconvenience. Furthermore, the survey questionnaire was designed to exclude degrading, discriminatory, or offensive language. Data collection was conducted meticulously to ensure relevance, and extra precautions were taken to safeguard respondents' well-being. The researchers strictly adhered to the principles of privacy and confidentiality as mandated by the Data Privacy Act of 2012 (Republic Act 10173) of the Philippines. Lastly, respondents were assured that the study's findings would be used solely for academic and educational purposes.

3.0 Results and Discussion

Table 1 presents AI tools used by students. This table highlights the distribution and frequency of various AI tools utilized by the respondents, providing insights into the tools most commonly accessed by students. In this portion, respondents were given the option to choose more than one tool, which explains why the total frequency count is 172, while the overall number of respondents is 100. This should be taken into account when interpreting the results.

Table 1. *Distribution of AI Tools Used by Students*

AI Tools Used	Frequency	Percent
Chatgpt	88	51.20%
Gemini	21	12.20%
Quillbot	33	19.20%
Grammarly	25	14.50%
Cici	4	2.30%
MetaAi	1	0.60%

The result showed that ChatGPT was the most frequently used AI tool, with 51.2%. This suggests that ChatGPT's versatility, accessibility, and conversational nature make it the preferred AI tool. Additionally, the popularity of Quillbot (19.2%) and Grammarly (14.5%) highlights students' focus on improving writing quality, paraphrasing, and grammar checking. This implies that AI tools are frequently used to refine academic work rather than generate content. Conversely, the lower statistics of Gemini (12.2%), Cici (2.3%), and MetaAI (0.6%) indicate students are either not familiar with these tools or do not find them as beneficial for their academic requirements. Moreover, these findings highlight the increasing dependence on AI-powered tools in education, stressing the necessity of integrating AI literacy initiatives and ethical frameworks to safely and effectively maximize the advantages of such technologies.

Table 2 shows the frequency of AI tool usage among students. The results reveal that respondents were evenly split between weekly users (37%) and rare users (37%), with daily users (16%) and monthly users (10%) constituting the minority. These results suggest that while AI tools are integrated into students' academic routines, they are not yet universally relied upon daily.

Table 2. *Frequency of AI Tools Usage*

AI Tools Usage	Frequency	Percent
Daily	16	16.00%
Weekly	37	37.00%
Monthly	10	10.00%
Rarely	37	37.00%

The relatively lower percentage of daily users (16%) implies that AI tools may serve as supplementary aids rather than primary resources for most students. Meanwhile, the presence of monthly users (10%) suggests that some students engage with AI tools only when necessary, possibly for specific academic tasks. The relatively rare use of monthly usage could be influenced by factors such as a lack of awareness about AI tools, limited exposure to their potential benefits, or a preference for traditional learning methods. Additionally, students may perceive AI tools as specialized resources only useful for particular tasks, rather than general study aids. These insights indicate a need for further exploration into the barriers that prevent more frequent use of AI tools among students.

Table 3 presents the results for Perceived Ease of Use as reported by the respondents. It explores how students view the ease of using AI tools in their academic routines, which is a key factor in determining their willingness to adopt and integrate these tools into their learning processes.

Table 3. *Perceived Ease of Use*

No.	Statements	Mean	SD	Interpretation
1	AI tools are easy to learn and use for academic tasks.	4.25	0.73	Very High
2	AI tools can be used effectively without the need for extensive training.	3.82	0.77	High
3	The interfaces of AI tools are user-friendly and accessible.	4.13	0.76	High
4	AI tools help complete academic tasks with minimal effort.	3.79	0.78	High
5	AI tools are easy to understand and use for learning.	4.23	0.66	Very High
	Overall Mean	**4.04**	0.74	High

The results highlight that students have a high perceived ease of use (Overall Mean = 4.04, SD = 0.74), indicating that most respondents find AI tools intuitive and accessible. Among the specific statements, the highest-rated item was "AI tools are easy to learn and use in for academic tasks" (M = 4.25, SD = 0.73), followed by "AI tools are easy to understand and use for learning" (M = 4.23, SD = 0.66), both interpreted as "Very High." This suggests that most students feel confident navigating AI tools with minimal learning effort. However, the item "AI tools help complete academic tasks with minimal effort" (M = 3.79, SD = 0.78) received the lowest rating, implying that while students find AI tools user-friendly, they may still require active engagement and critical thinking to effectively apply them in academic work.

The result underscores the importance of AI literacy, ensuring students maximize the benefits of these tools without over-relying on automation. These results are supported by several studies that highlight the intuitive nature of these technologies in educational contexts. For instance, the study of (Yang et al., 2024), found that perceived ease of use significantly influences students' acceptance and motivation to engage with AI tools. Likewise, Chandrasekera et al. (2024) revealed that students generally recognize the usability of AI tools, which aligns with the Technology Acceptance Model, emphasizing the importance of perceived ease of use in technology adoption. Further, Keuning et al. (2024) indicated that while students find these tools user-friendly, they still require active engagement to utilize them in academic tasks effectively. Conversely, Li et al. (2024) indicated that despite high perceived ease of use, students may still experience uncertainty or reluctance to fully adopt AI tools due to perceived risks and responsibilities associated with their use.

Table 4 presents the respondents' ratings on the perceived usefulness of AI and highlights their views on how AI tools contribute to their academic activities. Understanding students' perspectives on the practical benefits of AI can offer valuable insights into how these tools address their learning needs and shape their intention to use them.

Table 4. *Perceived Usefulness*

No.	Statements	Mean	SD	Interpretation
1	AI can enhance the ability to complete academic work more efficiently.	4.00	0.74	High
2	AI provides helpful insights and suggestions for academic studies.	4.04	0.69	High
3	AI contributes to better decision-making in both academic and business-related tasks.	4.02	0.79	High
4	AI tools positively impact academic performance and the overall learning experience.	4.07	0.66	High
	Overall Mean	**4.03**	0.72	High

The result revealed that students generally perceive AI tools as highly useful in their academic tasks, as reflected in the overall mean rating of 4.03. The highest-rated statement, emphasizing AI's positive impact on academic performance and learning experience (M = 4.07), suggests that students recognize AI as a valuable support system for their studies. Additionally, the strong agreement with AI's role in providing helpful insights and suggestions (M = 4.04) highlights its perceived effectiveness in enhancing learning processes. The study of M and Quraishi (2024) revealed that students rated AI's impact on academic performance, indicating a strong belief in its benefits for learning outcomes. Similarly, the study of Almassaad et al. (2024) rated high on AI's role in providing helpful insights, suggesting that students find these tools effective in improving their learning processes. These results imply that AI tools have become integral to students' academic experiences, facilitating knowledge acquisition and skill development. However, while students acknowledge their usefulness, the standard deviations indicate some variation in perceptions, suggesting that factors such as familiarity, accessibility, or individual learning styles may influence AI adoption. Given these insights, educational institutions may consider integrating AI literacy programs to maximize AI's responsible and effective use in academic settings.

Table 5 presents the respondents' ratings on their intention to use AI tools in the future. It provides insight into students' level of interest and willingness to incorporate AI into their academic routines. As presented in Table 5, the overall intention to use AI was rated high (M = 4.04, SD = 0.74), indicating that most students are willing to continue using AI in their academic activities. The highest-rated item was "I am open to exploring more AI applications for my studies" (M = 4.04, SD = 0.75), while "AI will be an essential part of the learning experience in the future" (M = 4.04, SD = 0.72) also scored highly. The high intention to use AI among students suggests a growing reliance on AI tools for academic support, highlighting the need for responsible integration and guidance to maximize its benefits while maintaining academic integrity. The result supports the study of Otermans et al. (2025), suggesting that students are increasingly open to engaging with AI technologies in their studies. Also,

Balabdaoui et al. (2024) reported that most students expressed a desire for AI integration into their academic work, indicating a proactive approach towards utilizing AI tools for educational enhancement.

Table 5. *Intention to Use (IU)*

No.	Statements	Mean	SD	Interpretation
1	I intend to continue using AI tools for academic work.	4.03	0.80	High
2	I am open to exploring more AI applications for my studies.	4.04	0.75	High
3	I recommend AI tools to my classmates for academic purposes.	4.04	0.70	High
4	AI will be an essential part of the learning experience in the future.	4.04	0.72	High
5	AI should be integrated into the business education curriculum.	4.04	0.71	High
	Overall Mean	**4.04**	0.74	High

A regression analysis was conducted to determine which factor best predicts intention to use AI (Table 6). The findings show that Perceived Usefulness (PU) was a significant predictor ($\beta = 0.567$, $t = 5.870$, $p < 0.001$), while Perceived Ease of Use (PEOU) was not significant ($\beta = 0.176$, $t = 1.825$, $p = 0.071$). The model had an R value of 0.696, indicating a strong positive correlation between the predictor variables and intention to use AI. In contrast, the R^2 value of 0.484 suggests that the predictors can explain 48.4% of the variance in students' intention to use AI.

Table 6. *Significance of the Perceived Ease of Use and Perceived Usefulness towards Intention to Use*

Intention to Use	Beta	t	p-value	Remarks
Perceived Ease of Use	.176	1.82	.071	Not Significant
Perceived Usefulness	.567	5.87	.000	Significant

r =	.696
r^2 =	.484
p =	.000
F =	45.575

These findings indicate that students are more likely to use AI tools if they perceive them as beneficial, rather than merely easy to use. This aligns with the Technology Acceptance Model (TAM), which emphasizes that Perceived Usefulness is the strongest determinant of behavioral intention (Venkatesh & Davis, 2000). Institutions aiming to enhance AI adoption should focus on demonstrating the academic benefits of AI tools rather than just improving their usability.

To summarize the results, the study highlights that business students generally view AI tools as valuable and accessible, with ChatGPT emerging as the most preferred platform due to its versatility and ease of interaction. While many students find AI tools helpful in enhancing academic performance and efficiency, their usage remains moderate, suggesting that these technologies are still regarded as supplementary rather than essential tools. Importantly, the regression analysis affirms that perceived usefulness significantly influences students' intention to use AI more than ease of use, emphasizing that students are more inclined to adopt AI when they clearly recognize its academic value. These insights underscore the importance of enhancing the usability of AI tools and ensuring that their educational benefits are effectively communicated. As institutions move toward deeper AI integration in education, these findings can guide the development of targeted AI literacy programs and policies that foster responsible, meaningful, and sustained engagement with AI technologies among students.

4.0 Conclusion

This study investigated the students' perceptions of AI in education using the Technology Acceptance Model (TAM). The results revealed that students generally perceive AI tools as highly useful and easy to use, with a firm intention to continue using them in their academic activities. The most frequently used AI tool was ChatGPT, followed by Quillbot and Grammarly, indicating a preference for tools that enhance writing and content refinement. Despite the high perceived ease of use, students acknowledged that AI tools still require active engagement and critical thinking to maximize their effectiveness. Regression analysis confirmed that Perceived Usefulness (PU) significantly influences students' intention to use AI, while Perceived Ease of Use (PEOU) was not a strong predictor. This suggests that students are more likely to adopt AI tools when they perceive them as beneficial to their academic success rather than simply user-friendly.

Based on the results of the study, the following recommendations are drawn to enhance the effective and responsible use of AI in education: To encourage responsible AI use, several measures should be adopted, starting

with the implementation of mandatory AI ethics and application training sessions for students from various disciplines., where students will gain comprehensive knowledge of various AI technologies, including ethical considerations, limitations, and best practices. In addition, business education programs must also introduce subjects related to artificial intelligence, so that students know how to use AI instruments in their education and work in the future. Additionally, institutions must implement clear guidelines and policies that encourage the responsible use of AI, so students view these tools as aids to learning, not as a way to replace academic engagement. Faculty development seminars focused on the pedagogical integration of AI are equally essential to guide students in using AI technology responsibly. Additionally, professionalism in educating educators about the introduction of AI tools should be prioritized. Last but not least, for a more comprehensive perspective on students' views about AI in education, further research should be conducted to examine other factors influencing AI adoption, including trust, data privacy concerns, and institutional support. These initiatives will maximize AI benefits while addressing potential adoption problems.

5.0 Contributions of Authors

All authors contributed to the study's conceptualization. Author 1 led research design, data analysis, and manuscript finalization, while Author 2 was responsible for data collection.

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7.0 Conflict of Interests

The authors assert the absence of any conflicts of interest regarding the completion and publication of this manuscript.

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"Gurit nin Paglaom:" Houseparents' Evaluation on the Effectiveness of Expressive Arts Therapy for the Abandoned and Neglected Children

Francis E. Martillano
Polytechnic University of the Philippines, Manila, Philippines

Author Email: femartillano.fo5@gmail.com

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Abstract. Child neglect and abandonment have serious emotional and psychological effects on children, making early intervention crucial. This study examined the effectiveness of expressive arts therapy as an intervention for abandoned and neglected children at a children's center in Albay. Expressive arts therapy integrates visual arts, music, movement, and painting to provide emotional support and healing. A mixed-method sequential explanatory design was used, combining quantitative and qualitative approaches. Strengths and Difficulties Questionnaires (SDQ) were administered to houseparents to assess changes in children's emotional regulation, conduct, hyperactivity, peer relationships, and social behavior before and after therapy. An experimental research design compared a group receiving expressive arts therapy with a control group. Pre-evaluation results showed that children had emotional and behavioral difficulties, with peer problems and hyperactivity in borderline or abnormal ranges. Post-evaluation results indicated improvements in emotional regulation and conduct, but peer and behavioral issues remained borderline. A key finding of this study is that statistical analysis revealed no significant differences between the experimental and control group, indicating that expressive arts therapy, when used in isolation, may be insufficient to achieve substance behavioral improvement. Despite this, qualitative data underscored the importance of structured implementation, tailored interventions, and caregiver involvement to maximize the effectiveness of therapy. These insights suggest that expressive arts therapy may benefit from integrating with other therapeutic approaches to more effectively support institutionalized children's social and emotional well-being. Future research should investigate such integrative models further to enhance therapeutic outcomes.

Keywords: Behavioral difficulties; Child neglect; Emotional regulation; Expressive arts therapy; Intervention.

1.0 Introduction

The early years of a child's life are widely recognized as the most critical stage for growth and development. During this formative period, children experience rapid physical, cognitive, emotional, and social development, which lays the foundation for their future well-being. Research underscores the importance of providing a supportive environment during early childhood to ensure healthy development and to protect children from adverse experiences that may impede their progress (Prasath, 2021; Casa Esperanza of Angels, 2016). Unfortunately, not all children benefit from such environments. Many are exposed to neglect, abandonment, and various forms of maltreatment, which severely compromise their developmental trajectories.

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Child maltreatment, including abandonment, neglect, and abuse, is associated with a range of adverse outcomes that may persist into adolescence and adulthood. These include emotional dysregulation, impaired cognitive development, and heightened vulnerability to mental health issues such as anxiety and depression (Davis, 2021; OneChild, 2023). In the context of the Philippines, this concern is exceptionally pressing. According to the Abandoned Children's Fund (2021), one in four Filipino children experiences some form of abuse, including abandonment, sexual exploitation, and physical or medical neglect. These children often suffer from feelings of inadequacy, rejection, and emotional distress, which, if left unaddressed, may lead to lifelong consequences.

Within residential care settings, houseparents play a pivotal role in mitigating the adverse effects of early trauma. Functioning as primary caregivers, houseparents provide custodial care, emotional support, and guidance. They foster stability, build trust, and offer a sense of belonging – factors crucial to a child's recovery from trauma (Kupenda, 2023; Peak Learning Systems, 2017). Moreover, houseparents are often the first to observe behavioral changes in children and are instrumental in initiating informal assessments and early interventions (DSWD, 2025; PubMed, 2021). Despite their indispensable role, many child-caring institutions in the Philippines, including government-run centers, operate without resident psychologists or access to specialized therapeutic interventions, highlighting a significant gap in psychosocial support for abandoned and neglected children.

One potential approach to address this gap is using expressive arts therapy. Expressive arts therapy is an integrative therapeutic intervention that combines visual arts, movement, drama, music, and writing to facilitate emotional expression, self-awareness, and healing (Prasath, 2021). It is particularly well-suited for young children, who may lack the verbal capacity to articulate their experiences and emotions. Research suggests that expressive arts therapy can provide a safe and engaging medium for children to process trauma, develop emotional regulation skills, and foster resilience (Our Little Roses, 2020). It also supports the development of trust and connection between children and their caregivers, which is essential in residential care environments.

Despite the global recognition of expressive arts therapy as an effective psychosocial intervention, there remains limited empirical research on its application within the Philippine context, particularly in institutions catering to children aged 0-6 years who have experienced abandonment or neglect. The Children's Center - a child-caring institution in the Philippines that provides custodial care and developmental services to abandoned and neglected children – currently lacks a resident psychologist and structured therapeutic programs. This presents an urgent need for innovative, accessible, and child-centered interventions that can be integrated into the Center's caregiving framework.

This study investigates the effectiveness of expressive arts therapy as a therapeutic intervention for abandoned and neglected children at the Children's Center. Specifically, it explores how expressive arts therapy can support the emotional and behavioral needs of children aged 0-6 years within a residential care setting. By addressing a significant gap in local research and practice, the study seeks to contribute to developing evidence-based intervention programs that houseparents and social workers can implement to enhance the well-being and quality of life of vulnerable children.

2.0 Methodology

2.1 Research Design

This study employed a mixed-method sequential explanatory design to examine the effects of expressive arts therapy on the behavior of abandoned and neglected children. The design integrated both quantitative and qualitative approaches to provide a comprehensive understanding of the intervention's impact. An experimental design was employed for the quantitative phase, involving pre- and post-evaluations using a standardized behavioral assessment tool. A narrative analysis was used in the qualitative phase to gain deeper insights into the participants' experiences. This method enabled a systematic investigation, first collecting numerical data and then further exploring the findings through interviews and focus group discussions. The qualitative phase provided a contextual understanding of the behavioral changes observed in the quantitative phase, ensuring a well-rounded analysis of the intervention's effectiveness. According to Creswell and Plano Clark (2017), the sequential explanatory design is appropriate for studies seeking to explain and interpret quantitative findings through qualitative follow-up. It allows researchers to first measure outcomes and then explore participants' perspectives

to enrich and contextualize the results, making it a suitable and effective approach for evaluating complex interventions such as expressive arts therapy in childcare settings.

2.2 Research Participants

The study involved two groups of participants: houseparents and resident children aged 3 to 6 years from a government-run children's center. Four houseparents were purposively selected based on their direct caregiving role in the 3-6-year-old ward and at least six months of continuous service. Houseparents in administrative or non-caregiving roles were excluded. Their consistent interaction with the children positioned them as key participants for observing behavioral changes throughout the study. Child participants were classified as abandoned, neglected, foundlings, voluntarily surrendered, or orphaned. Exclusion criteria included children with histories of sexual abuse or multiple forms of severe trauma, and those currently in foster care or residing outside the center. Eligible children were randomly assigned to either the experimental group, which received expressive arts therapy, or the control group, which did not. Systematic random sampling was employed to ensure balanced distribution based on age and gender, and the fishbowl technique was used for random group assignments. Houseparents had no input in the group assignment process. The control group followed the same daily routines and structure as the experimental group but did not participate in the therapy sessions. Their behaviors were observed and assessed using the same standardized tool, ensuring consistency in data collection across both groups.

2.3 Research Instruments

The primary tool used for the quantitative phase of this study was the Strengths and Difficulties Questionnaire (SDQ), a widely used behavioral screening instrument for children aged 2 to 17 years (Goodman, 1997). The parent-rated version was administered to houseparents to assess the children's behaviors before and after the expressive arts therapy intervention. The SDQ includes 25 items grouped into five subscales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behavior. The total difficulties score was derived from the first four subscales, while the prosocial behavior scale was evaluated independently. The SDQ has demonstrated sound psychometric properties, including acceptable internal consistency, test-retest reliability, and inter-rater agreement in multiple cultural contexts (Stone, Otten, Engles, Vermulst & Janssens, 2010).

The study employed semi-structured Focus Group Discussion (FGD) guides developed specifically for this study to support the quantitative findings and explore houseparents' perceptions of expressive arts therapy. These guides were designed to elicit insights on the perceived behavioral changes in children, the observed impact of the therapy sessions, and the overall caregiving experience. Since the FGD guide was researcher-developed and not adapted from an existing validated tool, it underwent expert review by professionals in child psychology and social work to ensure content validity. A pilot FGD was also conducted to refine the questions for clarity and relevance before full implementation.

2.4 Data Gathering Procedure

The research process began with approval from the research adviser, panel members, and the Graduate School-Research and Extension Office. Upon approval, formal permission was obtained from the Children's Center to conduct the study. The institution secured an assent form on behalf of the children, while houseparents were oriented on the study's objective, procedures, and ethical considerations. To enhance consistency and accuracy in reporting, houseparents received brief training on properly administering the SDQ, ensuring reliable baseline and post-intervention data.

Children aged 3 to 6 were systematically and randomly assigned to either the experimental group, which received expressive arts therapy, or the control group, which continued their regular daily routines. The fishbowl technique was applied to ensure random group assignment, with considerations of age and gender. Houseparents had no input in the group assignment process. The pre-intervention phase involved administering the SDQ to assess baseline behaviors. The experimental group then underwent five expressive arts therapy sessions facilitated by a licensed clinical psychologist trained in expressive arts-based interventions. Sessions were conducted over five weeks (June 12 to July 17, 2024), each lasting 60 to 90 minutes. The session design was based on the psychologist-developed expressive arts therapy design focusing on emotional awareness, social development, and self-

regulation. Activities included drawing, storytelling, movement, and music, tailored to the developmental needs of young children in residential care.

While not receiving any therapy during the intervention period, the control group was equally monitored and assessed using the same SDQ tool. After the intervention, post-evaluation SDQ assessments were completed for both groups. To deepen the understanding of the intervention's effects, focus group discussions (FGDs) were conducted with participating houseparents using a semi-structured guide developed by the researcher. The FGD guide underwent expert validation and a pilot test to ensure the clarity and relevance of the study context. Qualitative data from the FGDs were analyzed using thematic analysis to provide contextual insights into quantitative findings. As an ethical consideration, the control group received the same expressive arts therapy sessions after the study was completed.

2.5 Data Analysis

Both quantitative and qualitative methods were utilized to analyze the collected data. For the quantitative phase, data were processed using IBM SPSS Statistics (Version 26). Descriptive statistics, including means and standard deviations, were calculated to summarize children's behavioral scores before and after the intervention. A split-plot ANOVA (also known as mixed-design ANOVA) was employed to examine both within-subject effects (pre- vs. post-intervention) and between-subject effects (experimental vs. control groups). This approach was appropriate for the study's design, allowing simultaneous comparison of repeated measures and group effects (Field, 2013). To ensure the validity of the statistical results, key assumptions were tested: the Shapiro-Wilk test was used to assess normality, and Levene's test was applied to verify homogeneity of variances (Laerd Statistics, 2020).

For the qualitative phase, thematic analysis was used to interpret data gathered from focus group discussions with houseparents. Following Braun and Clarke's (2006) six-phase framework, an inductive approach was adopted, allowing themes to emerge naturally from the data without a pre-existing coding scheme. Transcripts were manually coded and grouped into broader categories reflecting shared meanings and recurring patterns. Validation strategies such as expert review and peer debriefing were employed to enhance the credibility and trustworthiness of the analysis. Although inter-rater reliability was not formally measured, themes were reviewed and refined in consultation with a qualitative research adviser to ensure consistency and clarity of interpretation.

2.6 Ethical Considerations

This study adhered to strict ethical guidelines to protect all participants' rights, dignity, and welfare, particularly the vulnerable children involved. Approval was obtained from the Graduate School-Research and Extension Office for an ethical evaluation of the study. The Children's Center provided formal consent for children's participation, as they were under state care. House parents also provided informed consent after being fully briefed on the research objectives, procedures, risks, and benefits. To ensure confidentiality, participants' identities and personal information were protected. All collected data were securely stored without identifying details, and responses were presented in an aggregated form to prevent individual identification. Digital records were password-protected and accessible only to the researcher and adviser.

A licensed clinical psychologist facilitated the expressive arts therapy sessions to minimize potential harm to participants, ensuring a safe and supportive environment for the children. A social worker was also present during all sessions to monitor child welfare and ensure compliance with child protection policies. Pre- and post-study debriefing sessions were conducted to address any concerns or emotional distress experienced by the participants. Finally, after completing the study, the control group received the same expressive arts therapy sessions to ensure that all children benefited equally. The research findings and recommendations were shared with the Children's Center to support further intervention planning for abandoned and neglected children.

3.0 Results and Discussion

3.1 Behaviour of Abandoned and Neglected Children Before Expressive Arts Therapy

Table 1 shows the pre-evaluation of the house parents on different behaviors – emotional problems, conduct problems, hyperactivity, peer problems, and pro-social among abandoned and neglected children of the children center before the conduct of expressive arts therapy across the control and experimental groups.

Table 1. *Pre-evaluation result comparison between the control and experimental groups*

Group	Variables	Mean	sd	Interpretation
Control Group	Emotional Problem	0.50	1.00	Normal
	Conduct Problem	1.00	1.41	Normal
	Hyperactivity	3.75	2.21	Normal
	Peer Problem	4.00	2.58	Abnormal
	Pro-social	7.25	1.70	Normal
Experimental Group	Emotional Problem	1.25	0.95	Normal
	Conduct Problem	3.75	2.87	Normal
	Hyperactivity	6.00	0.81	Borderline
	Peer Problem	3.50	1.91	Borderline
	Pro-social	6.00	1.41	Normal

Note. Normal: Emotional (0-3); Conduct (0-2); Hyperactivity (0-5); Peer Problem (0-2); Pro-social (6-10)
Borderline: Emotional (4); Conduct (3); Hyperactivity (6); Peer Problem (3); Pro-social (5)
Abnormal: Emotional (5-10); Conduct (4-10); Hyperactivity (7-10); Peer Problem (4-10); Pro-social (0-4)

Both groups demonstrated behavioural scores within the normal range for most domains. Notably, the control group exhibited behaviours primarily within normal limits across all areas, including emotional problems, conduct problems, hyperactivity, and prosocial behaviour. However, peer problems were classified in the abnormal range, and social difficulties even in the absence of intervention. In contrast, the experimental group showed borderline scores in both hyperactivity and peer problems. These scores highlight areas of concern related to attention regulation and peer interaction. Although their scores for emotional problems, conduct issues, and prosocial behaviour were within the normal range, the elevated means in hyperactivity and peer domains indicate potential behavioural challenges that warrant closer observation and targeted support.

These findings are consistent with existing literature on the SDQ's sensitivity in detecting emotional and behavioral issues in children exposed to neglect or abandonment (Rautenbach & Smith, 2021; Wang & Zhang, 2023). Children in institutional settings often exhibit difficulties in social interaction and self-regulation – symptoms commonly linked to adverse childhood experiences (Maxwell et al., 2024). Peer relationship problems may reflect unresolved trauma and the emotional disconnection often seen in children from unstable or non-nurturing environments (Wang & Zhang, 2023). Furthermore, although prosocial scores for both groups fell within the normal range, the experimental group's mean score was noticeably lower, suggesting a need to enhance social and empathic skills. Prior studies (Goodman, 2001; Rautenbach & Smith, 2021) emphasized that institutionalized children often require structured interventions to foster appropriate social behaviour. Expressive arts therapy has been shown to support such development by encouraging emotional expression, interpersonal engagement, and creative exploration (Malchiodi, 2005).

3.2 Children's Behavior

Based on daily records and house parent narratives, key emotional themes emerged before expressive arts therapy.

Emotional Problem

Child 1 exhibits intense emotions, particularly anger, which manifests physically and immediately. His resistance to correction suggests difficulty with emotional regulation, making his reactions overwhelming for himself and others. In contrast, Child 2 internalizes frustration but outwardly expresses defiance, possibly indicating struggles with authority. Emotional responses among children vary—tantrums, crying, sadness, and anger—highlighting individual coping mechanisms influenced by temperament and experiences.

Conduct Problem

Emotional regulation is central to children's conduct, particularly in handling frustration. Child 2 reacts outwardly when denied something, directing frustration toward others instead of processing it internally. She exerts control over peers, demonstrating a struggle with authority and group dynamics. The houseparent's role is crucial in modeling constructive emotional responses, as children's behavioral challenges reflect their ongoing emotional development.

Hyperactivity

Attention-seeking and emotional regulation are key themes. Child 1 craves attention but struggles to express his needs, indicating emotional vulnerability. Short attention spans and selective engagement are standard, with some children only participating in activities of interest. Emotional regulation issues, particularly related to anger, contribute to impulsive behaviors, such as restlessness and noncompliance with group activities. Supervision remains essential, as children's behavior varies, requiring tailored guidance.

Peer Problem

Children prefer playmates of similar age and physical ability, engaging in energetic activities like wrestling. This preference reflects social development, as younger peers may lack the coordination or interest for such play. Mutual understanding enhances peer relationships, with synchronized physical activity fostering connection.

Prosocial

Child 1 can be a reliable helper when given explicit instructions but requires reminders to stay focused. Learning household chores instills responsibility, independence, and discipline. Caregivers play a vital role in reinforcing expectations and ensuring children develop essential life skills through structured guidance.

3.3 Behavior of Abandoned and Neglected Children After Expressive Arts Therapy

Table 2 shows the post-evaluation of the house parents on different behaviors – emotional problems, conduct problems, hyperactivity, peer problems, and pro-social – among abandoned and neglected children in the Children's center after the conduct of expressive arts therapy across the control and experimental groups.

Table 2. *Post-evaluation result comparison between the control and experimental group*

Group	Variables	Mean	sd	Interpretation
Control Group	Emotional Problem	0.75	0.95	Normal
	Conduct Problem	0.75	0.95	Normal
	Hyperactivity	3.75	2.21	Normal
	Peer Problem	3.75	2.98	Borderline
	Pro-social	7.25	1.70	Normal
Experimental Group	Emotional Problem	0.50	0.57	Normal
	Conduct Problem	3.00	2.16	Borderline
	Hyperactivity	4.25	1.70	Normal
	Peer Problem	3.75	1.25	Borderline
	Pro-social	6.50	1.91	Normal

Note. Normal: Emotional (0-3); Conduct (0-2); Hyperactivity (0-5); Peer Problem (0-2); Pro-social (6-10)
Borderline: Emotional (4); Conduct (3); Hyperactivity (6); Peer Problem (3); Pro-social (5)
Abnormal: Emotional (5-10); Conduct (4-10); Hyperactivity (7-10); Peer Problem (4-10); Pro-social (0-4)

In the control group, children's scores for emotional problems, conduct problems, hyperactivity, and prosocial behaviour remained within the normal range post-intervention. These findings suggest relative behavioural stability, with minimal therapeutic impact. However, peer problems persisted in the borderline range, indicating ongoing challenges in social relationships. This stability may suggest that behavioural patterns among children are unlikely to shift significantly without targeted psychosocial intervention. In contrast, the experimental group demonstrated more varied outcomes. Emotional problems improved, remaining within the normal range. This improvement supports findings by Nazeri et al. (2020), who highlighted the efficacy of expressive arts therapy in helping children regulate positive emotions and reduce internalizing symptoms such as anxiety and sadness. These results suggest that the expressive component of the therapy may allow children to externalize and process complicated feelings in a nonverbal and non-threatening way.

The experimental group's hyperactivity score also remained within the normal range, yet this slight increase compared to the control group reflects lingering attention-related difficulties. This finding aligns with Rautenbach and Smith (2021), who noted that children with a history of trauma or neglect may exhibit persistent hyperactive behaviours due to heightened arousal and disrupted executive functioning. Although not alarming, this result highlights an area where expressive arts therapy might require supplementary behavioural support strategies, such as cognitive-behavioural techniques or structured physical activity. A more concerning result was the conduct problem in the experimental group, which remained in the borderline range. This shift from what was likely a previously abnormal range suggests some improvement, possibly due to the therapy's emphasis on expression, reflection, and structured social engagement. However, the persistence of borderline scores may indicate the need for longer-term or more intensive intervention to consolidate gains in behavioural self-regulation.

Similarly, peer problems remained borderline in the experimental group. The lower standard deviation suggests less behavioural variance, indicating that peer difficulties remain, they are experienced more uniformly across the group. This consistent pattern could reflect shared environmental or relational challenges, such as school bullying or social

withdrawal. It may also imply that while expressive arts therapy fosters self-expression, it may need to be paired with explicit social skills training to enhance peer integration and conflict resolution.

Prosocial behaviour scores stayed within the normal range for both groups, with the experimental group scoring slightly lower than the control group. This relative stability suggests that children continued to engage in positive behaviours such as sharing and helping, possibly sustained by the collaborative nature of the therapy. However, the slight decline in the experimental group might be due to residual antisocial tendencies or emotional fatigue from the therapeutic process itself, which can temporarily disrupt interpersonal behaviour before longer-term benefits are realized.

Expressive arts therapy appears to have positively influenced emotional regulation and potentially reduced the severity of conduct problems. However, the persistence of borderline behaviours in hyperactivity and peer relations highlights specific domains where therapy may need to be expanded or modified. These findings reinforce that while expressive arts therapy is valuable for internal emotional processing, it may need to be complemented with interventions that directly address behavioural and social functioning.

3.4 Behavioral Changes

Emotional Changes

Child 1 has shown gradual emotional growth, now listening when angry rather than resisting. This highlights the slow but possible progress in emotional regulation with patience and support. The persistence of anger, though reduced, underscores the challenge of completely altering a child's behavior, reinforcing the need for empathy and understanding. Data also emphasizes professional caregiving, noting staff training that promotes emotional detachment and professionalism. The reminder to "leave it at home" underscores the importance of maintaining consistency and emotional distance in effectively managing children's behavior.

Conduct

Child 3 has become more expressive after psychological intervention, suggesting that support can help children open up emotionally. However, the lack of change in other children highlights that the effectiveness of interventions varies, emphasizing the need for personalized care. Progress is non-linear, and children develop emotionally at different rates. Data also touches on social comparison—Child 3's improvement may create a positive feedback loop where her expressiveness is encouraged by caregivers and peers.

Hyperactivity

Data highlights attention-seeking behavior driven by children's emotional needs. Their demand for equal attention, such as being carried like their peers, reflects a deep need for validation and security. This sensitivity to perceived inequalities underscores the importance of fairness in caregiving. Caregivers face the challenge of balancing attention among children to prevent feelings of neglect or jealousy. Managing these dynamics requires emotional stability and consistency, as even minor differences in treatment can impact a child's sense of belonging.

Peer Relationships

Despite occasional conflicts over toys or attention, the children generally form strong bonds, demonstrating that shared environments can foster deep connections. These disputes, common in early development, help children learn social negotiation and self-regulation. The data also highlights the development of communication. Child 1's improved responsiveness and Child 3's increased talkativeness suggest that interactions with peers and caregivers significantly shape social and cognitive growth. The competition for adult attention, particularly from mothers, underscores the role of adult approval in social development.

Prosocial Behavior

Data highlights the balance between kindness and competition. While the children are generally kind, disputes arise over toys, reflecting early struggles between self-interest and cooperation. These interactions teach valuable lessons in sharing, emotional regulation, and fairness. Navigating cooperation and competition is a key developmental task as children learn to build friendships while managing conflicts over resources.

3.5 Impact of Expressive Arts Therapy

Table 3 on the next page shows the difference between pre and post-evaluation of the behavior among abandoned and neglected children in the experimental group before and after receiving expressive arts therapy. ANOVA was conducted to test the differences between pre- and post-evaluation behaviors, including emotional problems, conduct problems, hyperactivity, and peer relationships. The results show that there are significant differences across the four behaviors ($F = 9.313$, $p = 0.004$) and significant changes before and after receiving expressive arts therapy ($F = 13.500$, $p = 0.035$), as both p-values are lower than the significance level of 0.05.

Table 3. *Differences in the evaluation before and after receiving Expressive Arts Therapy*

Scale	Variables	Sum of Squares	Mean Square	F value	p-value	Difference
Emotional Problem	Time	0.25	0.25	0.40	0.55	No
	Time * Group	1.00	1.00	1.60	0.25	
	Residual	3.75	0.62			
Conduct Problem	Time	1.00	1.00	3.42	0.11	No
	Time * Group	0.25	0.25	0.85	0.39	
	Residual	1.75	0.29			
Hyperactivity Problem	Time	3.06	3.06	7.74	0.03	Yes
	Time * Group	3.06	3.06	7.74	0.03	
	Residual	2.38	0.39			
Peer Problem	Time	7.10	7.10	8.97	1.00	No
	Time * Group	0.25	0.25	0.31	0.59	
	Residual	4.75	0.79			
Pro-social	Time	0.25	0.25	3.00	0.13	No
	Time * Group	0.25	0.25	3.00	0.13	
	Residual	0.50	0.08			

The analysis of variance (ANOVA) results indicate that, among the five behavioral scales evaluated, only hyperactivity problems showed a statistically significant difference between pre- and post-evaluation ($p = 0.032$), suggesting that changes over time were meaningful and varied across groups. This finding aligns with prior research indicating that structured behavioral interventions and cognitive behavioral therapy can effectively reduce hyperactivity symptoms in children (Sonuga-Barke et al., 2013). In addition, recent research supported the findings with similar themes regarding the efficacy of expressive arts therapy in reducing hyperactivity among children. The study by Cibrian et al. (2022) highlighted that creative interventions, including art therapies, can significantly enhance attention and self-regulation in children.

Conversely, emotional problems, conduct problems, peer problems, and prosocial behavior did not show significant differences over time ($p > 0.05$), implying that the intervention or natural development did not result in substantial changes in these areas. Previous studies have suggested that while hyperactivity-related symptoms often respond well to behavioral interventions, emotional and conduct-related issues typically require more prolonged and intensive support to yield measurable improvements (Murray et al., 2016). Furthermore, the lack of significant changes in peer problems ($p = 0.595$) and prosocial behavior ($p = 0.134$) is consistent with findings that social skills development is a gradual process influenced by multiple environmental and interpersonal factors, such as family interactions and school dynamics (Ladd, 2005).

The slight change in the children's peer relationships in the experimental group has had little effect on how children make new friends or build upon their existing relationships. This study is supported by the children's records and insights from houseparents, who noted that some children are reluctant to engage in play with their peers at the center. Instead, these children often seek attention from the houseparents, indicating a competitive dynamic for adult attention. The findings are explained by the study of Weir (2020), who highlights that neglected children often struggle with low self-esteem, trust issues, and social withdrawal, which hinder their capacity to make new friends or build upon existing relationships. Furthermore, the study of Gorell et al. (2024) highlighted that children who experience neglect often develop anxious attachment styles, leading to difficulty in forming quality relationships and increased feelings of loneliness. This research emphasizes the cyclical nature of neglect and loneliness, where neglected children may isolate themselves further, exacerbating their relational difficulties.

The findings indicate that expressive arts therapy can be a valuable intervention for addressing the hyperactivity challenges faced by abandoned and neglected children. However, to maximize its effectiveness, it is crucial to

emphasize the need for long-term targeted interventions that cater to specific behavioral concerns and highlight the importance of extended follow-ups to assess the sustained impact of these interventions. Future research should investigate the impact of intervention intensity and duration on shaping children's social and emotional outcomes.

3.6 Subject Effects (Control vs. Experimental Group)

Table 4 presents the results of a statistical analysis conducted to explore the effect of expressive arts therapy on the behaviors of abandoned and neglected children. The primary objective of his analysis was to determine whether expressive arts therapy could significantly improve children's behavior. Understanding these findings is crucial for evaluating the therapy's efficacy in improving behavioral outcomes for vulnerable populations. The statistical analysis examined five behavioral domains: emotional problems, conduct problems, hyperactivity problems, prosocial behavior, and academic achievement. The results indicate that expressive arts therapy did not have a statistically significant difference in any of these behavioral measures between the control and experimental groups. These findings align with previous studies and suggest that expressive arts therapy may not always be sufficient as a standalone intervention (Malchiodi, 2020; Perry, 2021).

Table 4. *Subject Effects (Control vs. Experimental Groups)*

Scale	Variables	Sum of Squares	Mean Square	F value	P value	Difference
Emotional Problem	Group	0.25	0.25	0.26	.628	No
	Residual	5.75	0.95			
Conduct Problem	Group	25.00	25.00	3.28	.120	No
	Residual	45.8	7.63			
Hyperactivity Problem	Group	7.56	7.56	1.20	.316	No
	Residual	37.87	6.31			
Peer Problem	Group	0.25	0.25	0.02	.877	No
	Residual	57.75	9.62			
Pro-Social	Group	4.00	4.00	0.70	.433	No
	Residual	34.0	5.67			

For emotional problems (p = .628), expressive arts therapy did not improve substantially, aligning with research suggesting that it aids emotional expression but not regulation. Similarly, no significant differences were observed in conduct problems (p = .120), hyperactivity (p = .316), peer problems (p = .877), or prosocial behavior (p = .422). Based on the statistical results, expressive arts therapy did not produce significant changes in any of the five measured behavioral domains. The p-values for all categories were above the threshold of o.05, meaning that the observed differences between the control and experimental groups were not statistically significant. This suggests that expressive arts therapy alone may not be sufficient to address the complex behavioral issues of children with histories of abandonment and neglect.

These findings align with previous research, which suggests that while expressive arts therapy may offer therapeutic benefits, its impact may vary depending on factors such as the severity of trauma, duration of therapy, and individual child characteristics (McFerran, 2021). The lack of statistically significant results raises important considerations for future interventions. It may enhance its effectiveness by integrating expressive arts therapy with other therapeutic approaches, like cognitive-behavioral therapy or trauma-informed care (Perry, 2021). Additionally, the intervention duration in this study might have been too short to yield measurable changes, prompting the need for research on longer-term interventions (Malchiodi, 2020). A personalized treatment approach could also be essential to optimize the therapy's impact, as children respond differently to various interventions. Finally, further studies with larger sample sizes and rigorous methodologies are necessary to explore the potential benefits of expressive arts therapy for abandoned and neglected children (O'Connor et al., 2021).

3.7 Houseparents' Narratives of Children's Behavioral Change

The Need for Structure and Consistency in Expressive Arts Therapy

A common theme in the feedback is the importance of structure, consistency, and extended time for the effectiveness of expressive arts therapy. Participants desired longer sessions and more frequent activities, especially with younger children who might benefit from repetition. The idea that sessions could be more structured—perhaps with a clear progression of activities or goals—suggests that a well-defined framework might

make the therapy more effective and engaging for children. Frequent sessions, even if brief, are also emphasized as essential for retention and ensuring that the child's learning and emotional expression are maintained.

Arts as a Vehicle for Self-Expression and Emotional Sight

The role of arts in helping children express themselves and explore their emotions is a significant theme. Several responses highlight how children can communicate and express their emotions or behaviors through their artwork, even when they may not have the vocabulary or understanding to verbalize those feelings. For example, HSP02 mentions that children can show their feelings or thoughts through drawing. This could help improve their emotional regulation or enable them to continue expressing themselves similarly. Using color in masks as a reflection of behavior, as mentioned by HSP04, is a specific example of how the expressive arts can be a tool for gaining insight into a child's emotional state.

Therapy as a Developmental Tool

The therapeutic value of expressive arts in supporting emotional and behavioral development is another key theme. Participants mention how art therapy has helped understand the child's emotional state, helping them to express feelings like anger or frustration in a non-verbal way. The case of Child 2, for instance, highlights how behavioral patterns, such as a quick temper, can be explored and better understood through creative activities like art. By interpreting the child's artwork or behavior in response to specific prompts, therapists can gain valuable insight into the child's emotional and developmental progress.

Limitations of Short-Term and Infrequent Sessions

Several participants expressed concerns about the duration and frequency of the sessions. Short sessions (e.g., 15-20 minutes) and infrequent meetings (once a week) are considered less effective for younger children, who may forget what they have learned or fail to engage meaningfully with the therapeutic process. This aligns with the broader theme of children needing repetition and consistency to learn effectively and retain new behaviors or emotional tools. It also suggests that brief, occasional sessions may not be enough to foster the more profound, sustained therapeutic benefits of more regular and extended engagement.

Training for Caregivers and Parents

A recurring theme in the feedback is the desire for caregivers and parents to receive further training on how to effectively incorporate expressive arts techniques into their daily interactions with children. Participants expressed interest in learning to facilitate arts-based activities, suggesting that this skill set would allow them to better support their children's emotional expression and development outside the therapy sessions. Research has consistently shown that the success of therapeutic interventions is significantly enhanced when they are supported by consistent reinforcement at home (Miller et al., 2017). This need for caregiver training reflects an understanding that children benefit from ongoing emotional support and practice in real-world settings, which is crucial for their emotional and behavioral growth (Duffy & O'Connor, 2020). Therefore, providing caregivers with the tools to facilitate expressive arts activities at home is essential, ensuring that children have continuous opportunities for emotional expression and regulation.

Adaptability of Expressive Arts Therapy

There is an acknowledgment of the adaptability of expressive arts therapy to children's specific needs and developmental levels. For example, HSP03 notes that different children have varying skill levels or readiness to engage in arts-based activities, with some already being skilled at drawing. This highlights the flexibility of expressive arts therapy, which can be tailored to individual children's abilities and emotional needs. Studies have emphasized the importance of adapting therapeutic approaches to a child's developmental stage and emotional state (Malchiodi, 2015). The ability of therapists to adjust activities based on a child's developmental level, behavior, or emotional needs enhances the effectiveness of expressive arts therapy, making it a highly versatile and personalized intervention (Knill et al., 2005). The flexibility of this approach allows therapists to meet children where they are emotionally and developmentally, ensuring that each child receives appropriate support tailored to their unique circumstances.

3.8 Houseparents' Narratives of Challenges in Conducting Expressive Arts Therapy

Challenges of Group Therapy vs. One-on-One Sessions

A central theme in these responses is the challenge of managing group sessions, particularly when working with children who have varying needs and behaviors. The respondents emphasize that when children are grouped, especially those with different interests or behavioral needs, it becomes difficult for the facilitator to give adequate attention to each child. Several participants suggested that one-on-one sessions would be more effective because they allow the therapist to focus on each child's individual needs. The idea that managing multiple children in a group can be distracting, both for the facilitator and the children, is a recurring concern. This aligns with the broader theme of personalization in therapy—highlighting how individualized attention can better support a child's development.

Differentiation of Children's Needs

The feedback highlights the varying levels of engagement and interests among children, which impact their participation in activities. For example, some children are more drawn to drawing or visual activities, while others are more interested in singing, rhymes, or numbers. This suggests that one of the strengths of expressive arts therapy is its ability to adapt to various interests and needs. However, it also highlights the challenge of addressing these diverse needs simultaneously in a group setting. The variation in children's interests and engagement levels is key to understanding the importance of tailoring therapeutic activities to the individual.

Attention Management and Focus in Group Settings

Another emerging theme is difficulty maintaining focus and managing children's attention during group activities. When children are involved in activities, it is easy for some to get distracted or disengaged, especially when multiple children have different attention spans or interests. HSP02 notes that, on the first day of activities, the facilitator had to divide her attention between the children, resulting in distractions and disrupted sessions. This is a practical challenge in group therapy, suggesting that the session structure and activity type must align with the attention spans and interests of the children involved.

Behavioral Challenges and Distractions

The feedback often highlights how confident children exhibit challenging behaviors, such as Child 1, who was described as "disturbing" or disengaged. These behaviors can disrupt the session flow and hinder the effective implementation of therapy. It suggests that one of the limitations of group expressive arts therapy is dealing with children who may not be motivated or exhibit behaviors that interfere with the therapeutic process. This theme is tied to the idea that one-on-one sessions could be more effective in addressing these individual behavioral challenges without the distraction of other children.

Customization of Therapy Based on Individual Needs

A strong theme that emerges is the need to tailor therapy to each child's specific needs and interests. The desire for one-on-one therapy is rooted in the belief that it allows for more targeted interventions tailored to each child's specific needs at a given moment. For example, some children may need help with emotional expression, while others may benefit more from learning through drawing or music. Customizing therapy ensures that the child is engaged and supported in their emotional or behavioral development. This also underscores the broader principle that therapy should be tailored to each child's unique developmental stage, emotional state, and individual preferences.

Effective Facilitation and Therapist Adaptability

There is a recurring recognition that the success of expressive arts therapy depends not only on the children's engagement but also on the therapist's skill and adaptability. Several responses suggest that the therapist needs to be able to adjust the session according to the children's behavior and needs. For example, if a child is distracted or not participating, the therapist must be able to shift focus and engage that child in a way that works for them. This reflects the theme of how effective therapy requires the facilitator to be dynamic, responsive, and capable of managing diverse needs in a flexible manner.

4.0 Conclusion

Based on the findings, this study concludes that expressive arts therapy is a valuable intervention for addressing behavioral concerns such as borderline hyperactivity and peer difficulties among children in care settings. While many behaviors remain within normal ranges, targeted therapeutic approaches can further enhance emotional

expression and social interactions. The study highlights that expressive arts therapy supports emotional regulation, though its effectiveness varies among children, emphasizing the need for individualized interventions. The persistence of borderline behaviors in some areas suggests that continued support and adaptive strategies are necessary to maximize therapeutic benefits. Integrating additional group therapy sessions focused on peer relationship development could create a more supportive environment, fostering both emotional expression and social skills. The success of expressive arts therapy depends on structured implementation, active caregiver involvement, and individualized attention. Addressing group dynamics and improving therapist adaptability are crucial for optimizing outcomes. Insights from houseparents underscore the importance of ongoing training and support to ensure the effective integration of expressive arts therapy into the daily lives of vulnerable children. Future research should explore strategies to enhance responsiveness to therapy and refine interventions to meet the diverse needs of children in care.

5.0 Contributions of Authors

The author led the conception and design of the study, as well as the interpretation and analysis of results. The author also contributed to manuscript writing and revisions.

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7.0 Conflict of Interests

The author declares no conflicts of interest regarding the publication of this study.

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Enhancing Civic Literacy in Grade 6: Assessment and Strategic Interventions

Aldrin G. Mahilum[1*], Rachel Mae I. Deriada[2], & Marcel E. Baril[3]
[1]University of the Philippines-Cebu, Cebu City, Philippines
[2,3]Grade School Department, Sacred Heart School-Ateneo de Cebu, Mandaue City, Philippines

[*]Corresponding Author Email: agmahilum@up.edu.ph

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Abstract. Cultivating students to become critical, reflective, productive, and responsible members of society with a strong civic competence is the groundwork for forming nation builders. This research assesses the civic literacy of grade six Social Studies students in terms of personal responsibility, civic responsibility, leadership efficacy, civic thinking skills, civic participation skills, sense of community, and civic knowledge, and how do grade school teachers integrate civic literacy in their Social Studies lesson in a private basic education institution in Mandaue City, Philippines. Employing a mixed-method design, the study assesses 186 Grade 6 students' civic literacy across dimensions such as personal responsibility, civic responsibility, and leadership efficacy with a strong understanding of civic knowledge. While there are no significant differences in civic literacy based on sex or religion for most areas, leadership efficacy does show notable variation between Catholic and non-Catholic respondents. Additionally, integrating civic literacy in social studies lessons relies on real-life experiences in instruction, nurturing accountability and responsibility, contextualized learning, professional development, and resource utilization. The findings contribute to the existing literature by providing empirical data on the civic literacy levels of elementary students in the Philippine private school context while emphasizing the importance of culturally and contextually responsive pedagogies and highlighting actionable strategies for enhancing civic engagement at the basic education level.

Keywords: Civic education; Civic literacy; Leadership efficacy; Personal responsibility; Student engagement.

1.0 Introduction

The newly launched MATATAG Curriculum of the Department of Education highlights the primary objective of Social Studies discipline, that is to cultivate Filipino students to become critical, reflective, productive, and responsible members of society with a strong civic competence deeply rooted in a profound understanding of cultural identity and love for the country, while also possessing a global perspective and values related to social issues (2023). In the recently renewed mission of Sacred Heart School-Ateneo de Cebu, that is "*to nurture socially responsible innovators and transformational leaders…*" (Sacred Heart School-Ateneo de Cebu-Vision Mission 2023), civic literacy is a key foundation in its realization. A limited body of research assessing civic literacy among elementary students, particularly in private educational institutions, highlights the need for targeted instructional strategies.

Civic literacy is the ability to "let your life speak" by participating thoughtfully, responsibly, and passionately in the community's life with concern for the common good (Chi et al., 2006). The word "civic" is a Greek word that implies citizens of a city or an area. Therefore, civic education is that form of education, which is primarily

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designed and organized in content and function, to produce good and valuable people who know what events happen within the country and globally (Ukegbu & Anyaoha, 2014). It is a tool for releasing citizens from ignorance and providing them with the knowledge, abilities, political, economic, and social consciousness needed to support and preserve national consciousness. It also helps to enlighten, educate, and support each person's intellectual growth while instilling good values and patriotism (Nkechinyere, 2019).

Much of the existing research on youth civic engagement centers on high school, college, and young adult learners, with notable improvements in political knowledge and civic skills observed from ninth grade onwards (Andolina et al., 2003; Morgan & Streb, 2001; Perry & Katula, 2001). However, scholars increasingly recognize the elementary years as vital for laying the groundwork for civic knowledge, skills, and dispositions. Borysenko and Vysotska (2018) highlight that early grades present a critical window for fostering civic competencies, underscoring the need to establish age-appropriate expectations for students in civic knowledge, behaviors, and values.

More recent studies further underscore the importance of civic literacy at the elementary level. Gil and Domingo (2021) investigated how teachers assessed civic literacy during the COVID-19 pandemic and identified significant challenges, particularly in monitoring student progress and verifying the authenticity of student work. They advocated for more flexible and tech-integrated assessment tools better suited to remote learning contexts. Similarly, Enright et al. (2023) demonstrated how structured writing instruction on local civic issues can deepen students' understanding and engagement. Their study shows that integrating civics-specific writing helps develop young learners' skills in perspective-taking and communication. In another study, Willis, Baker, and Shulsky (2024) found that while future elementary teachers recognize the importance of civic literacy, many feel ill-equipped to integrate it effectively in the classroom, highlighting the need for improved civic education in teacher preparation programs.

At the global level, Schulz et al. (2025), in the IEA International Civic and Citizenship Education Study, provided comparative data on how 24 countries prepare students for citizenship. Their findings underscore the significance of national education policies and classroom practices in shaping students' civic knowledge, attitudes, and engagement. Complementing this perspective, Zakiah et al. (2023) examined how multicultural values are taught through civic education in elementary schools. Their research highlights the role of civic education in nurturing inclusive mindsets, appreciation of diversity, and cultural understanding—all essential components of civic competence.

To assess the civic outcomes in the elementary level, Chi (2006) patiently laid out the indicators and measures of civic outcomes at the elementary grades in a way that will stimulate reflection on the part of researchers and educators about appropriate directions in this area. Their framework highlighted the following components of civic literacy: Personal Responsibility (demonstrating responsible behaviors and work habits); Civic Responsibility (caring for others, valuing group work, caring for community, appreciating diversity and demonstrating environmental stewardship); Leadership Efficacy (demonstrating the attitudes and actions of taking leadership positions); Civic Thinking Skills (ability to think critically); Civic Participation Skills (skills in perspective taking, communication, group membership and conflict resolution); School as a Community (sense of community that exists within school); and Civic Knowledge (concepts and standards covered primarily in elementary grades).

At present, Sacred Heart School-Ateneo de Cebu has offered a Social Studies Curriculum at all levels of the grade school, as well as different multidisciplinary and interdisciplinary activities to reinforce civic consciousness and efficacy as engaged citizens of the Philippines. However, the absence of their impact assessment on the Grade School students calls for a systematic and thorough review. This study assesses the civic literacy among Grade 6 learners in Sacred Heart School-Ateneo de Cebu. Specifically, it aims to address the following: 1) the students' level of civic literacy in terms of personal responsibility, civic responsibility, leadership efficacy, civic thinking skills, civic participation skills, sense of community; and civic knowledge; 2) whether there is significant difference of learners' civic literacy in terms of sex and religion; 3) how grade school teachers integrate civic literacy in their Social Studies lesson; and 4) proposed interventions to increase the civic literary among grade school learners.

2.0 Methodology

2.1 Research Design

This study employed a mixed-methods design. The quantitative method was used to describe and interpret the current civic literacy of the grade school learners through a survey and a research-made multiple-choice test. On the other hand, the qualitative method was used to explore the strengths and limitations of civic literacy integration into the GS Social Studies curriculum to support the quantitative findings.

2.2 Research Participants

A complete enumeration of all the 186 Grade 6 learners in the Grade School of Sacred Heart School-Ateneo de Cebu Grade School Department was invited to answer the self-report survey and the researcher-made test to measure civic literacy. Grade 6 learners were chosen to be participants because the first year of the MATATAG Curriculum next year will include the Grade 7 level. Then, using purposive sampling, six GS Social Studies teachers will be invited for a Focus Group Discussion to identify how they interpret civic literacy in the GS Social Studies curriculum.

2.3 Research Instrument

This study utilized three instruments. First, the Civic Outcomes and Measures Scale, which was completely adapted from Chi et al. (2006). Second, a researcher-made Test to measure Civic Knowledge, which was validated by three experts—one in Social Studies content, one in Assessment, and one in the Research process. Third, a researcher-made Questionnaire for the Focus Group Discussion, which was also validated by the same experts.

2.4 Data Gathering Procedure

Parental consent was obtained before student participation, in adherence to ethical research standards. Details on the study procedure, nature of voluntary participation, risks and benefits, and statement of confidentiality were discussed with both the parents and student respondents before conducting the research. Then, they were asked to answer the adopted Civic Outcomes and Measures Scale by Chi et.al. (2006) and the researcher-made test to measure Civic Knowledge. The quantitative data were then analyzed to identify significant findings to be explored through focus group discussions with the Social Studies teachers.

2.5 Statistical/Data Treatment:

The quantitative data were tabulated and analyzed to describe the participants' civic literacy. At the same time, an independent T-test will be used to identify whether or not there is a significant difference between male and female enrolled students in their civic literacy. The Jamovi software was used to interpret the quantitative results. Also, a thematic analysis of the qualitative data was conducted on the answers in the focus group discussion with the Social Studies teachers.

3.0 Results and Discussion

The 186 student participants from Grade 6 were all identified as members of Generation Alpha, with an age bracket of ten to thirteen years old. They were categorized according to their sex and religion. In terms of sex, 47.8% of them were female, while 52.2% were male, showing a more or less equal percentage at present after the school became co-educational in and started accepting girls from being Sacred Heart School-Boys in 1998 (SHS-AdC history). Regarding religion, most are Roman Catholics, with 89.8%, and only 10.2% are non-Catholics. Sacred Heart School-Ateneo de Cebu is a Catholic school, placing a premium on forming students to be Christ-centered. However, its gates are also open for non-Catholic enrollees and communities.

3.1 Civil Literacy

Personal Responsibility

According to Chi (2006), personal responsibility is one of the components of civic literacy, which refers to demonstrating one's responsible behaviors and work habits. It encompasses moral and conventional aspects of personal responsibility. The data from Table 1 highlights the respondents' levels of Personal Responsibility across various indicators. Highly observed behaviors include always trying to do their best work, attempting to improve after a poor performance, and believing in the importance of rule-following, indicating a strong consensus on these values. Other behaviors, such as fixing something when broken, putting things away after use, and following

rules even when unobserved, are occasionally observed. The least frequently observed behavior is usually doing what one is supposed to do, reflecting a more neutral stance.

Table 1. *Respondents' Level of Personal Responsibility*

Indicators	Mean	sd	Interpretation
1. If I break something, I try to fix it.	4.07	0.89	Occasionally Observed
12. I usually do what I am supposed to do.	3.50	0.99	Neutral
19. It is important for me to follow the rules even if no one is watching.	4.00	1.00	Occasionally Observed
22. I put things away when I am done with them.	3.75	1.07	Occasionally Observed
25. I always try to do my best work.	4.32	0.90	Highly Observed
31. If I do not do a good job, I try to do better the next time.	4.28	0.88	Highly Observed
38. I think it is important for people to follow the rules.	4.39	0.86	Highly Observed

These results suggest that while there is a unified agreement on the importance of personal responsibility, these behaviors vary among the respondents based on their actual demonstration. Factors such as individual differences, situational contexts, or the specific nature of the responsibility in question can explain these. Wanabuliandari et al. (2021) conducted a study where the personal responsibility levels of elementary school students were analyzed and discovered that many students demonstrated low levels of self-responsibility, particularly during online learning periods. The research indicated that further reliance on technology, such as cell phones, diminished responsible behaviors, as students became less engaged with their peers and their educational environment. As emphasized in the study, teachers need to implement character education to promote positive values and strengthen students' sense of responsibility (Wanabuliandari et al., 2021).

Moreover, varied educational resources stress the significance of teaching personal responsibility in elementary education. For example, a blog post on HopSkipDrive frames strategies for teaching personal responsibility to elementary students, highlighting the role of modeling responsible behavior, setting clear expectations, and fostering an independent sense of responsibility. The article details that responsibility is not merely about obedience but involves self-initiated actions that reflect a child's desire to do the right thing (HopSkipDrive, 2023). Furthermore, the CIRCLE report on civic outcomes for elementary students underscores that personal responsibility is a crucial component of civic literacy. It claims that students should manifest responsible behavior by using good judgment, accepting responsibility for their actions, and showing initiative in problem-solving (CIRCLE, 2006). This blueprint illustrates the connection between personal responsibility and broader civic engagement, proposing that fostering responsibility in young students can lead to more engaged and conscientious citizens.

Civic Responsibility

According to Chi (2006), civic responsibility is another important component of civic literacy, which is defined as 'caring for others, valuing group work, caring for community, appreciating diversity, and demonstrating environmental stewardship. Table 2 reflects the levels of civic responsibility among the respondents, revealing a range of attitudes and behaviors related to civic engagement. The mean scores indicate that respondents generally exhibit a moderate level of civic responsibility, with several items categorized as "occasionally observed." Notably, the highest mean score is for the statement "I think it is important to change things that are unfair in society", suggesting a strong awareness of social justice issues among participants. Conversely, the lowest mean score is for "I try to get my friends to recycle bottles and cans", indicating a more neutral stance on environmental responsibility.

The role of educators in integrating social justice education into early elementary classrooms is highlighted by Kretz (2020), suggesting that when teachers address topics related to justice and injustice, students develop a greater understanding of these concepts. The natural inclination of young children to recognize fairness and injustice in their interactions, particularly in social settings like playgrounds, provides a foundation for this awareness (Edutopia, n.d.). Furthermore, engaging students in social justice activities, as outlined by Education World (2020), fosters their understanding of human rights and their responsibilities toward others, ultimately preparing them to become responsible global citizens. These insights indicate that when social justice topics are actively incorporated into the curriculum, elementary students can cultivate a heightened awareness of social issues and their implications.

In contrast, the neutral stance that elementary students often take regarding environmental responsibility can be attributed to several factors. While educators may successfully teach social justice concepts, environmental issues may not receive the same emphasis in the curriculum. The complexity of addressing multiple social issues can lead to challenges in incorporating environmental education, resulting in a less robust understanding among students, as noted by Kretz (2020). The American University (2023) also discusses the importance of culturally responsive teaching and its potential to empower students in addressing social justice issues. However, it suggests that environmental responsibility may be less prominent, contributing to students' neutral attitudes toward environmental actions. Education World (2020) further emphasizes the need for specific activities focused on environmental justice; without these, students may lack the motivation to engage actively in environmental responsibility, leading to a more indifferent stance.

Table 2. *Respondents' Level of Civic Responsibility*

Indicators	Mean	sd	Interpretation
2. To solve most problems, I must learn to work with others.	3.58	1.03	Occasionally Observed
4. I want to help when I see someone in need.	3.97	0.94	Occasionally Observed
6. I try to be with my family and recycle at home.	3.56	1.02	Occasionally Observed
10. When I decide, I try to think about how others will be affected.	3.69	1.08	Occasionally Observed
11. I try to be kind to other people.	4.21	0.92	Occasionally Observed
14. I want to have friends who have different backgrounds from me.	3.22	1.13	Neutral
16. I can learn more from working on group projects than from working alone.	3.49	1.33	Occasionally Observed
17. I have a responsibility to help keep the community clean.	3.69	1.06	Occasionally Observed
20. I apologize when I hurt someone's feelings.	4.20	0.90	Occasionally Observed
23. I spend time on projects with other people to help the community.	3.34	1.10	Neutral
24. I like working with other people on group projects.	3.52	1.37	Occasionally Observed
27. I think it is important to change unfair things in society.	4.49	0.75	Highly Observed
37. I have done things to help people in my community.	3.61	0.98	Occasionally Observed
39. I try to get my friends to recycle bottles and cans.	3.14	1.28	Neutral
42. I believe that I can make a difference in my community.	3.37	1.21	Neutral
43. I can learn a lot from people with backgrounds and experiences that are different from mine.	3.97	1.02	Occasionally Observed
46. I want to help when I see someone having a problem.	3.99	0.95	Occasionally Observed
47. I do my part to help the environment.	3.63	1.06	Occasionally Observed

Leadership Efficacy

According to Chi (2006), leadership efficacy is another important component of civic literacy, defined as 'demonstrating the attitudes and actions of taking leadership positions'. Table 3 reveals the levels of leadership efficacy among respondents, showcasing a blend of confidence in various leadership skills. The highest mean score is associated with the statement "If I am the leader of a group, I make sure that everyone in the group feels important", indicating that respondents prioritize inclusivity and emotional intelligence in leadership roles. This aligns with contemporary leadership theories emphasizing fostering team cohesion and motivation through relational leadership (Oh, 2023; Loughead & Hardy, 2006). However, several items reflect a more neutral stance, particularly regarding organizational skills, as seen in the mean score: "I am pretty good at organizing a team of kids to do a project." This suggests that while students may grasp the theoretical aspects of leadership, they may lack the practical experience or confidence to implement these skills effectively.

Table 3. *Respondents' Level of Leadership Efficacy*

Indicators	Mean	sd	Interpretation
7. Once I know what needs to be done, I am good at planning how to do it.	3.58	1.15	Occasionally Observed
13. When I see something that needs to be done, I try to get my	3.37	1.22	Neutral
18. I am pretty good at organizing a team of kids to do a project.	3.20	1.27	Neutral
21. If I am a group leader, I make sure that everyone in the group feels important.	4.17	0.95	Occasionally Observed
28. I can stand up for what I think is right, even if my friends disagree.	3.81	1.04	Occasionally Observed
33. When I see something wrong, I try to change it.	3.81	0.99	Occasionally Observed

Additionally, the dataset highlights a moderate level of self-efficacy in moral leadership. This indicates that respondents are willing to advocate for their beliefs, even in challenging situations. However, the lower scores in planning and organizing emphasize the need for further development in these areas. To enhance leadership efficacy, educational programs should provide practical experiences that build students' confidence in planning,

organizing, and initiating group actions, equipping them with the necessary skills to become effective community leaders.

Civic Thinking Skills

According to Chi (2006), civic thinking skills are another important component of civic literacy, which is defined as 'the ability to think critically'. Table 4 presents the levels of civic thinking skills among respondents, indicating a generally positive attitude toward critical thinking and rational discourse vis-à-vis civic issues. The highest mean score is for the statement "I can give reasons for my opinions", signifying that respondents feel self-assured in articulating their viewpoints and granting justifications for their beliefs. This skill is vital for meaningful civic engagement, as it encourages individuals to participate in discussions based on evidence and rationale. Additionally, the high mean score for the statement "I need to get information to support my opinions" specifies an awareness of the value of credible information in shaping their views, which is crucial for informed citizenship.

However, the slightly lower score for "I keep my mind open to different ideas when making a decision" recommends that while respondents are willing to gather data and articulate their opinions, they may struggle with fully embracing varied perspectives. This could indicate an inclination toward confirmation bias, where individuals prioritize information that aligns with their beliefs. Overall, while respondents establish a solid foundation in reasoning and information gathering, there is an opportunity for development in cultivating open-mindedness and engaging with myriad ideas. Educational programs to enhance civic thinking should promote critical analysis and respectful dialogue to equip individuals better to navigate complex civic issues and contribute positively to their communities.

Table 4. *Respondents' Level of Civic Thinking Skills*

Indicators	Mean	sd	Interpretation
5. I need to get information to support my opinions.	3.89	1.01	Occasionally Observed
29. I can give reasons for my opinions.	4.01	1.01	Occasionally Observed
30. I keep my mind open to different ideas when deciding.	3.83	0.95	Occasionally Observed

Civic Participation Skills

According to Chi (2006), civic participation skills is another important component of civic literacy which is defined as 'skills in perspective taking, communication, group membership and conflict resolution'. Table 5 presents the levels of civic participation skills among respondents (n=186), highlighting their abilities to engage effectively in social interactions and community involvement. The dataset indicates a generally moderate level of civic participation skills, with mean scores reflecting a mix of occasional observations and neutral responses across various statements. The highest mean score is for the statement "If a friend is mad at me, I try to understand why", suggesting that respondents recognize the importance of empathy and understanding in their interactions. This aligns with the notion that civic participation is not only about active engagement in community activities but also involves interpersonal skills that foster constructive dialogue and conflict resolution (Whitacre, n.d.).

Table 5. *Respondents' Level of Civic Participation Skills*

Indicators	Mean	sd	Interpretation
3. I try to think about how someone else would feel before I say something.	3.51	1.15	Occasionally Observed
8. If friends are fighting, I try to get them to talk to each other and stop fighting.	3.46	1.25	Neutral
9. I try to think before I say something.	3.43	1.11	Neutral
36. I summarize what another person said to ensure I understood.	3.74	1.05	Occasionally Observed
40. If a friend is mad at me, I try to understand why.	4.06	1.13	Occasionally Observed
41. I watch other people's body language to help me understand what they are trying to say.	3.90	1.14	Occasionally Observed
44. When I play with others, I take turns.	3.94	0.96	Occasionally Observed
45. I know how to avoid a fight when I need to.	3.91	1.15	Occasionally Observed
48. I ensure I understand what another person is saying before responding.	3.78	1.08	Occasionally Observed
49. When listening to someone, I try to understand their feelings.	4.03	1.04	Occasionally Observed

However, several items reflect more neutral responses, such as "If friends are fighting, I try to get them to talk to each other and stop fighting" and "I try to think before I say something". These scores indicate that respondents may not consistently apply the skills of meditation and thoughtful communication in practice, another important component of civic literacy, even if they acknowledge them. The relatively lower scores for statements related to

proactive conflict resolution and communication suggest potential areas for development in civic education. Research indicates that civic skills, including empathy, active listening, and conflict resolution, are crucial for effective civic engagement and participation (Kirlin, 2003). Therefore, educational programs should enhance these skills to empower students to engage more fully in their communities, fostering a sense of agency and responsibility essential for democratic participation (Perry & Katula, 2001).

Sense of Community

According to Chi (2006), civic participation skills are another important component of civic literacy, which was adapted from a much longer scale created by the Developmental Studies Center used to assess the sense of community within a school. Table 6 presents respondents' sense of community levels, revealing insights into students' perceptions of their school environment and interpersonal relationships. The dataset indicates a concerning trend, particularly highlighted by the low mean score for the statement "Most students at this school treat each other with respect," which falls into the "rarely observed" category. This suggests that many students may not feel that respect is a prevalent value within their school community. The importance of respect in fostering a favorable school climate is well-documented; research indicates that a respectful environment enhances student engagement and academic performance (Bryk & Driscoll, 1988). Conversely, the higher mean score for "Teachers at this school will not let students make fun of other students" indicates that while teachers actively create a supportive environment, the overall student culture may still lack mutual respect.

Table 1.6. *Respondents' Level of Sense of Community*

Indicators	Mean	sd	Interpretation
15. Most students at this school treat each other with respect.	2.68	1.16	Rarely Observed
26. Most students seem to care about each other, even people they do not know well.	3.22	1.18	Neutral
32. Teachers at this school will not let students make fun of other students.	3.96	1.12	Occasionally Observed
34. Students can debate and discuss issues in this school.	3.72	1.10	Occasionally Observed
35. Students feel like they are an important part of this school.	3.55	1.10	Occasionally Observed
50. Students can talk to the teachers in this school about this	3.44	1.35	Neutral

The dataset also reveals mixed perceptions regarding care and belonging among students. The statement "Most students seem to care about each other, even people they do not know well" received a neutral mean score, suggesting that while some students may feel a sense of care, it is not universally experienced. This aligns with findings from the literature that emphasize the role of community involvement in enhancing students' feelings of belonging and support (ThoughtExchange, 2022). Additionally, the mean scores for statements such as "Students feel like they are an important part of this school" and "Students can talk to the teachers in this school about things" further illustrate that while there are opportunities for student-teacher interaction, the sense of belonging and community is not as strong as it could be.

Civic Knowledge

Civic knowledge is also an important component in civic literacy, which focuses on the concepts and standards primarily at the elementary level. Table 7 reveals the respondents' civic knowledge wherein, in this case, the mean score is 8.86 with an SD of 1.28, which would place them within the "Advanced" level of performance according to the SHS-AdC's Levels of Proficiency. This score signifies that participants have a good knowledge of the main ideas of civics, which implies that these are indeed very knowledgeable youth about civic matters, one of the essential ingredients for democratic participation. Moreover, civic knowledge encompasses understanding political systems, rights, and responsibilities, how government works — all very important precursors of informed citizenship (TorneyPurta et al., 2001). Such a progressive categorization also reflects the ability of the respondents to apply their knowledge in real-life situations, a central component of civic engagement.

This is a high level of civic knowledge, as evidenced by this dataset, which agrees with several studies on the importance of civic education in building a properly informed and involved citizen. Other studies have found that students exposed to comprehensive civic education tended to record high civic knowledge and engagement (Gómez & Suárez, 2023). Moreover, civic knowledge is commonly followed by several positive indices such as increased political participation and greater civic responsibility (Kirlin, 2003). This is a responsibility to keep citizens up to date with civic knowledge. However, despite the generally exemplary trend, there are numerous demographics and educational settings where civic knowledge can take different turns. Further research should be done to examine how the acquisition of civic knowledge is influenced by socio-economic status, school climate,

and teaching methodology. In light of this, educators and policymakers may better tailor civic learning programs to build civic knowledge and engagement across diverse student populations.

Table 7. *Respondents' Level of Civic Knowledge*

	N	Mean	SD	Transmuted Grade	Level of Performance
Civil Knowledge	185	8.86	1.28	92	Advanced

Based on SHS-AdC's Level of Proficiency

95 – 100	*Excellent*
90-94	*Advanced*
85-89	*Proficient*
80-84	*Developing*
75-79	*Beginning*
Below 75	*Needs Improvement*

3.2 Relationship between Civil Knowledge and Students' Profile

Table 8 presents the results of the Mann-Whitney U test, which evaluates differences in civic literacy between male and female respondents across various dimensions, including personal responsibility, civic responsibility, leadership efficacy, civic thinking skills, civic participation, sense of community, and civic knowledge. The results indicate no statistically significant differences between the sexes in most areas, with p-values exceeding the 0.05 threshold for personal responsibility, civic responsibility, leadership efficacy, civic thinking skills, civic participation, and sense of community. However, a significant difference is observed in civic knowledge, with a p-value of 0.001, suggesting that gender may influence this dimension. These findings align with previous research indicating that while gender does not significantly affect overall civic engagement and literacy, it may play a role in specific areas such as civic knowledge, highlighting the need for targeted educational strategies to address these differences and promote equitable civic literacy among all students.

Table 8. *Mann-Whitney U (Nonparametric) Test on Respondents' Civic Literacy in terms of Sex*

	Statistic	P-value
Personal Responsibility	4208	.431
Civic Responsibility	4080	.702
Leadership Efficacy	4068	.714
Civic Thinking Skills	3888	.857
Civic Participation	3809	.899
Sense Of Community	3509	.896
Civic Knowledge	3174	**.001**

Note. H_a $\mu_{Female} < \mu_{Male}$

Table 9 presents the results of the Mann-Whitney U test, which examines differences in civic literacy between Catholic and non-Catholic respondents across various dimensions. The analysis indicates that religion does not significantly influence most aspects of civic literacy, as evidenced by p-values exceeding the 0.05 significance level for personal responsibility, civic responsibility, civic thinking skills, civic participation, sense of community, and civic knowledge. However, a significant difference is observed in leadership efficacy, with a p-value of 0.040, suggesting that Catholic respondents may demonstrate higher leadership skills. This finding aligns with research indicating that religious involvement can foster leadership qualities, such as moral reasoning and community engagement. While religion may impact leadership efficacy, it does not significantly affect other dimensions of civic literacy, highlighting the multifaceted nature of civic engagement shaped by various individual and social factors (Dik et al., 2014; Putnam & Campbell, 2010).

Table 9. *Mann-Whitney U (Nonparametric) Test on Respondents' Civic Literacy in terms of Religion*

	Statistic	P-value
Personal Responsibility	1517	.608
Civic Responsibility	1395	.206
Leadership Efficacy	1191	**.040**
Civic Thinking Skills	1359	.159
Civic Participation	1468	.691
Sense Of Community	1482	.333
Civic Knowledge	1341	.791

Note. H_a $\mu_{Catholic} > \mu_{Non\text{-}Catholic}$

Research on the relationship between religious affiliation and leadership efficacy has yielded mixed findings. Some studies suggest that religion shapes leadership practices, while others report minimal differences. For example, Hage and Posner (2015) found that religious affiliation and religiosity significantly impacted leadership behaviors, with religion having a greater influence than the degree of religiosity. Zakiah et al. (2023) highlighted that Catholic school leaders often integrate Gospel values, which shape their leadership approach compared to secular or faith-based schools. However, Savior (2014) found that institutional affiliation had little impact on leadership practices or perceived effectiveness among university presidents, although leaders at religious institutions demonstrated a more substantial commitment to their institution's mission and values. In other words, religious affiliation can shape leadership behaviors and perceptions, though the extent and nature of this influence may differ across settings.

3.3 Integration of Civic Literacy in Social Studies Lessons

Based on the discussion of the quantitative datasets and the FGD results with six grade school Social Studies teachers, the following themes emerged:

Real-Life Experiences in Instruction

The quantitative results indicate that students exhibit varying levels of civic literacy, particularly in civic knowledge. Educators can capitalize on this strength by embedding real-life experiences into lessons, enhancing students' understanding and application of civic concepts in their daily lives. Teachers emphasize the importance of relating civic literacy to real-life situations. For instance, Participants 2 and 5 highlight their practice of using reflection questions and real-life scenarios in assessments to make civic concepts accessible to younger students.

"I make sure that my examples are related to real-life situations based on their level," indicating the need for age-appropriate contextualization of civic concepts." (Participant 2)

"Providing contextualized examples would push students to reflect on it and develop their civic consciousness," showcasing how real-life examples can stimulate critical thinking and engagement." (Participant 5)

According to research, integrating complex texts and real-life scenarios into civic education significantly strengthens students' engagement and comprehension. For instance, students navigate civic issues effectively, fostering their ability to gather information from diverse sources, including news media, through scaffolded reading instruction, which is crucial for informed civic participation (Allen, 2016).

Nurturing Accountability and Responsibility

The study results show students' solid understanding of civic knowledge, which can be leveraged in fostering accountability. Educators can cultivate a sense of civic duty and engagement by discussing relevant societal issues and encouraging students to reflect on their responsibilities. Cultivating a sense of accountability is crucial for developing responsible citizens. Teachers raise a concern about students not relating to social issues, hindering their ability to participate in myriad civic responsibilities. For example, Participant 5 accounts that some students *"have not experienced any difficulty in life,"* resulting in a lack of awareness about societal issues. This highlights the need for educators to create opportunities for students to understand and empathize with diverse experiences. Participant 3 emphasizes the importance of engaging students with current societal issues, stating:

"I already started engaging with the different societies' issues and what was happening in the present times." (Participant 3)

Civic literacy empowers students to actively participate in their communities and understand their civic responsibilities. Students can engage in community organizing and advocate for social justice by nurturing civic consciousness. This aligns with the teachers' efforts to instill a sense of responsibility and obligation in their students through relevant civic education.

Contextualized Learning

The quantitative results show that students struggle with civic thinking and participation skills. Teachers can enhance students' understanding and engagement by contextualizing lessons around local and current issues, making civic education more applicable and meaningful. Contextualized learning is essential for making civic education relevant. Teachers face challenges localizing content and addressing students' limited exposure to broader societal issues. However, they recognize the value of integrating current events and community issues into lessons. Participant 2 articulates the challenge of engaging students with social issues beyond their immediate experiences, stating, *"Even if some students are aware of these issues, a lack of direct exposure frequently prevents them from fully understanding the consequences."* Participant 3 echoes this sentiment, expressing the difficulty in localizing context due to limited resources, emphasizing the need for more tailored materials that resonate with students' lives. Integrating civic education across various subjects can enhance students' critical thinking and engagement competencies. By embedding civic literacy within the curriculum, educators can encourage discussions on social issues and promote student-led projects that address community needs (Mirra, 2014). This approach makes civic education more applicable and fosters a deeper understanding of societal issues.

Professional Development and Resource Utilization

While the study indicates that students possess a strong understanding of civic knowledge, the challenges in critical thinking skills point to a need for improved instructional strategies. Professional development opportunities can provide teachers with innovative methods to engage students and enhance their civic literacy. Professional development is crucial for equipping teachers with the skills and resources necessary to teach civic literacy effectively. Teachers desire more training and resources to help them integrate civic concepts into their lessons. Participant 1 shares her commitment to professional growth by pursuing a master's degree, stating:

"With this, I can get to learn more teaching strategies which can help me to impart the lesson effectively." (Participant 1)

Participant 2 highlights the importance of online resources and seminars for enhancing teaching practices, suggesting that *"a seminar for teachers like me as a beginner would be a great help."*

Integrating civic literacy skills into the curriculum can alleviate the pressure on teachers by framing civic education as an overarching purpose rather than an additional subject. This perspective allows for incorporating civic learning into existing literacy instruction, making it more manageable for educators (Mirra, 2014). Furthermore, structured exposure to media literacy education can provide the necessary scaffolding for students to engage in civic activities effectively (Cohen & Kahne, 2012).

4.0 Conclusion

Based on the findings and discussion presented, it is concluded that the grade six students exhibit varying levels of civic literacy across dimensions such as personal responsibility, civic responsibility, and leadership efficacy, with a strong understanding of civic knowledge. While there are no significant differences in civic literacy based on sex or religion for most areas, leadership efficacy does show notable variation between Catholic and non-Catholic respondents. Additionally, the integration of civic literacy in social studies lessons relies on real-life experiences in instruction, nurturing accountability and responsibility, contextualized learning, and professional development and resource utilization. This study recommends that social studies educators 1) adopt contextualized teaching methods that link civic concepts to students' lived experiences; 2) integrate a comprehensive civic literacy curriculum into lessons, 3) emphasize critical thinking skills and leadership efficacy; 4) encourage students to actively participate in community service projects and local governance, providing opportunities to apply civic knowledge in practical settings; and 5) regularly assess students' civic literacy development and adapt teaching strategies to address identified gaps, ensuring all students are equipped with necessary skills for active citizenship.

5.0 Contributions of Authors

Author 1 (Aldrin G. Mahilum) – ideation, manuscript writing, supervising, data analysis; Author 2 (Rachel Mae I. Deriada) – writing, administering, transcribing, encoding, data analysis; Author 3 (Marcel E. Baril) – statistics, data analysis, writing and editing of the final manuscript based on the journal's standards.

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7.0 Conflict of Interests

The authors indicate that they have no conflict of interest.

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TeachTok: Enhancing Elementary Learners' Visual and Multimedia Literacy through TikTok as Mobile-assisted Language Learning Tool

Mary Cecille C. Arciaga
La Consolacion University Philippines, Malolos City, Philippines

Author Email: marycecille.arciaga@email.lcup.edu.ph

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Abstract. This study investigated the effect of integrating TikTok application into English language instruction through Mobile-assisted Language Learning (MALL). The researcher employed a mixed-methods technique utilizing an explanatory sequential design in two phases. By comparing learners' performance in pretest and posttest assessments, a researcher-developed instrument validated by experts was used. Additionally, a semi-structured interview was conducted with key informants to explore the affective, behavioral, and cognitive aspects of their experiences, further corroborating the quantitative findings. Through a purposive sampling technique and carrying out inclusion and exclusion criteria, eighty (80) grade 5 learners from an elementary public school in the Schools Division of Bulacan during the school year 2023 – 2024 were selected as participants. The research opted to utilize a two-group pretest-posttest design with experimental and control groups. Various statistical tools, such as the arithmetic mean and standard deviation, were used for descriptive analysis, and the t-test for Paired Samples was used for inferential statistics, which answered the research hypothesis. At the same time, the qualitative data were analyzed and interpreted through a thematic analysis approach. Results indicated a significant difference in learners' English language performance, as evidenced by the posttest scores. Utterances revealed positive changes in participants' attitudes, behavioral, and cognitive responses to the subject matter, highlighting the multifaceted benefits of incorporating TikTok in educational contexts. This study contributed to the growing body of research on TikTok and MALL offering Teach instructional framework aiming to leverage contemporary digital tools to enhance English language learning outcomes.

Keywords: TeachTok; Visual; Multimedia literacy; TikTok; MALL.

1.0 Introduction

Technology in the globalized era offers numerous advantages, significantly enhancing education and learning. It aids teachers in imparting knowledge and students acquiring it, making teaching and learning more engaging and enjoyable (Ellitan, 2020; Tuma, 2021). Integrating technology in classrooms has positively transformed the educational experience, introducing a new and widely embraced concept of learning (Inderawati et al., 2019). Furthermore, ICTs (Information and Communication Technologies) have revolutionized daily life by improving work conditions, information exchange, teaching methods, and research practices (Ratheeswari, 2018). Technology continues to shape and improve various aspects of human life, particularly education.

The rise of digital technology has shifted knowledge sharing and literacy from print-based to internet-based formats, introducing new literacy practices (Silvhiany, 2019). The abundance of online platforms requires

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individuals to develop critical thinking skills to evaluate their functions and implications (Silvhiany et al., 2021). In the digital age, literacy extends beyond traditional reading and writing, including navigating and critically assessing online content. In the era of innovation, English Language Education (ELE) has evolved significantly with the integration of Web 2.0 tools, fostering active and participatory learning through technology (Hu, 2022). The availability of online language resources has become crucial in complementing traditional materials, benefiting learners by enhancing language acquisition and emotional and social development in both formal and informal contexts (Benson, 2021; Sam & Shalini, 2021). However, informal learning remains challenging to define and assess, influenced by various factors, prompting scholars to focus on formal, classroom-based learning for generating new knowledge and promoting critical reflection (Heidari et al., 2021).

Social media, designed initially for communication, is increasingly used as an informal learning platform, offering diverse learning opportunities and enhancing education (Sobaih et al., 2020). This shift highlights its potential to encourage informal learning and transform how information is accessed. Social media engagement strategies are collaborative, purposeful, and dynamic, fostering active participation in learning activities (Bailey, 2021). It can also help users accomplish tasks or activities tailored to their needs. Social media is a widely used internet-based tool that enables individuals to share ideas and information through digital interaction (Cataldo et al., 2022). Platforms like Twitter, Instagram, YouTube, Facebook, Skype, and TikTok serve different communication roles across age groups. A 2021 survey found that YouTube and Facebook are popular among most American adults, while Instagram, TikTok, and Snapchat are more favored by younger adults under 30 (Anderson & Smith, 2021). There are age-related differences in platform preferences, with YouTube and Facebook being used by all age groups, while younger people gravitate toward Instagram, TikTok, and Snapchat.

Social media serves various purposes depending on user interests, including enhancing teaching and learning by facilitating knowledge sharing (Ahmad & Murad, 2020). Collaborative group work on social media helps students achieve their learning goals and boosts motivation (Manca, 2020). Social media is a valuable educational tool that provides up-to-date content, fosters engagement, and is accessible, participatory, and user-friendly (Erarslan, 2019). It also allows individuals to exchange information globally, making it an effective medium for learning. Social media apps are valuable for language acquisition and literacy development, enabling easy interaction and improving language skills (Pikhart & Botezart, 2021). They support various aspects of language learning, such as reading, pronunciation, vocabulary, speaking, writing, and listening, using features like online reading groups (Adebimpe & Rasidat, 2021). With the rise of mobile learning, especially during the COVID-19 pandemic, mobile apps have gained popularity for teaching and learning (Yuan et al., 2021). Mobile learning, defined as using mobile devices for learning anytime and anywhere (Criollo et al., 2021), has become essential in educational settings, where platforms like TikTok are shaping modern learning trends.

TikTok is a popular social networking platform, ranking second in global app downloads across Google Play and the Apple Store in 2019 (Sensor Tower Blog, 2020). Launched in 2016 by Zhang Yiming and owned by ByteDance, TikTok allows users to create and share short-form videos on various topics. Initially launched in China as Douyin, TikTok expanded internationally in 2017. In 2018, TikTok faced a temporary ban in Indonesia due to concerns over harmful content, but the app returned after a partnership with the Ministry of Women's Empowerment and Child Protection. TikTok's broad functionality and large user base make it a fun and engaging platform for learning. TikTok attracts a wide range of users, including children, teens, and adults, with 100 million users at its inception and videos reaching up to 1 billion people (Arkansyah et al., 2021). In Indonesia, some users became TikTok celebrities due to their viral videos. The platform engages users through Challenge programs, where individuals or groups complete tasks and challenge others to create videos. TikTok allows users to produce and share music videos, offering editing tools for near-professional results. The app's user-friendly interface and special effects make it easy for anyone to create engaging content, contributing to its popularity (Bhandari & Bimo, 2022).

Mobile-assisted Language Learning (MALL), which involves using mobile devices and technology to enhance foreign language learning in traditional classrooms, is emerging as a key area of research. This study is crucial for understanding the future of education, especially in the post-pandemic era (Shinas et al., 2022).

Mainland China has embraced technology-enhanced English Language Education (ELE) to improve national English proficiency and support its internationalization efforts in the digital era (Zeng, 2018). The rapid adoption of Web 2.0 platforms and the normalization of online learning due to the COVID-19 pandemic have made Mobile-assisted Language Learning (MALL) increasingly important (Paul & Liu, 2018; Rong & Abdullah, 2022). However, while MALL has gained attention, research has primarily focused on its impact on language proficiency, leaving a gap in exploring other effects and specific tools used in MALL (Chen & Jia, 2020; Li et al., 2022).

TikTok has emerged as a dynamic educational tool in the Philippines, leveraging its popularity among the youth to enhance learning outcomes. According to Cagas et al. (2022), the platform has proven effective in improving speaking and grammar skills among higher education students. Through creating and consuming short, engaging videos, learners develop linguistic competencies while enjoying a fun and interactive learning process. Similarly, Navera et al. (2024) emphasize that TikTok assignments, such as producing content aligned with curriculum objectives, foster creativity, critical thinking, active student engagement, and blending entertainment with education.

Moreover, the use of TikTok in the classroom extends beyond language learning. Quinto and Cho-oy (2022) argue that the app supports collaborative learning and enhances digital literacy by encouraging students to script, edit, and produce team content. Teachers also use TikTok to introduce complex concepts in simplified, visual formats, improving learners' comprehension and retention (Salasac & Lobo, 2022). These studies illustrate how TikTok is reshaping education in the Philippines, offering an innovative platform that bridges traditional teaching methods with the preferences of a digitally savvy generation.

The Philippines' poor performance in the 2022 Program for International Student Assessment (PISA) indicates that students in the country are approximately five to six years behind in learning abilities, according to the Department of Education (DepEd). The average PISA scores for participating countries were 472 in mathematics, 476 in reading, and 485 in science, while the Philippines scored significantly lower: 355 in math, 347 in reading, and 373 in science. The OECD notes that every 20 points below the average represents a one-year learning gap for 15-year-olds in PISA-participating countries.

According to Regional Memorandum No. 230, s. 2023, a fourth-quarter assessment was conducted in Kindergarten, Grades 1-10, and Senior High School core learning areas to measure student achievement. In the researcher's locality, the results revealed that the learning competency "Analyze how visual and multimedia elements contribute to the meaning of a text" was among the least learned. Out of 410 examinees, only 295 (72.18%) correctly answered questions related to this competency.

The Department of Education - Region 3 issued Regional Memorandum No. 502, s. 2022 outlines the "Guidelines on the Conduct of the 2022 Regional Diagnostic Assessment" for Grades 1-10 and Core Learning Areas in Grades 11-12. The objectives of the assessment are: (1) to determine the percentage of learners who met the minimum proficiency level in various learning areas; (2) to identify the most mastered and least learned competencies; (3) to use the results to enhance teaching skills through Learning Action Cell sessions; and (4) to create school intervention or remediation plans for addressing identified learning gaps, led by the School Head with support from Master Teachers (if applicable).

In compliance with Regional Memorandum No. 502, the researcher’s locale conducted the Regional Diagnostic Assessment (RDA) on September 13-14, 2024. The results showed that only 4 out of 399 exam takers (1%) achieved or exceeded the 60% minimum proficiency level (MPL). Specifically, in items 41-50 of the 50-item test, which focused on the competency "Analyze how visual and multimedia elements contribute to the meaning of a text," only 139 learners (35.11%) answered correctly. This indicates a significant gap in understanding this competency that needs immediate attention.

Studies suggest that TikTok can enhance students' engagement and motivation in language learning, improving communication skills. Chen et al. (2020) found that TikTok helped students improve English pronunciation, intonation, and rhythm. Similarly, Gao et al. (2020) observed improved speaking and listening skills, as TikTok provides real-world language materials. These findings highlight TikTok's positive impact on language

acquisition, suggesting it is a valuable tool for enhancing various language abilities, including speaking, listening, and pronunciation.

Several studies have shown that TikTok can help learners develop creativity and critical thinking skills. Chen and Chen (2020) found that TikTok allows students to create videos, fostering creativity and innovation. Saeed et al. (2020) suggested that TikTok encourages students to analyze and assess video language, enhancing their critical thinking abilities. These studies demonstrate TikTok's educational potential, showing that it can be used beyond its role as a social media platform to promote creativity and critical thinking in various educational contexts.

Affini (2020) found that 86.36% of students reported that TikTok was beneficial for learning descriptive text, suggesting its potential as an educational tool to improve learning competency. The study used mobile-assisted language learning, with students tasked with creating a one-minute video on TikTok as a performance task. This aligns with De Matta et al.'s (2023) study, which showed that TikTok can track language learning progress and motivate students to improve their English skills outside the classroom. Several studies highlight the growing importance of mobile applications, such as TikTok and Instagram, in enhancing language skills. Lee (2023) noted that these social media platforms have become essential in language teaching, offering dynamic and engaging features. However, few studies have explored using TikTok in second-language instruction (Yang, 2020). While research indicates that social media can positively impact language learning, there is limited exploration of newer platforms like TikTok. This gap presents an opportunity to investigate how TikTok can be used to practice literacy.

Building on prior research on social media for language practice, this study aimed to explore how learners use TikTok to express ideas inside and outside the classroom and their views on using mobile devices for literacy practice. The focus was narrowed to Douyin (TikTok) in ESL learning, as it is the most popular Web 2.0 application among Generation Z. The study follows an experimental approach, aiming to provide insights into how learners use TikTok for literacy and assist teachers in utilizing TikTok for the teaching and learning process by proposing an instructional framework based on the findings.

2.0 Methodology

2.1 Research Design

The study used a mixed-method approach, combining quantitative and qualitative methods to address the research objectives comprehensively. As defined by Chumney (2015), this approach involves collecting and analyzing both data types. The independent variable was the integration of Project TeachTok, using TikTok for English instruction, while the dependent variable was learners' academic performance in English. A pretest-posttest design was implemented with experimental and control groups to collect data. The experimental group used Project TeachTok, while the control group followed traditional teaching methods. Quantitative data were gathered through pretests and posttests and analyzed using statistical methods, including paired-sample and hypothesis testing. Qualitative data were obtained through semi-structured interviews with key informants and analyzed thematically to validate the quantitative findings.

The study followed a sequential explanatory design (Creswell, 2007), prioritizing quantitative data collection and analysis in the first phase and qualitative data in the second phase. The pretest/posttest assessed learners' competency in analyzing visual and multimedia elements of a text, covering topics on "Analyzing Visual Media Elements" and "Analyzing Texts Using Multimedia." The research spanned 11 sessions: one for the pretest, eight for Project TeachTok implementation, one for the posttest, and one for interviews. The eight sessions followed DepEd's Budget of Work for English 5, with the first topic covered in three sessions and the second in five, each lasting 50 minutes. The systematic approach ensured the study's validity and reliability, providing insights into the effectiveness of TikTok-integrated instruction.

2.2 Research Locale

This study took place in one of the public elementary schools in the Schools Division in the province of Bulacan. The inclusion of the school as the locale of the study was based on the following: (1) researcher's locality; (2) context of the baseline data; (3) participants' mobility and data accessibility; (4) ethical considerations for the vulnerable participants; (5) research feasibility; and (6) collaboration opportunities among school's internal and external stakeholders.

2.3 Research Participants

The study participants were 80 intermediate-level learners (40 males and 40 females) from a public elementary school in the Schools Division of Bulacan during the 2023–2024 school year, with ages ranging from 10 to 12 years. The learners, identified as bilingual in English and Filipino, faced difficulties in English-related learning activities, as shown by their low academic performance in previous quarters. The study focused on low-achieving learners who struggled more in English than other subjects. Specific inclusion criteria for Project TeachTok and subsequent interviews required participants to be Grade 5 students, identified as low achievers, and own smartphones capable of using TikTok. Learners who did not meet these criteria, including those in the control group or with high previous academic performance, were excluded.

From a population of 429 Grade 5 learners (221 males and 208 females) across 10 sections, 80 learners were purposively sampled—equally divided into experimental and control groups. This purposive sampling method, as described by Campbell et al. (2020) and Retchie (2023), enabled the researcher to deliberately select participants with the most relevant characteristics for the study, ensuring meaningful insights. Key considerations included access to smartphones for TikTok use and alignment with the study's focus on English performance. This targeted sampling strategy facilitated a manageable and in-depth investigation, enhancing the study's relevance and contribution to understanding primary education challenges in Bulacan during the 2023–2024 school year.

Table 1. *Respondents of the Study*

Public Elementary School	English Learners (N)	English Learners (n)	
		Experimental Group	Control Group
Male	221	20	20
Female	208	20	20
Total	**429**	**40**	**40**

2.4 Research Instrument

The study utilized tests and interviews to gather data and address the research questions. A pretest/posttest assessment tool evaluated learners' academic performance in English 5, measuring their progress and the impact of teaching activities.

Quantitative Instrument

The pretest assessed participants' prior knowledge before treatment using TikTok-based instructional materials. The treatment spanned eight sessions covering two topics: "Analyzing Visual Media Elements" (items 1-20) and "Analyze Texts Using Elements of Multimedia" (items 21-50). The posttest measured knowledge after the treatment, similar to the pretest but with shuffled questions. The 50 multiple-choice questions were sourced from validated self-learning modules used in the Schools Division of Bulacan. The assessment tool was validated by six experts, including Master Teachers and District Coordinators. Pilot testing with 30 non-participant learners yielded a Cronbach's Alpha of 0.81, indicating high reliability. Normality testing via the Kolmogorov-Smirnov One-Sample Test ($p < .001$) confirmed that the population data followed a Gaussian distribution, guiding the selection of the appropriate statistical test for analysis.

Qualitative Instrument

A semi-structured interview after the posttest assessed participants' attitudes toward learning English with TikTok, focusing on affective, behavioral, and cognitive aspects. Questions were adapted from Rahmawati and Anwar (2022). Each interview took 10–15 minutes per participant and provided insights into their learning experiences with mobile-assisted language learning.

Validators

Table 2 depicts the data outline of the professional profiles of individuals holding various positions within the educational context of Marilao North District, where the research was carried out. Each entry includes information on the position or area of specialization, educational qualifications, age, gender, and years of service of the individual. This structured format provides an overview of the diverse roles, qualifications, and demographic characteristics within the MND, highlighting a range of expertise from district leadership to English coordination and teaching roles. The data not only delineates their professional roles and educational attainment but also

underscores their collective experience in the field of education specifically in English as one of the learning areas in basic education, showing their qualification as validators of the pretest/posttest assessment tool, nonprint TeachTok materials, content analysis of the qualitative findings, and proposed instructional framework through their position and areas of specialization in DepEd throughout the years.

Table 2. *Profile of Validators*

Code	Position/Area of Specialization	Profile
PMV1	District English Adviser/Principal III	Have a master's degree, 54 years old, male, and 32 years in the Department of Education.
PMV2	Master-in-Charge of English/Master Teacher I	Have a master's degree, 46 years old, female, and 24 years in the Department of Education
PMV3	District English Coordinator/Teacher III	Have master's degree units, 34 years old, female, 11 years in the Department of Education
NPV1	District LRMDS Adviser/Principal III	Have doctorate degree units, 52 years old, female, and 30 years in the Department of Education.
NPV2	Master-in-Charge of LRMDS/Master Teacher I	Have doctorate degree units, 40 years old, female, 17 years in the Department of Education.
NPV3	District LRMDS Coordinator/Teacher III	Have a master's degree, 27 years old, female, and 6 years in the Department of Education
CAV1	District Research Coordinator/Master Teacher I	Have a doctorate degree, 36 years old, male, 11 years in the Department of Education, and 1 year in a local community college.
CAV2	Teacher III	Have a doctorate degree, 35 years old, female, and 12 years in the Department of Education.
CAV3	Teacher III	Have a doctorate degree, 33 years old, male, and 10 years in the Department of Education.

2.5 Data Gathering Procedure

The mode of gathering information was conducting pretest and posttest assessments of the study participants using printed questionnaires. The researcher followed these steps to collect data:

Quantitative Procedures

The pretest/posttest questionnaire underwent the process of validation to ensure that it was sufficient to assess the knowledge of the participants regarding English topics prior to the treatment. The researcher requested the Dean of Graduate Studies to provide a recommendation letter for applying the research review of ethical considerations under the LCUP's Research Ethics Committee. Upon securing approval from the REC, a permission letter was sent to the Schools Division Superintendent of Bulacan to request approval to conduct the study and request permission to distribute questionnaires to the participants. Also, the researcher asked for permission from the District Supervisor and the School Head of the participating school to conduct the study. With the approval of the institutional authorities, the researcher sought the approval of parents/legal guardians of the selected participants through consent and assent forms. With survey authorization, participants were advised that the information collected was handled privately and used solely for research purposes. The pretest was administered to the study participants with complete confidentiality and by ethical rules. The TikTok application integration was offered as an innovative treatment with the potential to generate beneficial knowledge and results. Following the treatment's implementation, participants were given a full explanation of the post-test procedures, emphasizing the necessity of their continuing involvement.

Qualitative Procedures

An email was sent to the author of the semi-structured interview questions to seek permission for the utilization to assess the attitude of the learners towards TikTok application integration through MALL to English classes. Finally, the researcher conducted the semi-structured interview with chosen key informants with the potential to validate the collected data from the assessments. The interview was audio-recorded with participants and their parents/legal guardians' permission to ensure that the research correctly captured the complexity of their remarks.

The researcher adhered to comprehensive procedures for data collection, security, storage, transfer, and destruction. Initially, assent forms were distributed and collected from the willing participants, with collected data encrypted and securely protected. Data were retained for 60-90 days or until all necessary information for statistical analysis was gathered, then transferred to offline storage. The personally identifiable information

collection was limited as per approved research protocols. Electronic data containing personally identifiable information was encrypted during transport on portable devices and transmitted via e-mail without third-party services, with caution exercised in public internet access. Remote access to such information is utilized VPN or encrypted desktops. Disclosure or dissemination of personally identifiable data only occurred with explicit approvals or legal requirements. Hardcopy information was securely stored in restricted-access institutional settings, while electronic data was stored on secure servers, with no storage outside such environments. Non-secure server or personal device storage employed encryption. Personally identifiable information was retained per La Consolacion University Philippines Graduate Studies policy, and securely destroyed after statistical submission. Decommissioned computers have all personally identifiable data removed securely. Furthermore, administered questionnaires were deleted after one week to ensure data security and confidentiality.

2.6 Ethical Considerations

The data collection procedure for this study was handled with the highest respect for the respondents' privacy. Permission to conduct the study in the DepEd Basic Education was obtained by formal correspondence with university authorities. Respondents/participants were informed about the study and asked for consent before participating. They were asked to sign written informed consent forms before participating in the survey, interview, and focus group discussion. To protect the confidentiality and privacy of the participants and responders to this study, the following procedures were followed: (1) any information acquired from the participation in this survey was anonymous, no one is identifiable since no name(s) are necessary for participation in this study, all identifying information was removed during the recording and interpretation processes, and only the researcher has access to the data and information obtained (2) participation in this study is optional; even if one decided to take the survey, he/she may withdraw at any moment, and no one should face any negative consequences for discontinuing participation as a responder; (3) any information one does not desire to share was closely monitored by the researcher; (4) during data collection, respondents/participants have the option to refrain from answering questions, and their request was granted and honored; and (5) all data received from informants was kept strictly secret. Furthermore, the researcher secured the participants' identity and rights in line with the Data Privacy Act of 2012.

3.0 Results and Discussion

3.1 Digital Literacy

Table 3 presents the control group's scores in terms of pretest (n=40). It can be gathered from the table that the group's mean score is 19.68, where 20 of the scores are higher than the mean, while 20 scores are lower than the mean. Also, the standard deviation of 7.95 indicates a moderate to high level of variability where the data points are away from the mean value. Data shows that elementary learners in the control group had a wide range of digital literacy abilities before introducing TikTok as an educational tool. The same proportion of scores above and below the mean and moderate to high variability suggests that the group's digital literacy was pretty diverse. This baseline data is critical for assessing the success of the TikTok-based educational intervention in future study phases.

Table 4 illustrates the mean scores obtained by the experimental group regarding the pretest (n=40). According to the table, the mean score of the experimental group is 19.45, where 23 scores are lower than the mean, while 17 scores are higher than the mean. Subsequently, the 7.11 standard deviation value means the individual scores varied significantly from the mean score. A higher standard deviation signifies that the scores are spread out over a broader range of values, reflecting diverse levels of digital literacy among the participants before the Project TeachTok intervention. The findings in Table 4 indicated that the experimental group, like the control group, had a wide range of digital literacy levels before the intervention. The slight variations in mean scores and score distribution served as the baseline for measuring the impact of using TikTok as an educational tool to improve digital literacy through mobile-assisted language learning. The similarity in pretest scores between the two groups contributes to a fair comparison when analyzing the intervention's success.

Table 5 demonstrates the mean score attained by the control group in terms of a post-test (n=40). It can be gleaned from the table that the group’s mean score is 21.83, with a standard deviation value of 5.11. This suggests that the individual scores are somewhat scattered, but they are closer to the mean than the pretest results, with a standard deviation of 7.95. The mean score increased from 19.68 (pretest) to 21.83 (posttest), indicating that the control

group's digital literacy improved during the research. This improvement might be attributable to overall learning and exposure over the research period, regardless of the specific TikTok intervention. The decrease in standard deviation from 7.95 (pretest) to 5.11 (posttest) indicated that the scores became more consistent and less dispersed. This might indicate that the learners' digital literacy abilities grew more consistent, possibly due to regular educational procedures or other variables impacting their learning environment. Table 6 shows the mean score acquired by the experimental group in terms of post-test (n=40). According to the table, the group obtained a mean score and standard deviation (37.70, 5.11), respectively.

Table 3. *Pretest Mean Score of Control Group*

N	Mean	SD
40	19.68	7.95

Table 4. *Pretest Mean Score of Experimental Group*

N	Mean	SD
40	19.45	7.11

Table 5. *Posttest Mean Score of Control Group*

N	Mean	SD
40	21.83	5.11

Table 6. *Posttest Mean Score of Experimental Group*

N	Mean	SD
40	37.70	5.11

The experimental group's mean score improved considerably, from 19.45 (pretest) to 37.70 (posttest). This significant improvement indicates that the use of TikTok as an educational tool had a significant beneficial influence on the learners' digital literacy. The standard deviation 5.11, corresponding to the control group's post-test results, suggests that the scores were uniformly distributed around the average. Despite the considerable rise in the mean score, the variability remained moderate, suggesting that the improvement was consistent across the board. The significant increase in mean score compared to the pretest and the control group's posttest mean score (21.83) demonstrates the usefulness of the TikTok-based educational tool. This showed that the experimental group gained much more from the intervention than the control group, which did not utilize TikTok.

Table 7 uncovers the difference between the pretest mean scores of control and experimental groups (n=80). According to the data, there is no significant difference between pretest mean scores of control and experimental groups, reflected in the t-value of .147 with the corresponding p-value of .884, which is higher than $\alpha = 0.05$. Thus, the null hypothesis is accepted.

Table 7. *Difference between the Pretest Mean Scores of Control and Experimental Groups*

Variable	t	df	p-value	Decision	Interpretation
Pretest of Control and Experimental Group	0.14	39	.884	Accept	There is no significant difference between the pretest scores of the learners in the control and experimental groups.

The lack of significant difference in pretest scores indicates that both groups started at a similar level of vocabulary knowledge. This is crucial for ensuring that any subsequent differences observed in posttest scores can be more confidently attributed to the intervention rather than pre-existing differences in digital literacy. Establishing that the groups were comparable at the start strengthens the validity of the study's findings. It ensures that the experimental group's performance improvements are attributed to the context clue teaching strategies rather than a prevailing method of teaching English.

Table 8 discloses the difference between the post-test mean scores of control and experimental groups (n=80). According to the table, it can be gathered that there is a significant difference between posttest mean scores of control and experimental groups, reflected in the t-value of -6.104 with the corresponding p-value of <.001, which is lower than $\alpha = 0.05$. Thus, as per the decision rule, the null hypothesis is rejected.

Table 8. *Difference between the Posttest Mean Scores of Control and Experimental Groups*

Variable	t	df	p-value	Decision	Interpretation
Posttest of Control and Experimental Group	-6.10	39	<.001	Accept	There is a significant difference between the post-test scores of the learners in the control and experimental groups.

The significant difference in posttest scores between the groups suggests that integrating Project TeachTok effectively enhances digital literacy among elementary learners. The experimental group, which received the intervention, showed substantial improvement in digital literacy compared to the control group, which did not receive the intervention. The use of TikTok and MALL as educational tools appears to be highly effective in improving digital literacy, indicating the potential of these tools to engage students and enhance their learning experiences. Enhancing digital literacy is crucial in today's technology-driven world, where a practical approach to achieving this goal using popular and accessible digital platforms is highly needed.

Table 9 unveils the difference between the control group's pretest and posttest mean scores (n=80). According to the data, it can be gathered that there is no significant difference between the pretest and posttest scores of the control group, reflected in the t-value of -1.582, with the corresponding p-value of .122, which is higher than α = 0.05. Thus, the null hypothesis is accepted. According to the statistics, the control group's digital literacy did not increase significantly between the pretest and the posttest. Score changes were insufficient to be declared statistically significant. The absence of substantial change in the control group suggested that the prevailing teaching method employed throughout the research period had little influence on improving the learners' digital literacy. This finding established an important benchmark for assessing the effectiveness of the TikTok intervention in the experimental group.

Table 9. *Difference between the Pretest and Posttest Mean Scores of the Control Group*

Variable	t	df	p-value	Decision	Interpretation
Pretest and Posttest of Control Group	-1.58	39	.122	Accept	There is no significant difference between the pretest and posttest scores of the learners in the control group.

Table 10 reveals the difference between the experimental group's pretest and posttest mean scores (n=80). It can be gleaned that there is a significant difference between the pretest and posttest scores of the experimental group, reflected in the t-value of -22.892, with the corresponding p-value of <.001, which is lower than α = 0.05. Thus, as per the decision rule, the null hypothesis is rejected.

Table 10. *Difference between the Pretest and Posttest Mean Scores of the Experimental Group*

Variable	t	df	p-value	Decision	Interpretation
Pretest and Posttest of Experimental Group	-22.89	39	<.001	Reject	There is a significant difference between the pretest and posttest scores of the learners in the experimental group.

The statistics indicated that the experimental group improved significantly in digital literacy from the pretest to the posttest. The large t-value emphasizes the magnitude of the improvement, which suggests that using TikTok as an educational tool significantly influenced the learners' digital literacy. This shows that the TikTok-based intervention improved elementary learners' digital literacy. Compared to the control group, which showed no significant change (as shown in Table 6), the experimental group's considerable improvement demonstrated the added benefit of the TikTok intervention. This illustrates that adopting TikTok as an educational tool can result in significant advances in digital literacy, as opposed to the control group's prevailing teaching method.

This is parallel to the results of the study by Rahmawati and Anwar (2022) which revealed that the improvement percentage of 95% means that the TikTok application effectively affected students' learning outcomes and based on the interview results, the participants showed positive attitudes toward learning English through the TikTok application which is further conforms by the result of the study of Tanza (2022) which showed that based on

participants' perspective and experience, the finding of this study revealed that utilization of Tik-Tok has a positive impact on literacy and language practices beyond the classroom.

Meanwhile, it is noteworthy that the findings of the study oppose the result of the study of Hu and Du (2022) which stated that its quantitative results demonstrated that MALL, where TikTok was used to supplement classroom-based teaching, did not exert the profound effects on language learning as suggested by qualitative participants and in previous literature, and that learners were less motivated for English learning and communication. While the literature on TikTok's effectiveness in educational contexts offers differing perspectives, this study's findings provide compelling evidence supporting its potential as a valuable tool for enriching digital literacy and language learning experiences in elementary education. Using TikTok's distinctive features, teachers may build engaging and dynamic learning environments that cater to young learners' different needs and preferences, promoting their growth and development in the digital age.

3.2 Qualitative Findings

One prominent theme from the responses was Happiness from Learning. The participants expressed their delight and happiness with the TikTok application as a novel technique for learning English. Despite staying home, kids were content because they could continue learning. Learning English using this platform made learners happy since it helped them improve their language abilities with the simple mobile app usage. The usage of technology in the classroom has made the process of teaching and learning more fun (Tuma, 2021). They emphasized their good emotions and how utilizing TikTok as a learning tool enhanced their attitude. As one informant noted, "*Ang pakiramdam ko po ay masaya dahil kahit ikaw ay nasa iyong tahanan, ikaw ay matututo*" which translates to "*I feel happy because even if you are in your home, you will learn*".

Table 12. *Matrix of Informants' Responses in Terms of Affective*

	Questions	Informants' Responses	Themes
1.	How do you feel after getting a new strategy to learn English through the TikTok application? *[Ano ang pakiramdam mo pagkatapos makakuha ng bagong pamamaraan upang matuto ng Ingles sa pamamagitan ng TikTok application?]*	B1: "Ang pakiramdam ko po ay masaya dahil kahit ikaw ay nasa iyong tahanan, ikaw ay matututo." B2: "Masaya po, dahil po natututo po ako gumamit ng English kahit ang gamit ko lang po ay *application*." B3: "Naging masaya ang aking pakiramdam dahil sa pamamagitan ng TikTok *application* ay natututo ako ng English."	Happiness from Learning
2.	Do you feel proud to be able to learn English through watching videos on the TikTok application? Why or why not? *[Ipinagmamalaki mo ba na natututo ka ng Ingles sa pamamagitan ng panonood ng mga videos sa TikTok application? Bakit o bakit hindi?]*	B1: "Ipinagmamalaki ko po na natututo ako gamit ang TikTok *app* dahil hindi lahat ng bata ay nagkakaroon o merong *gadget* na nakakapag *download* ng TikTok *app*" G1: "Opo, ipinagmamalaki ko po na natututo ako sa mga pinapanoud ko po na TikTok *videos*"	Pride in Learning through TikTok
3.	Do you feel excited to come to class when English is taught using the TikTok application? Why or Why not? *[Nasasabik ka bang pumasok sa klase kapag ang Ingles ay itinuro gamit ang TikTok application? Bakit o bakit hindi?]*	G1: "Opo, excited po akong pumasok lalo na po kung ang English *subject* po is napapalitan ng araling pang TikTok po" G2: "Ako po ay *excited* na mag-aral ng English dahil bukod po sa ang English po ang paborito kong *subject*, ang paggamit din po ng TikTok *app* ay masaya."	Excitement for Learning English

Another theme that emerged is the Pride in Learning English through TikTok. Participants were proud of their capacity to learn English by viewing videos on the TikTok program. They underlined their importance on learning successes through this novel technique, emphasizing a sense of satisfaction in acquiring English using a current and accessible platform such as TikTok. According to Silwal (2021), TikTok's short-form video format offers pupils a unique chance to engage in real language use. As one respondent stated, "*Ipinagmamalaki ko po na natututo ako gamit ang TikTok app dahil hindi lahat ng bata ay nagkakaroon o merong gadget na nakakapagdownload ng TikTok app*"

which translates to "*I am proud that I learn using the TikTok app because not all children have a gadget that can download the TikTok app*".

The third theme, Excitement for Learning English, underscored how ICT enhances teaching and learning. Using the TikTok app, participants showed their pleasure in attending English-language sessions. Ferstephanie and Pratiwi (2021) show that the use of TikTok in classrooms is effective in improving learners' motivation to speak English due to the online resources' interactive, innovative, and enjoyable features. They cited their interest in English and the participatory aspect of TikTok-based learning as reasons for their eagerness to attend the lessons. As one informant highlighted, "*Ako po ay excited na mag-aral ng English dahil bukod po sa ang English po ang paborito kong subject, ang paggamit din po ng TikTok app ay masaya*" which translates to "*I am excited to learn English because not only English being my favorite subject, using the TikTok app is also fun*".

Ease of Use is one of the prominent themes that emerged regarding behavioral aspects. Participants discussed their experiences using the TikTok app to improve English with different preferences for friends and teachers. According to Khazaei et al. (2021), TikTok may be used as a tool for learner-centered training, allowing students to take command of their learning process and progress their language abilities at their own pace. Overall, participants appear to use TikTok mostly for self-study, although they recognize its importance in improving their English abilities, whether or not with direct engagement with peers or teachers. As one informant mentioned, "*madalas ko rin po ginagamit ang app na TikTok nadadalian po akong gamitin at madali rin po ako natuto*" which translates to "*I also often use the TikTok app, it's easy to use and I also learned easily*."

Table 13. *Matrix of Informants' Responses in Terms of Behavioral*

	Questions	Informants' Responses	Themes
4.	Are you using the TikTok application more often to practice English with friends or teachers? Why or why not? *[Mas madalas mo bang ginagamit ang TikTok application para magsanay ng Ingles kasama ang mga kaibigan o guro? Bakit o bakit hindi?]*	B2: "madalas ko rin po ginagamit ang *app* na TikTok nadadalian po akong gamitin at madali rin po ako natuto." B3: "madali ko pong ma-*access* ang TikTok *application* tuwing magsasanay ng English." G2: "may mga TikTok *videos* din po na nakakatulong para po maintindihan ko pa po nang mas maayos at madali ang English."	Ease of Use
5.	Do you look forward to learning more about English in the TikTok application? Why or why not? *[Inaasahan mo bang matuto nang higit pa tungkol sa English sa TikTok application? Bakit o bakit hindi?]*	B1: "Inaasahan ko pong matuto ng English ng higit pa dahil ito ay masaya at ikaw ay malilibang" G1: "inaasahan ko pong matututo ako sa pamamagitan ng panunoud ng mga *videos* sa TikTok tungkol po sa English" G2: "inaasahan ko po na matuto ng higit sa English gamit ang TikTok *app* dahil mas marami po akong natututunan mula dito."	Enhanced Learning
6.	Are you able to finish your assignment/homework if the material is in the form of videos? Why or why not? *[Nagagawa mo bang tapusin ang iyong takdang-aralin kung ang materyal ay nasa anyo ng mga videos? Bakit o bakit hindi?]*	B1: "Opo, kasi ito ay matatapos ko po agad dahil mas mapapadali mong gawin ang takdang aralin" G1: "opo mas matatapos ko po kung nasa *videos* para po susundan ko nalang po ang mga gagawin pero minsan po kasi nalilito po ako eh kaya po nag papaturo pa po ako kay Mama kung pano po ang gagawin" B3: "ako ay nakakapagpasa ng takdang-aralin at nalilibang pa."	Learning Efficiency

Table 14. *Matrix of Informants' Responses in Terms of Cognitive*

	Questions	Informants' Responses	Theme
7.	Is learning English using the TikTok application easy? Why or why not? *[Madali ba ang pag-aaral ng English gamit ang TikTok application? Bakit o bakit hindi?]*	B1: "Madali naman po dahil ikaw rin ay malilibang" B3: "Opo, dahil ang TikTok application ay *easy-to-use*" G2: "ito po ay madali kapag gamit ang TikTok app dahil po sa may iba't-ibang paraan po para mas natutunan ito at napapatanili akong *motivated* na mag aral."	Ease of Learning
8.	Do you think English is an important world language for communication? If yes, how will the TikTok application help you learn English? *[Sa palagay mo, ang Ingles ba ay isang mahalagang pandaigdigang wika sa komunikasyon? Kung oo, paano makatutulong ang TikTok application sa iyong pag aaral ng wikang Ingles?]*	B1: "Makatulong po ito sa aking pag aaral ng English dahil ito po ay mapapadali" G1: "opo mahalaga po ang wikang English. Makakatulong po ang TikTok sa pamamagitan ng pagpapakita ng mga videos tungkol sa English minsan naman po ay matututo ka pong mag English kasi po pag tumatagal tagal na po ang pa gamit mo po ng TikTok na tungkol po sa English dun ka na po matututo" B3: "Opo, makatutulong ang TikTok *application* sa aking pagaaral ng wikang English sa pamamagitan ng mga *videos* tungkol sa bokabularyo at gramatika."	Assistance in Learning English
9.	Do you agree that watching videos using the TikTok application in English lessons helps you to improve a lot? Why or why not? *[Sumasang-ayon ka ba na ang panonood ng mga videos gamit ang application ng TikTok sa mga aralin sa Ingles ay nakakatulong upang ikaw ay labis na umunlad? Bakit o bakit hindi?]*	B2: "Sumasang-ayon poko, dahil natututo po ko ako kahit nasa bahay lang, nakakatulong rin po sakin ang panonood sa TikTok dahil mahalaga po ang aking napapanuod." G1: "opo sumasangayon po ako kasi po may iba't-iba akong natututunan gamit ang TikTok at mas lalo pong umunlad ang natututunan ko po sa English" G2: "ako po ay sumasang-ayon na ang panonood at paggamit ng TikTok *app* ay higit na nakakatulong para sa subject na English dahil marami pong TikTok *videos* na English at ito rin Po ay nakakatulong para naiintindihan po Ang English."	Positive Impact
10.	What benefits do you get after learning English through the TikTok application? *[Anong mga benepisyo ang makukuha mo pagkatapos matuto ng Ingles sa pamamagitan ng TikTok application?]*	B1: "Ang ating makukuha ng benepisyo na matuto gamit ang TikTok *app* ay masaya dahil masayang matuto ng English" G1: "natututo po ako ng wikang English at mga gawaing pang English sa pamamagitan ng TikTok" G2: "Ang benepisyo po na makukuha pagkatapos matuto ng English gamit ang TikTok *app* ay marami ito po ay ang nakakatulong umintindi at kayang makipag kamunikasyon gamit ang English."	Learning English with Enjoyment

From the responses provided, Enhanced Learning emerged as a theme. Participants indicated interest in learning more about English using the TikTok app, citing various reasons for their excitement. Their eagerness originated from the assumption that TikTok would give them a wealth of information, showing a positive attitude toward their continuing learning experience with the program. According to Zhao and Wagner (2022), TikTok's support

for multimodal learning is another factor contributing to its success as an English training platform. Overall, participants were enthusiastic and optimistic about improving their English skills using TikTok, which was fueled by its interesting and instructive material. One informant mentions, *"Inaasahan ko pong matuto ng English ng higit pa dahil ito ay masaya at ikaw ay malilibang"* which translates to *"I look forward to learning English more because it is fun, and you will have fun"*.

One theme that emerged from the responses is Learning Efficiency. Participants related their experiences completing projects or homework when provided in video format, with varying replies. It means that video resources helped learners complete tasks and increased their engagement with the learning content. TikTok is a new social media app that allows users to produce intriguing movies, connect with other users in comments and private conversations, and show attractive and simple-to-use special effects (Bhandari & Bimo, 2022). Overall, participants recognized the benefits of having assignments in video format, such as ease of completion and greater interest, though some may need occasional assistance or explanation. An informant stated, "*opo mas matatapos ko po kung nasa videos para po susundan ko nalang po ang mga gagawin pero minsan po kasi nalilito po ako eh kaya po nag papaturo pa po ako kay Mama kung pano po ang gagawin*" which translates to "*Yes, I can finish it better if there are videos so I'll just follow the steps to be taken, but sometimes I'm confused, so I'm teaching mom how to do it*".

One prominent theme from the responses is Ease of Learning. Participants offered varying viewpoints on the ease of learning English using the TikTok app. They found the platform simple to use, implying that its accessibility and broad material add to the ease of learning English. Social media is an excellent medium for assisting the teaching and learning process since it is open, participatory, and people-friendly (Erarslan, 2019). Overall, users feel that learning English on TikTok was simple, citing characteristics such as entertainment value, usability, and motivating features as significant considerations. A participant responded, *"Ito po ay madali kapag gamit ang TikTok app dahil po sa may iba't-ibang paraan po para mas natutunan ito at napapatanili akong motivated na mag-aral"* which translates to *"It's easy when using the TikTok app because there are different ways to learn it better and keep me motivated to study"*.

Another theme TikTok offered was Assistance in Learning English, which has emerged. Participants recognized the value of English as a worldwide language for communication. It implied that the site provided functional instructional materials for language learning. According to the study conducted by Saeed et al. (2020), TikTok may be used to improve students' critical thinking abilities by encouraging them to assess and analyze the language used in the videos. Overall, participants appreciated the value of English in communication and saw TikTok as a valuable tool for improving their English abilities by providing interesting video material focusing on vocabulary and grammar. One informant uttered: *"Opo, makatutulong ang TikTok application sa aking pagaaral ng wikang English sa pamamagitan ng mga videos tungkol sa bokabularyo at gramatika"* which translates to *"Yes, the TikTok application can help me learn the English language through videos about vocabulary and grammar"*.

The third theme underscored the Positive Impact of using the TikTok application in English class. Participants believed watching videos on the TikTok app during English sessions greatly helped them improve. According to Hu (2022), TikTok is a potential tool for teaching English since it is entertaining and participatory. Overall, participants acknowledge TikTok's importance in improving their English, citing its accessibility and various materials as crucial reasons for their progress. As one informant noted, *"Ako po ay sumasang-ayon na ang panonood at paggamit ng TikTok app ay higit na nakakatulong para sa subject na English dahil marami pong TikTok videos na English at ito rin po ay nakakatulong para naiintindihan po ang English"* which translates to *"I agree that watching and using the TikTok app is more helpful for the English subject because there are many TikTok videos in English and it also helps to understand English"*.

Lastly, Learning English with Enjoyment emerged as a theme. Participants discussed the different benefits of learning English with the TikTok app. They confirmed that TikTok improved understanding and allowed for successful language communication. TikTok can potentially be an extremely successful platform for teaching English as a second language (Tan, 2022). Overall, users believed that learning English using the TikTok app provided benefits such as enjoyment, skill gain, and enhanced communication skills. One of the informants said, *"Ang ating makukuha ng benepisyo na matuto gamit ang TikTok app ay masaya dahil masayang matutuo ng English"* which translates to *"What we can benefit from learning with the TikTok app is fun because we can learn English happily"*.

3.3 Integration of QUAN-QUAL Data

Through the presented findings, the quantitative data revealed that there is a significant difference between the pretest and posttest mean scores of the experimental group indicating that there is sufficient evidence to conclude that Project TeachTok is effective in enhancing the digital literacy skill of the grade 5 learners meanwhile, based on the qualitative results, the participants responded with positive comments on the mobile-assisted language learning where TikTok application was carried out reflective of the recurring themes in affective, behavioral, and cognitive aspects of their attitude towards MALL.

Integrating TikTok as an educational tool has proven to enhance elementary learners' digital literacy and engagement in learning English. The significant statistical improvement observed in the experimental group, coupled with enthusiastic qualitative feedback, underscores the platform's ability to make learning more accessible, enjoyable, and impactful. Educators can foster a more dynamic and effective learning environment by leveraging familiar and engaging digital media.

As for the point of convergence, across the abovementioned studies, there was a consensus that the experimental group, which used TikTok as an education tool, improved significantly in digital literacy compared to their pretest scores. Their posttest mean scores showed a significant rise, indicating progress. This showed that TikTok has the potential to be an effective medium for improving digital literacy among elementary learners. Despite variances in research designs and situations, the continuous improvement seen in the experimental group highlights TikTok's ability to enhance digital literacy in educational settings favorably.

Table 15. *Integration of Quan-Qual Data*

Quantitative findings	Qualitative findings	Integrated theme
The statistics indicated that the experimental group improved significantly in digital literacy from the pretest to the posttest. The large t-value emphasizes the magnitude of the improvement, which suggests that using TikTok as an educational tool had a major beneficial influence on the learners' digital literacy. This shows that the TikTok-based intervention improved elementary learners' digital literacy. Compared to the control group, which showed no significant change (as shown in Table 6), the experimental group's considerable improvement demonstrated the added benefit of the TikTok intervention. This illustrates that adopting TikTok as an educational tool can result in significant advances in digital literacy, as opposed to the control group's prevailing teaching method.	**Excitement for Learning English** G1: "Opo, excited po akong pumasok lalo na po kung ang English *subject* po is napapalitan ng araling pang TikTok po" **Ease of Use** G2: "may mga TikTok *videos* din po na nakakatulong para po maintindihan ko pa po nang mas maayos at madali ang English." **Positive Impact** B2: "Sumasang-ayon poko, dahil natututo po ko ako kahit nasa bahay lang, nakakatulong rin po sakin ang panonood sa TikTok dahil mahalaga po ang aking napapanuod."	**Engaging Digital Learning** TikTok is an effective educational tool that enhances digital literacy and increases student engagement in learning English. The platform's familiar and interactive format not only makes learning more accessible and enjoyable but also provides substantial educational benefits, making it a valuable addition to contemporary teaching strategies.

The research's result, as well as the findings of Rahmawati and Anwar (2022) and Tanza (2022), showed that TikTok has a beneficial influence on language learning outcomes depicting convergence against Hu and Du's (2022) study where they discovered that when TikTok was utilized as a complement to classroom-based instruction, it had no meaningful benefits on language acquisition and made learners less motivated. This discrepancy in data implied that TikTok's usefulness as a language learning tool may vary depending on instructional design, learner motivation, and contextual circumstances.

While the research environment provided interesting possibilities and obstacles to integrating TikTok into educational practices, the data showed that TikTok has the remarkable capability to improve elementary learners' digital literacy and language development. However, the observed variations highlight the importance of additional investigation and evaluation of many elements to maximize TikTok's usefulness as a teaching tool in various learning settings. These factors were carefully considered when crafting the proposed instructional framework, which was the end output of the study.

4.0 Conclusion

The participants in both control and experimental groups have equal variances by their pretest mean scores. In contrast, the posttest mean scores of the groups illustrate a significant difference, indicating that the experimental group participants enhanced their digital literacy much more than the control group through Project TikTok. Integrating TikTok as an educational tool can significantly improve digital literacy abilities among grade 5 learners compared to the prevailing teaching method. This demonstrates the ability of innovative educational tools such as TikTok to improve learning outcomes and prepare learners for success in the digital era.

The study found that learners had a favorable attitude about using the TikTok mobile application to learn English, with substantial affective, behavioral, and cognitive consequences. Participants reported excitement and satisfaction with TikTok as an educational tool for language acquisition, citing its ease of use and capacity to improve their language skills. They were proud of their TikTok learning achievement, acknowledging the platform's distinctive features and influence on their participation in English-language classes. Furthermore, users underscored the app's significance in increasing learning efficiency and providing valuable aid in studying English.

The study's findings emphasized the possibility of using the TikTok application to improve elementary learners' digital literacy abilities in the educational setting. Teachers may use the TEACH educational framework, which is particularly designed for TikTok integration, to methodically target, engage, apply, check, and hone learners' digital abilities wholly and logically. By aligning with the Department of Education's MATATAG Curriculum goals and emphasizing learner outcomes such as digital tool proficiency, critical thinking, and adaptability, the TeachTok framework aims to create a dynamic and inclusive learning environment in which learners actively participate, innovate, and collaborate.

5.0 Contributions of Authors

The author's contributions to a research paper include conceptualizing the study, writing, data collection and analysis, methodology design, supervision, project management, securing funding, and reviewing/editing the manuscript.

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7.0 Conflict of Interests

The author declares that there are no conflicts of interest.

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The Mediating Effect of Organizational Embeddedness on the Relationship between Job Satisfaction and Turnover Intention of Library Personnel

Pearl Joy P. Villanueva*[1], Garry L. Bastida[2]
[1]University of Mindanao, Davao City, Philippines
[2]Davao Oriental State University, Mati City, Philippines
[1]Notre Dame of Marbel University, City of Koronadal, South Cotabato, Philippines

*Corresponding Author Email: p.panoy.521825@umindanao.edu.ph

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Abstract. High turnover rates among library personnel challenge institutional stability, yet research on mitigating factors remains limited. This study examines the mediating role of organizational embeddedness in the relationship between job satisfaction and turnover intention among library personnel. Using a non-experimental quantitative design, data were collected from 303 respondents through standardized surveys, and statistical analyses, including correlation and mediation tests, were conducted. Results showed that job satisfaction (mean = 3.53) and organizational embeddedness (mean = 3.60) were high, while turnover intention was moderate (mean = 2.73). Job satisfaction was negatively correlated with turnover intention ($r = -0.297$, $p < 0.001$) and positively correlated with organizational embeddedness ($r = 0.573$, $p < 0.001$), while organizational embeddedness was negatively correlated with turnover intention ($r = -0.476$, $p < 0.001$). Mediation analysis confirmed that organizational embeddedness partially mediated the relationship between job satisfaction and turnover intention. These findings highlight the need for strategies that enhance job satisfaction and organizational embeddedness to reduce turnover intention, emphasizing the importance of improving work environments, career development, and institutional support to retain skilled library personnel, ultimately contributing to workforce stability and aligning with the United Nations' Sustainable Development Goal 8 on decent work and economic growth.

Keywords: Job satisfaction; Library and information science; Organizational embeddedness; Philippines; Turnover intention.

1.0 Introduction

Employee departures are commonly understood as organizational turnover, traditionally viewed as either voluntary or involuntary (Hyatt, 2025). When employees choose to leave, voluntary turnover has drawn particular concern due to its impact on organizational performance, knowledge continuity, and workforce morale. In December 2024 alone, 3.2 million individuals in the U.S. quit their jobs, reflecting declining confidence in better opportunities (Hyatt, 2025). According to Jeremy (2025), over 18% of employees voluntarily left their organizations, highlighting the persistent challenge of employee retention. The departure of highly skilled personnel disrupts productivity and affects organizational reputation, strategic alignment, and institutional memory (Saufi et al., 2023).

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Employee turnover poses a unique threat in library institutions, where knowledge preservation, specialized expertise, and organizational continuity are critical. Despite abundant research on turnover in general organizational settings (Bishop, 2019), limited attention has been given to turnover intention among library professionals, who operate under distinct resource constraints, evolving digital landscapes, and changing professional responsibilities. These factors necessitate tailored retention strategies that reflect the specific needs of the library workforce.

Research consistently shows that job satisfaction is inversely related to turnover intention (Li et al., 2019). Dissatisfied employees are more likely to disengage and eventually leave their organizations. Low employee satisfaction is a recognized predictor of high turnover, which can reduce institutional performance and continuity (Hancock et al., 2013; Hur, 2013; Meier & Hicklin, 2008; Lee, 2017). Employers must invest in strategies that enhance satisfaction, such as fair compensation, professional development, recognition, and flexible work arrangements, to create a positive work culture that retains talent (Kappel, 2017; Mohan, 2021).

Another relevant concept is organizational embeddedness**,** which refers to how employees feel connected to their jobs, organizations, and communities. This embeddedness has significantly reduced turnover intention by fostering a sense of belonging and institutional alignment. While some studies suggest it has a greater influence on long-term employees, others argue it may be more critical for new hires, indicating the need for further exploration in different organizational contexts (Li et al., 2019). In the library setting, embeddedness may be shaped by job security, professional identity, and institutional culture, all of which merit closer investigation.

Emotional intelligence also plays a growing role in workforce retention, enabling employees to manage stress, build relationships, and adapt to workplace challenges. Though often underexplored as a mediating factor, emotional intelligence can significantly influence job satisfaction and organizational embeddedness, contributing to lower turnover intention. Integrating emotional intelligence into retention strategies may provide deeper psychological insights into employee behavior and commitment.

Given these considerations, this study aims to investigate the role of organizational embeddedness in shaping job satisfaction and turnover intention among library personnel. This research seeks to fill a gap in the literature specific to library contexts by focusing on the perceived relationships between employees and their roles and institutions. Findings will offer actionable insights for library administrators, human resource professionals, and policymakers, allowing them to implement evidence-based strategies that improve employee satisfaction and retention, such as recognition, training, career development, and emotional support. Fostering stronger institutional ties can support organizational stability and contribute to broader goals such as Sustainable Development Goal 8 (Decent Work and Economic Growth) in the local context.

2.0 Methodology

2.1 Research Design

This study used a descriptive-correlation approach, which is a non-experimental quantitative methodology. The descriptive correlational design is used in research investigations to determine the link between several variables and provide static representations of situations (McBurney & White, 2009). The aim of this study was to determine the association between job satisfaction and organizational embeddedness, as well as between job satisfaction and turnover intention. The descriptive-correlation study approach was therefore deemed appropriate.

2.2 Research Participants

The study was conducted in the southwest part of Mindanao Island, in the province of South Cotabato. Situated in the Soccsksargen region of Mindanao, South Cotabato is formally known as the Province of South Cotabato. Koronadal, the capital, is bounded north and west by Sultan Kudarat, south and northeast by Sarangani, and the far northeast by Davao del Sur (Province of South Cotabato, 2021). The study's respondents were the library personnel employed in different types of libraries in Region XII. Participants in this study were library personnel, including licensed and non-licensed librarians and library staff in charge, employed in various libraries within Region XII. Due to the absence of an official list of library personnel employed in Region XII, the researcher limited the study to a sample of 1,243 library personnel who could be readily reached. To obtain a representative sample,

the researcher used a convenience sampling strategy. The most accessible or reachable people are found using this non-probability sampling technique. Convenience sampling is valued for its ease of use and speed, even if it does not entirely remove selection bias (Hassan, 2024). To determine the number of responders, the researcher used Slovin's Formula. 303 respondents made up the study's overall sample size, as calculated by applying the formula.

2.3 Research Instrument

Various survey questionnaires from other scholars were modified and adapted for the study. Three separate sections made up the questionnaire: Organizational Embeddedness, Turnover Intention, and Job Satisfaction. The specialist performed reliability testing and evaluated the questionnaires for construct validity. The validations demonstrated an exceptionally high level of performance, which showed an overall mean score of 4.42. Pilot testing was done to evaluate the instrument's dependability on the factors. For job satisfaction, turnover intention, and organizational embeddedness, Cronbach's alpha was 0.91, 0.91, and 0.91, respectively. The questionnaire appears reasonably reliable based on these values, which show good internal consistency.

2.4 Data Gathering Procedure

Among the measures used in this study was validating the modified and adapted questionnaires. Following validation, the researcher directly contacted school presidents and library directors in Region XII to request permission from several schools, libraries, and offices. While email or tools like Google Forms contacted remote sites, approved questionnaires and informed consent forms were hand-delivered to local libraries. After compiling each participant's response, the researcher ran statistical calculations and analyzed the information gathered.

2.6 Ethical Considerations

The study complied with ethical standards by securing informed consent from participants and encrypting and password-protecting data. The data could only be viewed by authorized individuals, preventing plagiarism and revealing conflicts of interest. Using robust security protocols, unambiguous expectations, beneficial resources, and transparent communication, the researcher mitigated possible hazards, including breaches of confidentiality, psychological anguish, time obligations, and data security.

3.0 Results and Discussion

3.1 Level of Job Satisfaction

Table 1 presents the level of job satisfaction among respondents with an overall mean of 3.53, which is described as high. Respectively, the highest level of job satisfaction is with the Nature of Work, which has a high descriptive level with a mean score of 4.02. This is followed by Compensation, which also has a high level of job satisfaction with a mean score of 3.75. Co-workers similarly receive a high job satisfaction rating with a mean of 3.63. Communication is subsequent, with a high job satisfaction level and a mean of 3.56. Moving to the moderate descriptive level, Promotion has a mean score of 3.37. Contingent Reward follows closely with a mean score of 3.26. Supervision also falls in the moderate category with a mean score of 3.12.

Table 1. *Level of Job Satisfaction*

Indicators	Mean	SD	Interpretation
Compensation	3.75	0.68	High
Promotion	3.37	0.57	Moderate
Supervision	3.12	0.48	Moderate
Contingent Reward	3.26	0.66	Moderate
Co-workers	3.63	0.76	High
Nature of Work	4.02	0.68	High
Communication	3.56	0.45	High
Overall	**3.53**	**0.61**	**High**

The result aligns with the Job Characteristics Model developed by Hackman and Oldham (1976), which identifies five core job characteristics—skill variety, task identity, task significance, autonomy, and feedback—as key factors influencing job satisfaction (Lucas, 2024). Together, these traits shape the nature of work and play a crucial role in raising job satisfaction. Furthermore, Humphrey et al. (2007) carried out a meta-analysis that synthesizes results from multiple studies, indicating that work design elements, such as task characteristics and work environment, substantially impact job satisfaction. The nature of work, defined by fulfilling and stimulating duties, is a

significant factor in total job satisfaction. This emphasizes how crucial it is for businesses to concentrate on job design and ensure workers find meaningful and compelling employment.

These results highlight the significance of job design in promoting employee well-being. Organizations must prioritize the development of meaningful and stimulating roles, as job satisfaction, particularly concerning the nature of work, correlates with increased productivity, reduced turnover rates, and enhanced employee engagement. Improving lower-scoring factors, including promotion opportunities and contingent rewards, may increase overall job satisfaction and organizational commitment.

3.2 Level of Turnover Intention

Table 2 shows that the level of turnover intention among respondents has an overall mean of 2.73, which is described as moderate. Respectively, the highest turnover intention is indicated by the statement "I often dream about getting another job that will better suit my personal needs," with a moderate descriptive level and a mean score of 3.02. This is followed by "I would likely accept another job with the same compensation at my level should it be offered to me," with a mean score of 2.86, indicating a moderate turnover intention. The statement "I seldom look forward to another day at work" has a moderate turnover intention with a mean of 2.74, and "I often consider leaving my job" follows with a moderate level and a mean of 2.71. The statement "My job does not fulfill my personal needs" shows a low level of turnover intention with a mean of 2.59, and "I am frustrated to have not been given the opportunity at work to achieve my personal work-related goals" also falls in the low category with a mean score of 2.47.

Table 2. *Level of Turnover Intention*

Indicators	Mean	SD	Interpretation
I often consider leaving my job.	2.71	1.18	Moderate
My job does not fulfill my personal needs.	2.59	1.14	Low
I am frustrated that I have not been allowed to achieve my personal work-related goals at work.	2.47	1.07	Low
I often dream about getting another job to better suit my needs.	3.02	1.29	Moderate
I would likely accept another job with the same compensation at my level if offered.	2.86	1.22	Moderate
I seldom look forward to another day at work.	2.74	1.12	Moderate
Overall	**2.73**	**0.98**	**Moderate**

The findings are consistent with Fuchs (2022), who noted that employees are more inclined to contemplate departure when their personal needs and expectations remain unmet by their employers. The finding that "I often dream about getting another job that will better suit my personal needs" correlates with the highest turnover intention, which supports this assertion. Mah et al. (2024) identified in their meta-analysis that unmet personal requirements and insufficient opportunities for personal development significantly predict turnover intention. These results underscore the importance of employee engagement and career development in retention strategies. Organizations should align job roles with employees' objectives and establish growth, recognition, and fulfillment pathways to reduce turnover intention. Organizations can decrease voluntary turnover and improve workforce stability by cultivating a kind and supportive environment that emphasizes well-being.

3.3 Level of Organizational Embeddedness

Table 3 presents the level of organizational embeddedness among respondents with an overall mean of 3.60, which is described as high. It also shows that the highest level of organizational embeddedness is indicated by the statement "My organization utilizes my skills and talents well," with a high descriptive level and a mean score of 3.90. This is closely followed by "I feel like I am a good match for my organization," which also has a high level of organizational embeddedness with a mean score of 3.89. The statement "I fit with the organization's culture" similarly has a high level, with a mean of 3.75. "My values are compatible with my organization's values" and "I like the authority and responsibility I have at my organization" both have high levels of embeddedness, with mean scores of 3.79 and 3.72, respectively. The perks provided by the organization are rated high, with a mean of 3.64, followed by "I am well compensated for my level of performance in my organization" with a mean of 3.46 and "My promotional opportunities are excellent in my organization" with a mean of 3.43, both also indicating high levels. The statements regarding healthcare and retirement benefits provided by the organization have moderate levels of organizational embeddedness, with mean scores of 3.22 and 3.18, respectively.

Table 3. *Level of Organizational Embeddedness*

Indicators	Mean	SD	Interpretation
My organization utilizes my skills and talents well.	3.90	0.77	High
I feel like I am a good match for my organization.	3.89	0.82	High
I fit with the organization's culture.	3.75	0.81	High
I like the authority and responsibility I have at my organization.	3.72	0.87	High
My values are compatible with my organization's values.	3.79	0.84	High
The perks provided by my organization are outstanding.	3.64	0.83	High
My promotional opportunities are excellent in my organization.	3.43	0.82	High
I am well compensated for my level of performance in my organization.	3.46	0.92	High
The health-care benefits provided by my organization are excellent.	3.22	0.99	Moderate
The retirement benefits provided by my organization are excellent.	3.18	1.11	Moderate
Overall	**3.60**	**0.64**	**High**

This observation is supported by the findings of Yoon et al. (2022), which indicate that workers who feel their abilities are being used successfully form stronger bonds with their company. According to Inegbedion et al. (2020), workers who feel their abilities are being used to their full potential typically express more job satisfaction and a decreased desire to quit. These findings emphasize the significance of skill utilization and workplace alignment in enhancing employee commitment. Organizations can improve embeddedness by offering meaningful work, aligning roles with employees' competencies, and fostering an environment that values employees. Enhancing compensation structures, career advancement opportunities, and benefits packages may further reinforce employees' commitment to the organization. Organizations can enhance retention, engagement, and long-term workforce stability by cultivating a culture that promotes professional development and acknowledges employee contributions.

3.4 Relationship between Job Satisfaction, Turnover Intention, and Organizational Embeddedness

Table 4 in the correlation analysis of the variables reveals several significant relationships. The correlation between job satisfaction and turnover intention is -0.297, with a p-value of less than 0.001, leading to rejecting the null hypothesis. This negative correlation indicates higher job satisfaction is associated with lower turnover intention. Similarly, the correlation between job satisfaction and organizational embeddedness is 0.573, with a p-value of less than 0.001, resulting in rejecting the null hypothesis. This positive correlation suggests that higher job satisfaction is related to greater organizational embeddedness. Lastly, the correlation between organizational embeddedness and turnover intention is -0.476, with a p-value of less than 0.001, leading to the rejection of the null hypothesis. This negative correlation implies that greater organizational embeddedness is associated with lower turnover intention.

Table 4. *Correlation Analysis of the Variables*

Pair	Variables	r	p	Interpretation
IV and DV	Job Satisfaction and Turnover Intention	-.29	<.001	Significant
IV and MV	Job Satisfaction and Organizational Embeddedness	.57	<.001	Significant
MV and DV	Organizational Embeddedness and Turnover Intention	-.47	<.001	Significant

Job happiness and organizational embeddedness have a strong positive link, which implies that higher job satisfaction strengthens employees' commitment to the company. Alig (2023) found that employees' perceptions of their integration into the company's culture and structure were positively correlated with their level of job satisfaction. Zhenjing et al. (2023) assert that workplace attachment and job happiness correlate positively. People who are happier at work are more likely to build closer bonds with their employer. Attrition intention and organizational embeddedness have an inverse relationship, which aligns with earlier studies that found that the workforce tends to leave as organizational embeddedness rises. Strong organizational links that encourage a sense of belonging and increase dedication have been proven to minimize turnover intention (Shah et al., 2020). According to a study on the theoretical perspectives of organizational embeddedness by Peltokorpi and Allen (2023), people with strong social and psychological ties at work are less likely to plan to leave because of their high degrees of embeddedness.

These findings underscore the significance of improving job satisfaction and organizational embeddedness to mitigate turnover intention rates. Organizations should adopt strategies that enhance employee satisfaction,

reinforce workplace relationships, and encourage meaningful engagement to bolster retention, loyalty, and long-term workforce stability.

3.5 Mediation Analysis of Organizational Embeddedness between Job Satisfaction and Turnover Intention

Table 6 displays the direct and indirect effects of job satisfaction (an independent variable) on turnover intention (a dependent variable), with organizational embeddedness as a mediating factor. The results indicate that job satisfaction substantially impacts turnover intention (Effect = -0.792, p = 0.5564, 95% CI [-0.3438, 0.1855]). Job satisfaction and turnover intention were significantly correlated indirectly through organizational embeddedness, suggesting partial mediation (Effect = -0.5659, 95% CI [-0.8208, -0.3684]). The bootstrap confidence interval excludes 0, indicating that the mediation effect is statistically significant.

Table 5. *Direct and Indirect Effect of X and Y*

						95% Confidence Interval
	Effect	**se**	**t**	**p**	**LLCI**	**ULCI**
IV → DV	-0.792	0.1345	-0.5888	.5564	-0.3438	0.1855
						95% Confidence Interval
	Effect	**BootSE**		**BootLLCI**		**BootULCI**
Emotion	-0.5659	0.1146		-0.8208		-0.3684

Additionally, organizational embeddedness substantially indirectly impacts job satisfaction and turnover intention, suggesting partial mediation. Since the bootstrap confidence interval excludes zero, the indirect effect of X on Y is significant (Effect = -0.5659, 95% CI [-0.8208, -0.3684]), suggesting a strong mediation effect. The initial stage determines whether there is a mediating influence between the relevant factors. The analysis based on the causal step is finished if the influence is not statistically significant. Complete mediation has been achieved if, by the end of the investigation, the effect of the independent variable on the dependent variable is entirely negligible. This implies that the mediating variable controls all impacts. Only partial mediation is achieved if the analysis is significantly reduced in the last step, but still significant.

Mediation analysis assesses the degree to which organizational embeddedness, the mediator variable, affects the relationship between the independent variable of job satisfaction and the dependent variable of turnover intention. The direct effect of the independent variable on the dependent variable stops being significant when the mediator is added, indicating full mediation, which implies that the mediator fully explains the relationship. Partial mediation is recommended if the direct effect is substantial but lessened (MacKinnon et al., 2007). In this instance, job satisfaction affects turnover intention significantly, even when considering organizational embeddedness, indicating that only partial mediation exists.

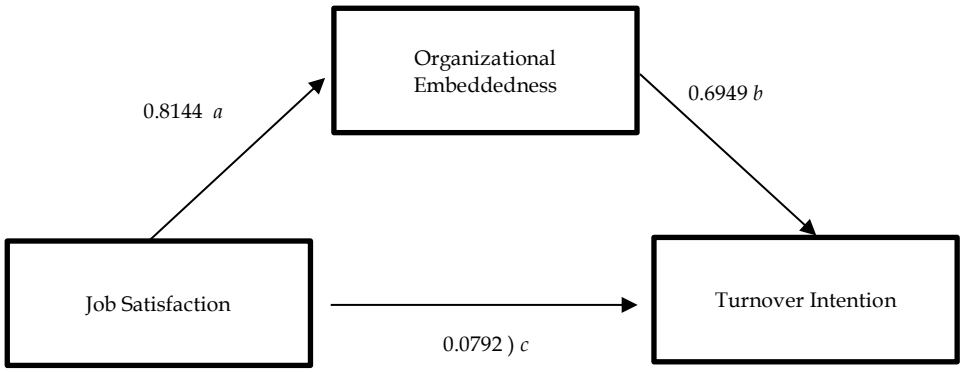

Figure 2. *Med Graph Showing the Mediation Analysis*

The statistical significance of these pathways indicates that organizational embeddedness partially mediates the relationship between job satisfaction and turnover intention; however, other variables not included in the model may also be influential. Additional mediation analysis, including path analysis, is necessary to investigate other possible mediators or moderators affecting this relationship. Organizational embeddedness reduces turnover

intention; however, it does not fully account for why employees leave. Additional organizational and individual factors, including HR policies, career advancement prospects, and perceived administrative support, significantly impact employees' decision-making processes (Díaz-Fernández et al., 2023). Osowski (2018) emphasizes that demographic and socioeconomic factors may moderate the connection among job satisfaction, organizational embeddedness, and turnover intention.

These findings highlight the significance of enhancing job satisfaction and organizational embeddedness to promote employee retention. Organizations must enhance job satisfaction through compensation, meaningful work, and a positive workplace culture while also strengthening organizational embeddedness by fostering employee connections, promoting career development, and reinforcing organizational commitment. Future research should incorporate additional mediators or moderators, including leadership styles, perceived job security, and psychological contract fulfillment, to improve the complex dynamics of turnover intention and employee retention.

4.0 Conclusion

This study surveyed 303 library personnel across Region XII to examine the interplay between job satisfaction, organizational embeddedness, and turnover intention. Findings revealed that job satisfaction with supervision and contingent rewards was comparatively lower, suggesting a need for enhanced managerial practices, recognition systems, and feedback mechanisms. Meanwhile, low turnover intention was associated with unmet career goals, highlighting the importance of personalized career development, mentoring, and professional growth initiatives. Although organizational embeddedness was rated high overall, benefits such as healthcare and retirement scored lowest, suggesting perceived gaps in long-term organizational support. Enhancing these areas through benchmarking, wellness programs, and flexible benefits could strengthen employee commitment. The results align with the Job Demands-Resources (JD-R) model, emphasizing the role of job resources—such as task significance, autonomy, and skill variety—in promoting satisfaction and embeddedness. While job satisfaction contributes to reduced turnover intention via higher embeddedness, the moderate intention to leave suggests unresolved issues, such as limited career mobility or lack of recognition. Future studies should investigate how various job resources influence turnover intention across different sectors and roles, potentially expanding the JD-R framework's applicability in retention strategies.

5.0 Contributions of Authors

PJPV composed the manuscript and executed the study, whilst GLB contributed to the editing and implementation of the survey. They additionally created and refined the study equipment and the research design. Both authors engaged in editing, revising, and writing.

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7.0 Conflict of Interests

Regarding the publication of this work, the writers declare no conflicts of interest.

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Effective Classroom Management for the Modern Learning Environment

Josephine T. Marquez, Jane C. Oropa*
North Eastern Mindanao State University, Tandag, Surigao del Sur, Philippines

*Corresponding Author Email: janeoropa2022@gmail.com

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Abstract. Classroom management remains a key challenge for teachers as they navigate diverse student needs, evolving teaching methods, and technological advancements. This study examined the issues and challenges faced by teachers of San Francisco District, Agusan del Sur, Philippines, using an exploratory sequential research design. In this design, the study was conducted in two distinct but interconnected phases. The initial phase involved the collection and analysis of quantitative data using a structured survey administered to the respondents. The findings from this phase served as the basis for the second phase, which involved qualitative data collection through in-depth interviews and focus group discussions. The findings in quantitative method showed that teachers struggled with behavior management, discipline strategies, cultural competence, emotional climate, instructional management, student engagement, and communication, a high grand mean of 4.326. The physical environment with the lowest mean of 4.06 was the least challenging aspect, but it still required attention. In qualitative method the themes emerged, these identify key strategies employed by teachers to address these challenges, including fostering inclusive learning environments, promoting positive discipline, enhancing student-centered instruction, and advocating for diversity and equity. The results underscore the importance of adopting adaptive management strategies, promoting professional development, and securing policy support. To address these concerns, the study proposes a policy brief recommending the institutionalization of continuous professional development programs on modern classroom management techniques, the integration of digital tools in behavior and instruction management, and the creation of a supportive school culture that prioritizes learner-centered approaches. These policy directions aim to strengthen the capacity of educators to manage classrooms effectively and respond to the demands of 21st-century education. The study concludes that effective classroom management in modern settings requires a balanced combination of traditional discipline techniques and innovative, student-centered approaches responsive to current educational realities.

Keywords: Classroom management; Teacher challenges; Student engagement; Policy brief; Professional development.

1.0 Introduction

Classroom management is essential for creating an effective learning environment and fostering student success. Teachers face numerous challenges in managing classrooms, particularly in today's rapidly evolving educational landscape. These challenges include addressing diverse student needs, adapting to changing teaching paradigms, and adhering to legal and institutional constraints. Effective classroom management is crucial in maintaining discipline, promoting engagement, and ensuring productive learning experiences. However, many educators

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struggle with classroom management despite its importance due to limited resources, large class sizes, and inadequate professional support.

Several studies have explored teachers' difficulties in classroom management and their impact on students' academic performance. Charles and Mkulu (2020) identified financial constraints, lack of stakeholder cooperation, overcrowding, and resource shortages as major obstacles in public primary schools, contributing to high student absenteeism. Similarly, Yonas et al. (2023) found that inadequate materials and weak professional relationships hinder student success in Tanzanian secondary schools. Ezemba et al. (2022) further highlighted how factors such as poor seating arrangements and large class sizes negatively affect the teaching-learning process in Anambra State. These studies emphasize the importance of effective classroom management strategies in overcoming these challenges and improving academic outcomes.

Despite these findings, limited research exists on classroom management challenges specific to the San Francisco District of Agusan del Sur Division. Teachers in this district reportedly face shortages of instructional materials, difficulties in maintaining professional relationships with students, and gaps in classroom management skills. However, little is known about the specific contexts and factors contributing to these issues. Understanding these unique challenges is crucial for developing targeted interventions, such as teacher training programs, mentorship initiatives, and professional development opportunities.

This study aims to examine teachers' classroom management challenges in the San Francisco District and explore strategies to address them. By analyzing specific issues in this context, the research provides valuable insights to improve teaching practices and promote student achievement. The findings will inform policy recommendations and training initiatives that support teachers in developing practical classroom management skills. Ultimately, this study seeks to inform educators, administrators, and policymakers in creating a more structured and supportive learning environment for students.

2.0 Methodology

2.1 Research Design

This study utilized a sequential exploratory design, a subtype of the mixed-methods research approach. It began with a quantitative phase, followed by a qualitative phase to complement and expand on the findings. The sequential process allowed for deeper exploration of the research problem by integrating statistical analysis with thematic interpretation. For the qualitative component, the study employed thematic analysis, following the approach outlined by Braun and Clarke (2006). This method facilitated the identification of key themes based on the experiences and perspectives of teachers and master teachers regarding classroom practices and management. Additionally, thematic analysis was applied to documentary sources, ensuring a structured approach to analyzing patterns within qualitative data.

2.2 Research Participants

The study involved 135 participants, including 110 teachers for the quantitative phase and 25 key informants for the qualitative phase. For the quantitative phase, 110 respondents were selected from a total population of 151 teachers using a statistical formula to ensure representativeness. For the qualitative phase, 25 key informants were selected using purposive sampling based on specific criteria, including a minimum of five years of teaching experience, leadership roles, specialization in specific fields, and active involvement in school programs. Focus Group Discussions (FGDs) were conducted until data saturation was reached.

2.3 Research Instruments

A researcher-made questionnaire was used to collect data. The instrument underwent content validation and reliability testing by education experts, including a District Supervisor, School Principal, and Master Teachers. The questionnaire was divided into three sections. The first section collected demographic information, including age, gender, civil status, years of service, academic rank, and highest educational qualification. The second section focused on classroom management challenges, covering areas such as physical environment, behavior management, instructional strategies, communication, student engagement, emotional climate, discipline strategies, and cultural competence, using a 5-point Likert scale. The third section assessed teachers' response strategies, using open-ended questions to gain qualitative insights. A pilot test was conducted with 25 teachers

from a different district to assess reliability. Cronbach's alpha (α = 0.762) confirmed good internal consistency across all indicators.

2.4 Data Gathering Procedure and Analysis

The data-gathering procedure followed a structured approach. Before distributing the questionnaires, the researcher first obtained approval from the Graduate School Office, the Schools Division Superintendent, and the school principals. Once permission was granted, the researcher personally administered the survey to ensure respondents fully understood the instructions. Qualitative data collection involved semi-structured interviews and focus group discussions (FGDs) with key informants, which were recorded with their consent and subsequently transcribed for analysis. A statistician assisted in processing quantitative data, while qualitative data underwent transcription, coding, categorization, and thematic analysis. All data collection adhered to the Data Privacy Act 2012 (Republic Act No. 10173). The study employed various statistical tools to analyze the data. Frequency count and percentage were used to describe demographic data, while the weighted mean was applied to analyze classroom management challenges and teachers' response strategies. Pearson Product-Moment Correlation was used to examine relationships between teacher profiles and classroom management challenges. Thematic analysis was conducted for qualitative data to identify patterns and emerging themes from the participants' responses.

2.5 Ethical Considerations

The study followed strict ethical guidelines to protect participants' rights and ensure data confidentiality. Informed consent was obtained in writing and verbally, and participants were assured of their right to withdraw at any time. Confidentiality and anonymity were maintained by securing personal data and ensuring that identifying information was not linked to any responses. The principle of beneficence was upheld by ensuring that the study contributed to educational improvements while minimizing risks to participants. Justice and fair treatment were observed by ensuring equitable selection criteria and avoiding exploiting vulnerable groups. The researcher maintained transparency and honesty by clearly communicating the study's objectives and faithfully reporting findings. Additionally, cultural sensitivity was consistently demonstrated throughout the research process, ensuring respect for participants' diverse backgrounds and values.

3.0 Results and Discussion

3.1 Profile of the Respondents

Table 1 presents the frequency distribution of respondents based on age, civil status, years of service, academic rank, and highest educational attainment. Most (57%) of the 110 respondents are aged 26-45, followed by those aged 46-55 (32%). Individuals aged 55 and above comprise 10%, while those under 26 represent just 1%. These findings suggest a predominantly young teaching workforce, aligning with studies that highlight the impact of age on teaching experience (Almuhatar et al., 2015).

A strong female predominance is evident, with women comprising 94% of the respondents. This supports previous research that indicates public school teachers in the Philippines are predominantly female (Sebastian et al., 2022). Despite this, higher-ranking administrative positions are still occupied mainly by men (Regaldo, 2017). Regarding civil status, the majority (88%) are married, while 7% are single and 5% are widowed, highlighting a workforce primarily composed of individuals in committed relationships.

The respondents also demonstrate a diverse range of experience. A small percentage (5%) have been in service for 1-5 years, while the majority (39%) have 6-10 years of experience. The rest are distributed across various service lengths, with a mix of early-career and veteran educators. Regarding academic rank, more than half (52%) hold the position of Teacher III, followed by Teacher I (28%) and Teacher II (15%). Higher academic ranks, such as Master Teacher I and II, account for only 5%, reflecting a structured career progression.

Regarding educational attainment, 42% of the respondents hold a bachelor's degree, 34% have a Master's degree, and 25% possess a Doctoral Degree. This distribution indicates a highly educated workforce, suggesting strong aspirations for professional development. Overall, these findings provide insight into the demographic and professional backgrounds of the respondents, reflecting trends in the teaching profession.

Table 1. *Demographic details of the survey respondents*

Profile	Classifications	Frequency	Percentage
Age	below 26 years old	1	1.00
	26 to 45 years old	63	57.00
	46 to 55 years old	35	32.00
	55 years old and above	11	10.00
Sex	Male	7	6.00
	Female	103	94.00
	Total	110	100.00
Civil Status	Single	8	7.00
	Married	97	88.00
	Widowed	5	5.00
Number of Years in Service	1 to 5 years	5	5.00
	6 to 10 years	43	39.00
	11 to 15 years	21	19.00
	16 to 20 years	15	14.00
	21 to 25 years	13	12.00
	26 years above	13	12.00
Academic Rank/ Position	Teacher I	31	28.00
	Teacher II	17	15.00
	Teacher III	57	52.00
	Master Teacher I	3	3.00
	Master Teacher II	2	2.00
Highest Educational Attainment	Bachelor's Degree	46	42.00
	Master's Degree	37	34.00
	Doctorate Degree	27	25.00

3.2 Classroom Management Issues and Challenges

Table 2 presents the mean scores and descriptive interpretations for eight classroom management and challenges indicators. The data suggests a positive perception across all eight indicators. The mean score for the Physical Environment is 4.060, indicating a "Strongly Agree" level of satisfaction with the physical environment. The highest mean score within this indicator is 4.27 for "The lighting conditions of the classroom are properly installed," while the lowest is 3.92 for "The classroom is free from uneasy movements of the learners. Sufficient space is provided for learners to collaborate and work on group tasks. While the overall physical environment is satisfactory, there may be a need to improve the spatial arrangement to facilitate better movement and collaboration among learners. Notably, the school's daily routine is an effective strategy for structuring procedures for entering and exiting the classroom, which include specific pathways and signals.

Similarly, the perception of Behavior Management is "Agree," with a mean score of 4.451. The highest mean score within this indicator is 4.56 for "Setting rules/classroom agreement together with the learners," while the lowest is 4.29 for "The inclusion of learners with special needs in the general classroom." While behavior management practices are generally effective, there may be room for improvement in inclusivity practices for learners with special needs. Utilizing differentiated activities to cater to the diverse needs of learners. Additionally, promoting group work is crucial in developing social skills and fostering peer connections. In addition, ensuring that learners with special needs are fully integrated into the classroom requires additional training and resources.

Moving on to Instructional Management, the mean score of 4.284 also indicates a "Strongly Agree" perception. The highest mean score within this indicator is 4.37 for "Engaging learners in active and lively discussions and using inquiry-based learning in the classroom," while the lowest is 4.22 for "Assigning learners in groups to collaborate with peers and personalizing learning opportunities." Instructional management is effective, but there may be a need to enhance group collaboration and personalized learning opportunities. The teacher must incorporate thought-provoking activities and engage students in higher-order thinking skills. This allows learners to work on projects that align with their interests in real-world applications. Furthermore, the use of technology enables learners to create personalized learning opportunities.

Table 2. *Descriptive details of the classroom management issues and challenges encountered*

Indicators	Mean	SD	Adjectival Description
Physical Environment			
1. The arrangement of furnishings and floor coverings in the classroom follows the standards.	3.94	0.13	Agree
2. The lighting conditions of the classroom is properly installed."	4.27	0.11	Agree
3. The ventilation of the classroom is sufficient.	4.14	0.05	Agree
4. The classroom is free from uneasy movements of the learners. Enough space is intended for learners to collaborate and do group tasks.	3.92	0.07	Agree
5. The design and display of visual materials are good and in order.	4.04	0.04	Agree
Grand Mean	**4.06**	**0.08**	**Agree**
Behaviour Management			
1. The inclusion of learners with special needs in the general classroom	4.29	0.08	Agree
2. Maintaining a routine that learners know what's coming next	4.44	0.09	Agree
3. Setting rules/classroom agreement together with the learners	4.56	0.02	Strongly Agree
4. Creating stimulating lessons for the learners to be involved and engaged throughout the lesson	4.45	0.03	Agree
5. Using positive language rather than creating a negative language in reinforcing the wrong behavior of learners. If in case a learner is misbehaving the parents will be called or a home visit will be done to settle misconduct of learners	4.52	0.01	Strongly Agree
Grand Mean	**4.45**	**0.05**	**Agree**
Instructional Management			
1. Organizing instruction and learners to facilitate learning and sequencing of tasks	4.26	0.04	Agree
2. Assigning learners in groups to collaborate with peers and personalizing learning opportunities	4.22	0.05	Agree
3. Observing and noting learners' academic advancement and performance	4.33	0.03	Agree
4. Using ICT integration in the lessons and the availability of internet connection	4.24	0.02	Agree
5. Engaging learners in active and lively discussions and using inquiry-based learning in the classroom	4.37	0.01	Agree
Grand Mean	**4.28**	**0.03**	**Agree**
Relationships & Communication			
1. Respecting learners' opinions and encouraging them to express them	4.18	0.06	Agree
2. Collaborating with parents and other stakeholders in the community	4.20	0.07	Agree
3. Establishing and communicating learning goals to the learners and the parents at the start of the school year	4.22	0.05	Agree
4. Engaging parents to be participative in HRPTA Meetings and School and classroom projects	4.36	0.04	Agree
5. Engaging harmoniously with peers, staff, and other key officials in school and community	4.18	0.03	Agree
Grand Mean	**4.22**	**0.05**	**Agree**
Student Engagement			
1. Motivating disengaged learners in various ways	4.24	0.04	Agree
2. Encouraging learners particularly those who are disconnected from peers and other teachers	4.30	0.05	Agree
3. Assessing learners with external stressors such as mental health challenges or family and community factors	4.25	0.03	Agree
4. Giving learners autonomy in their learning	4.21	0.02	Agree
5. Varying the types of strategies and techniques that will be used in the classroom to prevent boredom and absenteeism in the class	4.30	0.01	Agree
Grand Mean	**4.25**	**0.03**	**Agree**
Emotional Climate			
1. Understanding the various emotions of learners in the classroom	4.42	0.06	Agree
2. Establishing and maintaining a happy and conducive classroom for the learners	4.36	0.07	Agree
3. Providing a caring and a fair environment for the learners	4.40	0.05	Agree
4. Practicing a reward system inside the class	4.20	0.04	Agree
5. Setting clear classroom routines and expectations	4.34	0.03	Agree
Grand Mean	**4.34**	**0.05**	**Agree**
Discipline Strategies			
1. Imposing clear rules and procedures on the distribution and collection of materials in the class	4.31	0.05	Agree
2. Following strictly the set of routines at the start and until the end of the class	4.33	0.04	Agree
3. Adhering to time management in reporting to class and in the submission of reports and projects	4.37	0.03	Agree
4. Creating a class culture that encourages appropriate behavior and discourages disruption	4.25	0.02	Agree
5. Always imposing discipline to avoid bullying	4.53	0.01	Strongly Agree
Grand Mean	**4.35**	**0.03**	**Agree**
Cultural Competence			
1. Embracing and maintaining culturally-responsive teaching and learning	4.36	0.04	Agree
2. Accommodating individual learners with diverse backgrounds	4.32	0.05	Agree
3. Using intercultural communication skills as a means for enhancing learning	4.30	0.03	Agree
4. Focusing activities and intentionally structured environments or a perspective-taking behavior in understanding norms, values, and traditions	4.31	0.02	Agree
5. Ranking the value of ideas such as religion, honesty, tradition, etc. to meaningful conversations	4.35	0.01	Agree
Grand Mean	**4.32**	**0.03**	**Agree**
Overall Grand Mean	**4.28**	**0.10**	**Agree**

Regarding Relationships and communication, the mean score is 4.229, indicating a "Strongly Agree" perception of positive relationships and communication within the school. The highest mean score within this indicator is 4.36 for "Engaging parents to be participative in HRPTA Meetings and School and classroom projects," while the lowest is 4.18 for both "Respecting learners' opinions and encouraging them to express them" and "Engaging harmoniously with peers, staff, and other key officials in school and community." Relationships and communication are generally positive, but there may be a need to further encourage a child-friendly environment and harmonious engagement among school staff and officials. An Interest Day was conducted in schools to

showcase their talents and skills through interactive activities. Students feel comfortable as they are led by SELG, an organization representing learners' voices.

The score of 4.258 indicates a "Strongly Agree" perception of Student Engagement. The highest mean score within this indicator is 4.30 for both "Encouraging learners, particularly those who are disconnected from peers and other teachers" and "Varying the types of strategies and techniques that will be used in the classroom to prevent boredom and absenteeism in the class," while the lowest is 4.21 for "Giving learners autonomy in their learning." Student engagement is generally positive; however, there may be a need to provide learners with more autonomy in their learning processes. Using real objects during discussions allows learners to gain a meaningful experience. Additionally, project-based learning can foster greater autonomy, enabling learners to explore topics of interest and develop their critical thinking skills.

With a mean score of 4.344, the Emotional Climate is perceived as "Agree." The highest mean score within this indicator is 4.42 for "Understanding the various emotions of learners in the classroom," while the lowest is 4.20 for "Practicing a reward system inside the class." The emotional climate is generally positive, but there may be a need to enhance reward systems to support further learners' emotional well-being, such as pupils of the week are posted inside the classroom, giving learners stickers or certificates for completing assignments, attendance, or exhibiting good behavior, encourages motivation and reinforces positive actions. Thus, teachers can enhance classroom management and further boost learners' engagement and well-being.

The mean score of 4.356 indicates a "Strongly Agree" perception of Discipline Strategies. The highest mean score within this indicator is 4.53 for "Always imposing discipline to avoid bullying," while the lowest is 4.25 for "Creating a class culture that encourages appropriate behavior and discourages disruption." Discipline strategies are generally effective, but there may be a need to develop further class cultures that encourage appropriate behavior and discourage disruptions. Teachers must set and communicate clear expectations for behavior, ensuring students understand the rules and the consequences of their actions. Also, developing positive reinforcement to acknowledge appropriate behavior and community building involves activities that promote teamwork and collaboration.

Finally, the mean score of 4.327 suggests a "Strongly Agree" perception of cultural competence within the school. The highest mean score within this indicator is 4.36 for "Embracing and maintaining a culturally responsive teaching and learning," while the lowest is 4.30 for "Using intercultural communication skills as a means for enhancing learning." Cultural competence is generally positive; however, there may be a need to enhance intercultural communication skills further to support learning. Considering the diverse backgrounds of learners creates a more supportive learning environment.

The overall grand mean of 4.2886 further reinforces the positive perception of classroom management and challenges, indicating an "Agree" sentiment across all indicators. This data suggests a generally positive and supportive learning environment in public elementary schools. It is essential to note that this data is based on a single point in time and may not accurately reflect changes that occur over time. Further research would be necessary to determine the long-term classroom management trends and identify any factors that may contribute to the positive perception. Despite these limitations, the data provides valuable insights into the current state of classroom management and challenges. The positive perception of classroom management and challenges is encouraging, suggesting that public elementary schools provide a supportive and conducive learning environment for learners.

3.3 Relationship Between Profile Variables and Classroom Issues and Challenges

Table 3 presents the results of correlation analyses examining the relationship between various factors (age, sex, civil status, years of service, academic rank, and educational attainment) and different aspects of school climate. Only one significant correlation was found - between age and relationship and communication ($r = 0.430$, $p < 0.001$), suggesting that older teachers tend to have a more positive perception of relationships and communication in the school. All other correlations were insignificant, indicating that the other factors examined do not have a significant relationship with the perceived school climate in these areas.

Table 3. *Relationship between the profile of the respondents and classroom issues and challenges*

Variables		Computed r	p-value	Decision	Conclusion
Physical Environment	Age	0.019	0.841	Failed to reject Ho	Not Significant
	Sex	0.020	0.838	Failed to reject Ho	Not Significant
	Civil Status	0.066	0.494	Failed to reject Ho	Not Significant
	No. of Years in Service	0.158	0.099	Failed to reject Ho	Not Significant
	Academic Rank	0.332	0.001	Reject Ho	Not Significant
	Educational Attainment	0.041	0.674	Failed to reject Ho	Not Significant
Behavior Management	Age	0.068	0.483	Failed to reject Ho	Not Significant
	Sex	0.083	0.388	Failed to reject Ho	Not Significant
	Civil Status	0.031	0.752	Failed to reject Ho	Not Significant
	No. of Years in Service	0.025	0.793	Failed to reject Ho	Not Significant
	Academic Rank	0.122	0.204	Failed to reject Ho	Not Significant
	Educational Attainment	0.055	0.566	Failed to reject Ho	Not Significant
Instructional Management	Age	0.125	0.194	Failed to reject Ho	Not Significant
	Sex	0.163	0.089	Failed to reject Ho	Not Significant
	Civil Status	0.097	0.315	Failed to reject Ho	Not Significant
	No. of Years in Service	0.052	0.588	Failed to reject Ho	Not Significant
	Academic Rank	0.089	0.358	Failed to reject Ho	Not Significant
	Educational Attainment	0.132	0.170	Failed to reject Ho	Not Significant
Relationship & Communication	Age	0.141	0.141	Failed to reject Ho	Not Significant
	Sex	0.430	0.000	Reject Ho	Significant
	Civil Status	0.069	0.477	Failed to reject Ho	Not Significant
	No. of Years in Service	0.083	0.388	Failed to reject Ho	Not Significant
	Academic Rank	0.003	0.979	Failed to reject Ho	Not Significant
	Educational Attainment	0.021	0.830	Failed to reject Ho	Not Significant
Student Engagement	Age	0.070	0.468	Failed to reject Ho	Not Significant
	Sex	0.067	0.489	Failed to reject Ho	Not Significant
	Civil Status	0.013	0.896	Failed to reject Ho	Not Significant
	No. of Years in Service	0.011	0.908	Failed to reject Ho	Not Significant
	Academic Rank	0.083	0.390	Failed to reject Ho	Not Significant
	Educational Attainment	0.164	0.0.87	Failed to reject Ho	Not Significant
Emotional Climate	Age	0.086	0.372	Failed to reject Ho	Not Significant
	Sex	0.034	0.727	Failed to reject Ho	Not Significant
	Civil Status	0.005	0.958	Failed to reject Ho	Not Significant
	No. of Years in Service	0.049	0.612	Failed to reject Ho	Not Significant
	Academic Rank	0.065	0.467	Failed to reject Ho	Not Significant
	Educational Attainment	0.061	0.529	Failed to reject Ho	Not Significant
Discipline Strategies	Age	0.118	0.221	Failed to reject Ho	Not Significant
	Sex	0.050	0.605	Failed to reject Ho	Not Significant
	Civil Status	0.009	0.928	Failed to reject Ho	Not Significant
	No. of Years in Service	0.001	0.989	Failed to reject Ho	Not Significant
	Academic Rank	0.006	0.949	Failed to reject Ho	Not Significant
	Educational Attainment	0.114	0.236	Failed to reject Ho	Not Significant
Cultural Competence	Age	0.137	0.153	Failed to reject Ho	Not Significant
	Sex	0.022	0.821	Failed to reject Ho	Not Significant
	Civil Status	0.001	0.995	Failed to reject Ho	Not Significant
	No. of Years in Service	0.022	0.822	Failed to reject Ho	Not Significant
	Academic Rank	0.026	0.786	Failed to reject Ho	Not Significant
	Educational Attainment	0.101	0.294	Failed to reject Ho	Not Significant

3.4 Strategies in Addressing Classroom Management Issues and Challenges

This section presents the thematic analysis of the participants' perspectives on modern classroom management issues and the interview transcripts with the chosen respondents of the study for a qualitative part, extracting eight major themes across the different indicators. These themes reveal the various ways the respondents cope with the challenge. The findings suggest that effective classroom management relies on adaptive environments, positive reinforcement, differentiated instruction, open communication, and culturally responsive teaching. By integrating these insights, teachers and educators in the Philippines can create dynamic and supportive learning environments that cater to the evolving needs of Filipino learners while embracing local cultural and contextual realities.

Creating an Adaptive and Inclusive Learning Environment

The participants emphasized the importance of a flexible and conducive classroom setup, user-friendly furniture, and sufficient lighting and ventilation. They emphasized the urgent need for learning spaces accommodating diverse learners, including those with learning disabilities. The schools in Agusan del Sur faced overcrowded classrooms and a lack of resources. These prompted teachers to maximize the school's mini gym space and implement cost-effective solutions, such as utilizing natural lighting and repurposing materials for classroom

improvement. Some teachers also suggested the integration of technology-friendly setups and noise-reduction strategies to enhance the learning environment.

"We made sure that we are resourceful because not every material or need of ours is provided by DepEd."
"We requested additional funding for technology resources."
"Utilizing initiative to address overcrowded classrooms by utilizing available space for learning within the school environment."

According to Dagunduro et al. (2024), creating an adaptive and inclusive learning environment is crucial for promoting educational equity. This involves tailoring educational practices to meet the diverse needs of all students, ensuring that each learner has access to the resources and support necessary to succeed.

Reinforcing Positive and Restorative Practices
In behavior management, the participants preferred reinforcing positive practices, such as reward systems and recognition programs, and encouraging desirable attitudes towards peers and learners. Many advocates promoted restorative justice practices over punitive approaches, emphasizing conflict resolution and peer mediation to foster a more harmonious classroom environment. In an educational setting, strengthening values, education, and character formation play a significant role in behavior management, with teachers integrating cultural and moral lessons to instill discipline and respect among learners.

"We try to develop effective assessments aligned with new methods, which is crucial yet challenging."
"Implementing new educational approaches presents numerous challenges."
"Inconsistency in the implementation across different classrooms can create inequities."

According to Brown (2023), teachers' preferences for positive reinforcement align with contemporary educational research emphasizing a constructive approach to behavior management and restorative practices in the classroom. This perspective supports the idea that fostering a favorable classroom climate can significantly enhance student engagement and reduce occurrences of misbehavior. By utilizing restorative practices, such as community circles and peer mediation, educators create opportunities for students to engage in dialogue, understand different perspectives, and develop empathy, critical components in resolving conflicts and improving relationships among classmates.

Enhancing Differentiated and Learner-Centered Instruction
The participants emphasized the need to enhance differentiated instruction to meet and cater to diverse learning needs. They emphasized using various instructional strategies, including cooperative learning and technology integration, despite the challenge of internet connectivity. The participants even narrated how they addressed this problem. Most of them use mobile data to address internet connectivity, continually providing learners with diverse learning experiences. In the Philippine setting, the K-12 curriculum encourages contextualized instruction, where lessons are adapted to local culture and real-life applications. Individualized or personalized learning paths and formative assessments were also highlighted as essential in ensuring effective instructional management.

"We adopt new educational trends despite our limitations."
"Ensuring accessibility and differentiation for diverse learners adds complexity."
"I will divide them according to their strengths, such as linguistic skills and visual-spatial."

According to Onyishi and Sefotho (2020), enhancing differentiated instruction is crucial for meeting and catering to diverse learning needs. Differentiated instruction involves tailoring teaching environments, content, processes, and products to accommodate students' varying abilities, interests, and learning styles. This approach is critical in inclusive classrooms, where students with diverse backgrounds and abilities learn together. It emphasizes how differentiated instruction reflects a broader educational trend towards inclusivity and personalization in teaching. By adopting varied instructional strategies, educators can better address the unique needs of each student, thereby enhancing engagement and learning outcomes. The integration of technology, despite connectivity challenges, demonstrates a commitment to providing equitable access to educational resources.

Building Trust and Open Communication/Dialogue

Regarding relationships and communication, the participants emphasized the importance of establishing strong relationships with learners and their parents through active listening, empathy, and respect. Open and transparent communication channels, including parent-teacher meetings, district meetings between teachers and school heads and supervisors, and peer mentorship programs, were noted as effective strategies for fostering meaningful interactions. In a misunderstanding or conflict, a grievance committee is designated to address the issue. In Agusan del Sur, strong family involvement in education is a cultural norm, and schools often rely on community partnerships and barangay interventions to support the development of the learners.

"Helping students who need extra support on time, managing misbehavior, and balancing work with personal life."
"Providing adequate resources, open communication, and consistent implementations in the classroom."
Regular evaluations and adjustments were made based on assessment data.

According to Felten et al. (2023), building trust in the classroom involves deliberate actions by teachers to establish and maintain trust with students. These actions, or "trust moves," include demonstrating competence, integrity, and care, essential for creating a supportive and effective learning environment. The emphasis on active listening, empathy, and respect highlights the importance of emotional intelligence in educational settings. By engaging in open and transparent communication, teachers can foster stronger relationships with students and parents, ultimately leading to improved educational outcomes.

Intensifying Interactive and Experiential Learning Approaches

In student engagement, teachers and other educators recommend integrating hands-on activities, gamification, reading interventions, Gulayan sa Paaralan Program, Project LEARN (Let's Enjoy and Read Now), Project MARRe (Mag Feeding Aron Ready sa Reading), and inquiry-based learning to boost learners' engagement. Engaging learners to be motivated to lead in discussions, apply real-world concepts, and participate in extracurricular activities was also emphasized to maintain learners' interest and motivation. Engagement is further enriched in the participants' schools through local festivals, Indigenous knowledge systems, and the integration of mother-tongue-based instruction, particularly in early grade levels.

"Managing a more flexible classroom can be challenging."
"Foster a culture of continuous improvement."
"Secure additional funding for resources such as technology and updated curriculum materials."

According to Blyznyuk and Kachak (2024), interactive learning significantly enhances students' critical thinking skills by promoting active participation, problem-solving, and collaboration. Integrating interactive and experiential learning approaches in education is essential for promoting student engagement and developing critical thinking skills. Educators can create a dynamic and stimulating learning environment by incorporating hands-on activities, gamification, and inquiry-based learning. These methods make learning more enjoyable and encourage students to participate and take ownership of their education actively.

Fostering a Supportive and Safe Learning Environment

The participants emphasized creating a nurturing and psychologically safe classroom in an emotionally charged climate. Strategies included implementing mindfulness practices, socio-emotional learning (SEL) activities, and peer support systems. Providing counseling resources and proactively addressing mental health concerns were also key elements in fostering a favorable emotional climate. In schools, designated guidance counselors are assigned to conduct peer counseling programs, initiate activities among students to organize clubs, and organize activities that foster a supportive and safe learning environment. Another common strategy identified by the participants is engaging parents and other stakeholders in managing classroom behavior. Many teachers believe that open communication with parents helps reinforce classroom expectations at home. This partnership fosters a consistent approach to discipline and encourages students to take responsibility for their actions.

"Effective time management and workload distribution strategies are essential."
"Implement clear rules, policies, and structures to manage students effectively."
"Improve communication channels between teachers, parents, and administrators."

Mempin (2024) states that the synergy between student responsibility and teacher skills is essential in creating a safe and inclusive learning environment. It emphasizes the importance of the collaborative efforts between students and teachers in fostering a favorable school climate. A harmonious and inclusive learning environment is created when students take responsibility for their actions and teachers provide guidance and support. This collaboration promotes academic success and enhances students' social and emotional well-being.

Balanced Approach Between Structure and Flexibility

For disciplined strategies, participants highlighted the need for clear, consistent, and fair discipline policies, regardless of economic status or culture, while allowing for flexibility in addressing individual differences. Many advocated for a mix of firm guidelines and compassionate intervention, incorporating student reflection activities and parental involvement in discipline matters. In Agusan schools, values-based discipline is often implemented, incorporating religious and ethical education to instill proper conduct and responsibility among learners.

"Encouraging collaboration among teachers through peer evaluation and shared planning helps overcome challenges."
"Resources were allocated to support the new approach."
"Developing individualized learning plans, creating a supportive and inclusive classroom environment."

According to Ruesch and Sarvary (2023), introducing an "extension without penalty" system represents a practical application of this balanced approach. Educators can address diverse student needs without compromising accountability by establishing clear guidelines for assignment submission while embedding flexibility through the option to request extensions. This dual approach fosters an inclusive environment that respects individual circumstances, improving student engagement and performance. However, challenges remain. Teachers must communicate these policies effectively to ensure all students know their options without feeling stigmatized or singled out. Moreover, the balance between structure and flexibility must be continually evaluated to ensure it serves all students equitably, particularly in diverse classrooms where socioeconomic factors may impact access to resources and support.

Promoting Diversity, Equity, and Inclusion

Regarding cultural competence, the participants acknowledged the increasing diversity in modern classrooms and stressed the need for culturally responsive teaching. Strategies included integrating multicultural perspectives into the curriculum, celebrating cultural diversity through school events, and fostering an inclusive mindset among learners through presentations during activities focused on equity and social justice. In the Philippine educational system, Indigenous Peoples' Education (IPED) programs, heritage of language preservation, and participation in community engagement initiatives will help promote cultural advocacy for awareness and respect for diverse ethnic groups.

"Building a supportive school culture that values innovation."
"Addressing digital divides."
"Teacher training should be prioritized for integrating global citizenship education."
"Opportunities for teachers and learners to share experiences and best practices."

According to Rogahang et al. (2023), inclusive education practices are essential for fostering diversity and equity in the classroom. The study highlights the importance of adopting student-centered approaches, promoting teacher professional development, and implementing inclusive curricular adaptations to create environments that celebrate differences and provide equal opportunities for all learners. However, educators often face resource constraints, varying levels of support, and the need for ongoing professional development. Furthermore, implementing inclusive strategies requires educators, support staff, and administrators collaboration. Addressing these challenges is crucial for successfully promoting diversity, equity, and inclusion in educational settings.

4.0 Conclusion

The findings indicate that teachers demonstrate a strong commitment to behavior management, as high ratings show. This suggests that they effectively create engaging lessons that encourage student participation. However, challenges persist in managing the physical environment, instructional strategies, relationships, communication, and cultural competence. These difficulties are linked to a lack of support structures and limited local engagement.

To address these issues, reviewing and refining existing strategies, programs, and policies to improve classroom management is necessary. Continuous innovation and professional development should be prioritized to strengthen teaching effectiveness and the overall educational experience.

5.0 Contributions of Authors

The authors of this research collaborated to review and approve the final version of the study. This ensures the study's completeness and integrity. Author Jane C. Oropa played an integral part in the editing, writing, supervision, data analysis, and encoding. Author Josephine T. Marquez concentrated on conducting fieldwork, distributing and retrieving survey instruments, doing comprehensive data analysis, transcribing the gathered material, and adhering to ethical guidelines throughout the study. These complementary contributions underscore the collaborative endeavors and mutual obligations as adviser and mentee to generate a thorough and ethically robust research output.

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Reversing Traditional Gender Roles: Narratives of Househusbands With Working Wives

Kyle Russelle P. Paredes*, Anajane Marie L. Silvestre, Teresa V. Buna
Cavite State University – Imus, Imus, Cavite, Philippines

*Corresponding Author Email: kylerusselle.paredes@cvsu.edu.ph

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Abstract. This study explored the narratives of five househusbands from Cavite, Philippines, focusing on their preparations for the role and experiences in financial management, childrearing, household management, interpersonal relationships, and time management. Participants were selected based on specific criteria: having children, being full-time househusbands for more than two months, having working wives, and living in a nuclear family setup. Initially, these men were breadwinners with minimal involvement in household chores. However, financial difficulties, such as low income, unstable earnings, and job loss, led them to transition into full-time caregiving roles. As they adapted, they demonstrated resilience, dedication, and care for their families, learning to manage daily responsibilities efficiently. They developed personalized time management strategies, acquired new household skills, and overcame challenges disciplining their children while expressing love differently. Over time, their competence in household and caregiving tasks improved, creating a sense of fulfillment and happiness in their roles. Reflecting on their experiences, participants concluded that being a househusband does not diminish one's masculinity. Instead, their journey highlights the importance of redefining traditional gender roles, breaking societal stereotypes, and embracing diverse family dynamics in a changing social landscape.

Keywords: Family dynamics; Gender roles; Househusbands; Gender; Narratives.

1.0 Introduction

The Filipino expression "*haligi ng tahanan*" (pillar of the household) reflects the traditional expectations for gender roles and behavior inside the family unit, where the father is regarded as the central defender, provider, and leader. The father is responsible for providing for the family's financial needs and ensuring their essential needs are satisfied. Making significant judgments and being responsible for household matters are frequent responsibilities of this role. The Filipino term "*ilaw ng tahanan*" (light of the household) is a cultural idea emphasizing the mother figure's crucial function and importance within the family and domestic setting. The expression captures the idea that mothers are viewed as the emotional, guiding, and caring force that offers coziness, love, and stability to the home. Mothers are frequently seen as the major caregivers in charge of raising their children, running the home, and supporting their family members emotionally. Customarily, the father serves as the family's primary provider and titular leader in the Philippines' patriarchal society (Guinto, 2019). The cultural norms and ideas passed down through Filipino society's generations are the origins of these traditional gender roles and indicators.

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The concept of stay-at-home parents has often been associated with mothers. However, there has been a significant rise in the number of men choosing to stay at home and take on the traditional tasks typically performed by women, challenging the notion that caregiving is solely a female domain. There is now a significant societal shift in attitudes toward gender roles and parenting taking place, as more men are staying at home and tending to childcare (Wang, et al., 2013). In today's society, a man who takes on the primary responsibility for running the home and looking after the family's domestic duties, with his partner or spouse handling the primary responsibility for working outside the home, is called a "househusband".

This emerging dynamic, however, is not without tension. Househusbands often face social scrutiny and internal conflict due to persistent cultural expectations that define masculinity through economic provision and leadership. Despite progressive strides in gender equality, societal acceptance of men as primary caregivers remains limited and influenced by longstanding stereotypes. Crucially, economic and educational factors deeply influence the transition to a househusband role. For many men, lower educational attainment and limited employment opportunities, particularly in low-income households, contribute to their reassignment of roles (Cerrato & Cifre, 2018). Financial hardship, job instability, or underemployment often catalyzes this shift. In contrast, their wives, who may have achieved higher educational qualifications or more stable income sources, often take on the breadwinning role (Oláh et al., 2018). This reversal underscores how socioeconomic status intersects with gender expectations, influencing family decisions and individual identities (Tanyag, 2017).

As educational and career opportunities for women continue to grow, particularly in urban settings, more families are adapting to pragmatic role-sharing arrangements (Oláh et al., 2018; Cerrato & Cifre, 2018). These shifts reveal the complex negotiations within households where income and educational disparities reshape traditional norms. In many cases, the househusband role is not solely a voluntary decision but a product of economic necessity and strategic adaptation to contemporary realities. According to Kuteesa et al. (2024), several efforts to challenge and break away from traditional gender roles have gained momentum, promoting gender equality, equal opportunities, and the dismantling of gender stereotypes. This includes organizations and programs encouraging men to embrace nurturing and caregiving roles, and empowering women to pursue careers and leadership positions traditionally dominated by men. The aim is to create a more inclusive society where individuals can express their talents, abilities, and aspirations, irrespective of gender. Over the past three decades, the female labor force has increased globally (Baclig, 2022), challenging the traditional division of labor. Thus, the shift towards gender equality in education and employment opportunities has contributed to the rise of working wives and househusbands.

However, societal attitudes and stereotypes still challenge them, and cultural attitudes must evolve and embrace their role. Understanding the narratives of househusbands with working wives offers valuable insights into the evolving dynamics of household gender roles. The authors intended to shed light on the roles, challenges, and societal perceptions faced by househusbands through exploring their experiences and how they affect individual well-being. By recognizing and exploring these experiences, people can foster a more inclusive and supportive environment that values diverse family models, challenges traditional gender norms, and promotes equality and understanding for all individuals, regardless of gender.

2.0 Methodology

2.1 Research Design

The study employed a qualitative research approach with a narrative research design. This design was chosen to explore and interpret human experiences, meanings, and social phenomena in a contextualized manner. Through qualitative data collection and analysis, such as observation and interviews, the study aimed to acquire the richness of human actions, cognitions, and interpersonal relations. Using narrative analysis, the authors could interpret their stories to understand how they experienced events, feelings, and decisions. This allowed the participants to organize and convey their experiences in a coherent and timely sequence.

2.2 Research Locale

While this study provides valuable insights into the experiences of househusbands, its scope is limited in several ways. The participant group was composed exclusively of individuals residing in Cavite, Philippines, without a distinction between urban and rural settings. This may limit the generalizability of the findings, as geographical

contexts can influence social norms, economic opportunities, and perceptions of caregiving roles. Furthermore, participants were all from nuclear family setups. They shared relatively similar socioeconomic backgrounds, which may not fully capture the diversity of family structures or experiences across different class or cultural contexts. Future studies would benefit from including participants from varied geographic locations, extended or non-traditional family arrangements, and a wider range of socioeconomic statuses to gain a more holistic view of the dynamics shaping male caregiving roles in the Philippine context.

2.3 Research Participants

The study collected data from five (5) participants who met specific selection criteria to ensure relevance and reliability (see Table 1). Participants were required to: have children living in the household, serve as full-time househusbands, be the primary caregivers and homemakers, have a partner who is employed, have at least two months of experience as a househusband, and be living in a nuclear family setup. By selecting a small sample size, the authors could allocate resources effectively and conduct a more in-depth analysis of each participant's experiences. The participants are all in the middle adulthood stage. Three of them engaged in side hustles as a service tricycle driver, an on-call foreman, and a farmer, while the other two were unemployed during data collection. Educational backgrounds varied: one participant had completed college, another had some college education, two had high school education, and one had completed elementary education. All participants were legally married, with family monthly incomes predominantly falling below the Filipino class threshold of ₱10,957, while one participant reported an income within the range of ₱10,957 to ₱21,914.

Table 1. *Overview of Participants' Profile*

	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
Pseudonym	P1-E3	P2-C2	P3-H4	P4-C2	P5-H8
Age	39	39	47	41	50
Marital status	Married	Married	Married	Married	Married
Educational background	Elementary	College	Highschool	College	Highschool
No. of children	3	2	4	2	8
Sideline job	Farmer	Service	N/A	N/A	Foreman
Monthly family earnings	Below P10,957	Below P10,957	Below P10,957	Below P10,957	P10,957- P21,914
Duration of being a househusband	2 years	6 years	2 months	3 years	2 years

2.4 Research Instrument

Data was collected through individual face-to-face interviews using a researcher-made semi-structured interview guide that has undergone expert validation from three psychometricians and an audio recording device for transcription.

2.5 Data Gathering Procedure

The authors developed an interview guide containing questions designed to explore the lived experiences of househusbands with working wives. To ensure the validity and appropriateness of the instrument, the interview guide was reviewed and validated by experts and subsequently translated into Filipino for better comprehension by participants. A purposive sampling strategy was employed to select respondents who met the study's criteria. Before conducting the interviews, participants were informed about the study's objectives, potential risks and benefits, the voluntary nature of their participation, their right to withdraw at any time, and the confidentiality measures in place. The timing and location of the interviews were arranged based on participants' availability and convenience. Pseudonyms were used to keep their identity confidential. Participants were required to sign an informed consent form before proceeding with the interview. During the interviews, the authors followed the structured questions in the guide while encouraging participants to provide in-depth narratives, including their thoughts, emotions, sensations, and recollections. This approach allowed for a comprehensive understanding of their experiences. After the interviews, the authors thanked the participants for their involvement. When necessary, they conducted follow-up inquiries to clarify or gather additional information.

2.6 Ethical Considerations

This study adhered to ethical guidelines to ensure the study's reliability and validity while safeguarding participants' rights. Informed consent was obtained from all participants, ensuring they were fully aware of the study's purpose, procedures, potential risks, and benefits before voluntarily agreeing to participate. Additionally,

informed consent for recording devices was secured, allowing participants to approve using audio recording for interviews while maintaining their privacy. Participants were granted full autonomy in their research participation, with the freedom to withdraw from the study at any time without facing any consequences. Storage and disposal protocols were implemented to protect sensitive data, ensuring that research materials were securely stored in a protected area to prevent unauthorized access, loss, or theft. After the study, proper disposal methods were followed per ethical regulations. Furthermore, strict confidentiality measures were upheld to protect participants' personal information and research data. The authors ensured that all collected data remained secure and inaccessible to unauthorized individuals. The study was conducted in compliance with ethical guidelines established by the profession of Psychology and the University, ensuring responsible and ethical research practices.

3.0 Results and Discussion

The findings are organized chronologically, detailing participants' experiences across six phases, each highlighting the evolution of their roles and identities. Participants' excerpts illustrate these phases, offering insights into the personal, economic, and societal factors influencing their transitions. While the findings provide significant insights into the lives of househusbands, they must be understood within the context of certain limitations. The research was conducted in Cavite, Philippines, without indicating whether participants were from urban or rural areas. These geographical environments may influence access to support networks, employment, and exposure to changing gender norms, potentially affecting how caregiving roles are perceived and experienced.

3.1 Phase 1: Pre-Househusband Life

Before assuming domestic roles, participants lived by traditional male breadwinner expectations, facing demanding work schedules and societal pressures. Their identities were intertwined with professional success, making the transition to caregiving a profound shift. For instance, one participant recalls the long commutes' physical and emotional toll (P3-H4), while another describes the emotional cost of being an Overseas Filipino Worker (P4-C2).

"Before I became a househusband, it was tough because I had to wake up early in the morning and travel to work" - P3-H4
"I was an OFW… far away from my family" P4-C2
"I was a general foreman in a company that built structures in Makati, Robinson, Tacloban, Isabela, and other places." P5-H8

These experiences highlight the complexity of moving from a provider to a caregiver, with participants navigating significant changes in identity and societal expectations. The transition underscores a shift from fulfilling prosocial roles emphasizing financial and familial stability to a caregiving role demanding emotional and psychological adjustment. This change challenges traditional gender roles, highlighting the need for greater societal flexibility in defining masculinity. The phenomenon of left-behind fathers further illustrates this shift. As more Filipino women migrate for employment opportunities abroad, men are increasingly assuming primary caregiving responsibilities (Lam & Yeoh, 2016). This role reversal disrupts traditional paternal roles and necessitates a redefinition of masculinity within the familial context.

3.2 Phase 2: Family Situations Leading to Role Assignment

Economic instability is one of the primary reasons men assume the househusband role. Financial challenges are among the most significant drivers of role reassignment in families. Studies indicate that job loss, low wages, and unpredictable work conditions often compel families to redistribute household responsibilities (Amparo et al., 2024). For instance, P1-E3 reported that his salary was insufficient to cover daily household expenses, leading to his decision to stay home while his spouse took on paid employment. Similarly, P5-H8 faced unpredictable job conditions, making it impractical to maintain steady financial contributions.

"It is not enough… my salary is not enough for the daily expenses." P1-E3

In some cases, job loss directly triggered the transition into caregiving. Participants such as P3-H8 and P4-C2 found themselves unemployed, forcing them to take on domestic responsibilities.

"*I lost my job*" P3-H8

Job loss serves as a significant turning point in these transitions. Participants such as P3-H8 and P4-C2 faced unexpected unemployment, requiring them to take on domestic responsibilities. This situation aligns with broader research indicating that economic downturns and labor market shifts disproportionately impact men in industries like construction, manufacturing, and transportation, pushing them toward alternative roles at home (Agbayani et al., 2019).

While financial hardship was central in triggering the role shift, some participants also cited personal health issues, family dynamics, or simply a desire to be more present for their children as contributing factors. These less tangible motivations suggest that caregiving roles not only react to necessity but may also reflect evolving personal values, preferences, and changing cultural norms. This aligns with broader studies highlighting the growing appeal of engaged fatherhood and emotional involvement in child-rearing as markers of modern masculinity (Doucet, 2018; Lee & Lee, 2018).

3.3 Phase 3: Family Reactions and Social Dynamics

Participants faced societal and familial pressures upon transitioning into househusband roles. While some experienced judgment and unsolicited advice from relatives, others found support from friends and community members. These external reactions reflected the persistence of traditional gender expectations, which often led to self-doubt and emotional strain.

"*My sibling told me to go back to work because I am the man*" P4-C2
"*At first, of course, they mocked you for staying at home*" P1-E3

For example, P1-E3 faced ridicule for staying at home, and P2-C2's relatives questioned his family's financial stability after his resignation. P4-C2's sibling also urged him to return to work, reinforcing the breadwinner norm. Despite these pressures, participants remained committed to their families, showing resilience despite societal skepticism. Gonalons-Pons and Gangl (2021) support the idea that, despite evolving gender norms, the expectation for men to be primary providers remains deeply ingrained. This persistent social pressure intensifies the emotional and psychological challenges that househusbands face. Societal stereotypes about masculinity often create psychological strain, with househusbands feeling inadequate or anxious due to the expectation that men should be providers. Unlike women, who often receive societal validation for caregiving, househusbands face criticism that challenges their masculinity. A lack of recognition for their caregiving role can intensify these feelings (Lee & Lee, 2016).

While participants felt frustrated, they also found empowerment through social connections. P2-C2 and P3-H4 experienced positive social shifts, forming stronger community relationships. As they adapted, the emotional support from spouses, friends, and neighbors helped boost their confidence and foster a sense of belonging.

"*So now, we have become close because my neighbors, who are also in the same line of work as me, interact in the same way, so they are the ones I have become close with. However, there have been big changes because I've made more friends now. Yes, I have improved. It is better because when they see me, sometimes when I go out, we chat… that is how our bond was formed.*" P3-H4

These experiences underscore the emotional complexity of men stepping into caregiving roles. Unlike women, who often receive societal validation for caregiving, househusbands face criticism that challenges their masculinity. A lack of recognition for their caregiving role can intensify these feelings (Guansing et al., 2023). However, supportive networks can mitigate these challenges, enhancing their psychological resilience. Encouragement from others, such as positive feedback from neighbors, helps build self-esteem and reinforces their caregiving identity.

Moreover, encouragement from others boosted their confidence, validated their choice, and created a supportive environment. P1-E3 found emotional support from friends helpful in managing criticism, while P2-C2 felt reassured by positive feedback on his parenting. P3-H4 gained self-esteem from neighbors' praise for his

household efforts. Participants' experiences show that when househusbands feel valued by their communities, they are more engaged and effective in their caregiving roles. Supportive networks can mitigate these challenges, enhancing their psychological resilience. Encouragement from others, such as positive feedback from neighbors, helps build self-esteem and reinforces their caregiving identity (Ike et al., 2023). Encouraging and respecting men in caregiving roles not only benefits their mental health but also promotes more balanced gender roles within families. These experiences underscore the emotional complexity of men stepping into caregiving roles. Many men experience an initial struggle with societal perceptions and personal identity, as masculinity is traditionally associated with financial provision (Amparo et al., 2024). However, over time, supportive family dynamics and positive reinforcement from spouses and communities can help ease this transition.

3.4 Phase 4: Preparations for the Househusband Role

Becoming a househusband involves huge psychological, emotional, and practical adjustments. Unlike regular work, managing domestic responsibilities and childcare requires more organizational ability, flexibility, and resilience. Participants emphasized the importance of resilience and adaptability, prioritizing family needs over personal aspirations. P2-C2 and P5-H8 highlighted emotional stability as a key factor in successfully managing uncertainties, a finding supported by studies on role reversals in family structures (Agbayani et al., 2019). For instance, P1-E3 puts much effort into planning his daily routine to coordinate household work and self-care. He lays out a structured morning routine that involves preparing breakfast, showering, and starting household chores. Similarly, P3-H8 places much emphasis on his child's school routine while, at the same time, undertaking cooking, cleaning, and childcare responsibilities.

"Before you sleep, you think about what you must do the next day. It makes your sleep better, and when you wake up, you have breakfast and coffee... then a shower, and after that, work starts. I even cook, drive the kids to school, and sometimes do laundry too." P1-E3

"I wake up early every day, especially because my youngest is studying. I wake up early to avoid disturbing him since he still has to go to school. I wake up, cook, and then drive him to school." P3-H8

Becoming a househusband involves huge psychological, emotional, and practical adjustments. Unlike regular work, managing domestic responsibilities and childcare requires organizational ability, flexibility, and resilience. Current literature shows that role changes, particularly those against societal norms, can initially be stressful but eventually lead to higher personal satisfaction and better family relationships (Amparo et al., 2024). Evidence supports the significance of establishing routines in effective home management. Establishing an attainable daily routine makes people feel more in charge of their plan and activities, enhancing efficiency and reducing tensions (Balmet, 2014). Moreover, assuming mutual home chores fosters unity and mutual development between partners, leading to an equal and harmonious home setup (Bhalaji, 2022).

3.5 Phase 5: Experiences as Househusbands

The househusband role contradicts traditional gender roles and requires much adaptation. Although some men are pushed into this role by circumstance, others become primary caregivers. Their experiences depend on various factors, such as time management, child-rearing issues, discipline practices, emotional fulfillment, and scope for personal growth. This part discusses these topics in greater depth, exploring how househusbands organize their work and remake masculinity in family life today.

Time Management: Juggling Multiple Roles

One of the most significant challenges for househusbands is the successful execution of several household chores. As others use schedules to keep everything in check, others learn how to multitask. Time management has been discovered to be a necessary skill in caregiving, as the capability to manage household chores and childcare tasks and self-wellness is vital in maintaining household harmony (Guansing et al., 2023). P3-H4 preferred multitasking as his preferred approach, juggling the tasks of cleaning, cooking, and taking children to school simultaneously. In contrast, however, a regular daily routine in P2-C2 was designed to ensure uniformity and effectiveness. Househusbands create personalized plans according to the particular needs of their households. The plans prioritize their flexibility and adoption of traditionally feminine roles.

Parenting Challenges: Adjusting to Full-Time Parenting

Most househusbands encounter difficulties in converting to full-time parenting, particularly those with less experience in child-rearing before assuming their home duties. Empirical evidence indicates that men who become caregivers feel incompetent and uncertain as they have to learn parenting skills that were not familiar to them (Francisco & Francisco, 2022). For example, househusbands formerly breadwinners may feel compelled to "prove" themselves as parents in the home. Role reversal can be stressful since men are stereotypically not caregivers but providers.

Disciplinary Approaches: Navigating Authority and Compassion

Parenting involves setting boundaries and using discipline; however, househusbands use different approaches in discipline and controlling the child's behavior. Some use a more understanding and conversation-based approach, whereas others apply traditional discipline methods. P2-C2 highlighted the need to know the reasons behind misbehavior before punishing it. This position is consistent with evidence indicating that positive reinforcement and open communication facilitate stronger parent-child relationships (Shah, 2023). P1-E3, however, sometimes employed strict discipline like spanking, which he disagreed with his wife. These diverse approaches illustrate the fluidity of fatherhood and the challenge of balancing authority and emotional closeness.

Love and Caregiving: Expressing Affection in Different Ways

Househusbands show their children that they love them by carrying out routine caregiving tasks. Most individuals show their love by serving, including preparing food, preparing the children for school, and assisting with homework. These actions align with findings regarding the "love languages" theory, which explains that people express and receive love in various forms (Francisco & Francisco, 2022). Physical affection is how some househusbands show love, e.g., hugging their kids. Others put quality time first, ensuring they are available for their children's milestones and routines. However, by taking on the role of caregivers, these men short-circuit the traditional masculine constructions that identify power with emotional regulation.

Personal Growth: Learning and Adapting to New Responsibilities

To be a househusband, men must usually learn new cooking, cleaning, and home maintenance skills. With time, most men are self-assured and proud to be able to contribute to their homes. Scientific research shows that men who engage in caregiving activities tend to learn more emotional intelligence and problem-solving skills (Guansing et al., 2023). P2-C2, for instance, learned to prepare and cook food for his family, something he had no experience doing prior to this. P5-H8 upgraded his household maintenance skills, thus making their home life convenient and operational. These experiences enable a broader redefinition of gender roles, demonstrating that care is not necessarily associated with women.

Happiness and Fulfillment: Finding Joy in the Role

Although there are initial challenges, most househusbands ultimately experience happiness and fulfillment in their caregiving roles. The research indicates that men who actively participate in their children's lives have greater emotional well-being and satisfaction (Shah, 2023). P5-H8's happiness was his ability to talk to his children and see them grow. P2-C2 was proud of his children's personal and academic achievements and recognized his contribution to their growth. This sense of completion comes from a redefinition of masculinity that emphasizes emotional connection and care over conventional definitions based on economic support.

Navigating Gender Norms: Challenging Societal Expectations

Societal judgment is one of the biggest challenges for househusbands. Traditional gender roles position men as breadwinners, and caregivers are judged. They are condemned by extended families or peers who perceive their role as non-traditional (Shah, 2023). But most househusbands discover how to play by these rules by confidently taking ownership of their caregiving responsibilities. Their experiences work to redefine gender norms, establishing that men are as nurturing and competent in the home as women.

Routine and Efficiency: Establishing Structure in Daily Life

Househusbands develop systematic schedules to carry out their responsibilities efficiently. This ensures order in the house and that all tasks are completed professionally. The daily routines generally include breakfast, getting school-going children ready for school, and doing chores around the house. Afternoon activities may include meal

preparation, errands, recreational activities, or rest. By creating an efficient schedule, househusbands enable a clean home setting and thus prove themselves effective caretakers. Research indicates routine daily practices are key to fostering family care and well-being, specifically among men stepping into caregiving. Male caretaker homemakers who establish routine frameworks have recorded less stress and more effectiveness in discharging their roles (Hackensack Meridian Health, 2020; Tuminello, 2020). Repetitive and routine protocols have been shown to enhance control perceptions, lessen apprehension, and foster mental stability, which is important amid changes. Househusbands' lives uncover the changing gender roles in modern families. Although they face challenges in time management, child care, and social expectations, they also enjoy satisfaction, personal growth, and a sense of achievement in their work. Their lives uncover the importance of being flexible and persistent and prove that caring is not a gendered activity but a human one.

3.6 Phase 6: Reflection and Valuation of Experience

This phase emphasizes how househusbands challenge traditional gender roles and redefine their sense of masculinity through caregiving and household responsibilities. The participants reflect on transforming their identities, relationships, and sense of fulfillment. Rather than perceiving their roles as diminishing their masculinity, they see them as empowering and central to the family's well-being.

Masculinity Being Flexible

One key theme is the idea of masculinity being flexible, rejecting the notion that fulfilling household responsibilities makes a man less masculine (Doucet, 2018). For example, P2-C2 boldly asserts:

"A real man, of course, because being a househusband does not make a man any less of a man."

Similarly, P3-H4 emphasizes that true masculinity lies not in dominance or rigid gender roles but in kindness, emotional strength, and non-violence, challenging societal perceptions that associate caregiving with weakness. These reflections align with psychological research suggesting that househusbands often experience a more profound sense of fulfillment and empowerment as they embrace caregiving roles. Rather than being a loss of status, their involvement in household tasks enhances their family life and deepens their connection with their children and spouse. The evolving role of househusbands challenges traditional notions of masculinity, emphasizing that engaging in household responsibilities does not diminish a man's masculinity. Research indicates that stay-at-home fathers often experience a more profound sense of fulfillment and empowerment as they embrace caregiving roles, enhancing family life and strengthening connections with their children and spouses (Lee & Lee, 2018). For these men, nurturing and caring for their families becomes central to their identities, providing a profound sense of purpose and pride.

Building Open-Mindedness and Emotional Resilience

Another common theme relates to building open-mindedness and emotional resilience. Earlier research has shown that resilience, accompanied by adaptive coping strategies in caregivers, is associated with favorable psychological outcomes, lower levels of stress, and better well-being (García-Alberca et al., 2019). Participants identify the need for adaptability while performing household responsibilities and the emotional calmness needed to manage family relationships. For instance, P1-E3 underscores the importance of staying calm and adaptable, especially in dealing with the emotional intricacies of caregiving. Similarly, P5-H8 highlights the importance of emotional resilience since he knows that staying calm and avoiding negative thought patterns during altercations improves his relationship with his wife. This is supported by research that shows that skills in regulating emotions, like cognitive reappraisal and sustaining a positive outlook, are significant in building resilience among caregivers (Conversano et al., 2023). This psychological shift towards emotional openness helps househusbands adjust to changing roles and fosters more harmonious relationships. Their ability to embrace new perspectives and responsibilities fosters personal growth and strengthens their emotional connections with their families.

Deepened Familial Relationships

The final theme centers on the deepened familial relationships that emerge from active caregiving. Many househusbands express pride and fulfillment in their roles as caregivers. P2-C2, for instance, explains that his decision to become a househusband stemmed from his desire to prioritize his children's well-being, emphasizing that his role as a caregiver is a form of love and protection for his family. P3-H4 similarly reflects on the importance

of conflict resolution within the household, recognizing that maintaining peace in front of his child is crucial for their emotional development. Research indicates that fathers who engage in caregiving experience stronger emotional bonds with their children and greater family cohesion (Lamb, 2010). P5-H8 finds pride in managing his children's needs and activities, demonstrating househusbands' joy and pride in their contributions to family life (Cabrera et al., 2018).

"I am proud because…I am proud of myself because I could care for my child's needs." P5-H8

The reconceptualization of masculinity that these narratives account for transcends the simple redefining of roles in the household; it works actively to alter wider society's discussions about gender and fairness. When men take up caregiving roles assigned as feminine, they visibly challenge rigid gender binaries between provider and carer. This visible disruption of gendered labor norms functions as a personal adjustment and a political statement that contests the societal structures upholding rigid gender roles. Over time, such role reversals can, in principle, force institutional and community attitudes towards change, towards a shared recognition that caregiving is not feminine but a shared human obligation. Such altered perceptions can, in turn, further facilitate a culture valuing emotional labor, empathy, and domestic skills as skills for all individuals regardless of gender.

Overall, the study suggests that being a househusband redefines their masculinity and enhances their emotional and psychological well-being. Their deepened familial connections, emotional resilience, and fulfillment from caregiving roles challenge traditional gender norms and underscore the evolving nature of fatherhood and masculinity in modern family life. Their experiences demonstrate that masculinity is not a fixed construct but rather a fluid and evolving expression of responsibility, care, and emotional engagement.

4.0 Conclusion

This study offers a deeper understanding of the transformative experiences of househusbands in the Philippines, shedding light on how traditional gender roles are being redefined within households. The findings reveal that economic challenges often drive these men to transition from breadwinners to primary caregivers, reshaping their identities and expanding their roles within the family. Through this shift, participants demonstrated resilience, adaptability, and dedication, challenging conventional notions of masculinity and domesticity. Underscoring the importance of exploring gender role reversal in the context of evolving family dynamics, particularly in traditionally patriarchal societies. The participants' narratives reflect a profound shift in responsibilities and perceptions of caregiving and homemaking as integral aspects of their identity. These men redefined fatherhood and masculinity by embracing non-traditional roles, creating more inclusive and supportive family environments.

The participants initially prioritized earning income with minimal involvement in household tasks, adhering to traditional breadwinner roles that left caregiving and domestic responsibilities to their partners. Financial hardships, such as low income and job loss, prompted a transition to becoming househusbands, showcasing their adaptability and commitment to their families. As househusbands, they developed personalized strategies to manage their time and responsibilities effectively, balancing household chores, caregiving, and personal obligations. Despite initial unfamiliarity, they adapted to tasks like cooking, cleaning, and disciplining children, enhancing their competence and confidence over time. This role shifting brought a sense of accomplishment, fulfillment, and pride, as participants redefined traditional gender roles and embraced caregiving with positivity. Their proactive approach fostered stronger family bonds, mutual respect, and a more inclusive perspective on family dynamics. By breaking conventional norms, they demonstrated that caregiving and homemaking transcend gender, creating a supportive and equitable environment within their households.

As gender role reversals become more common, this study highlights the need for societal acceptance and structural support to facilitate these transitions. Based on the findings of this study, this research proposes the implementation of gender-sensitive and inclusive policies that recognize the efforts of househusbands. Such policies may include gender-neutral parental leave and reintegration programs for full-time caregivers. Schools and community organizations should, in turn, promote awareness through gender sensitivity training, inclusion of non-traditional family roles in curricula, and campaigns aimed at de-stigmatizing male participation in caregiving. Local government offices and Non-Governmental Organizations can, in turn, develop support networks and skill development courses for male caregivers. At the same time, advocacy groups and the media

should be encouraged to promote positive portrayals of househusbands to deconstruct dominant stereotypes. Finally, developing a national plan for constructing gender-inclusive family structures is proposed to empower institutions to promote supportive and equitable environments for all caregivers.

Future studies should explore the broader societal implications of these changes. For instance, how do communities and workplaces respond to this redefinition of gender roles? What policies and resources can better support families navigating similar transitions? Additionally, further research could explore the intersection of class, education, and regional differences in shaping the experiences of househusbands and the long-term impact of these roles on family dynamics and gender equality.

5.0 Contributions of Authors

The authors contributed equally to all sections of the study. They have thoroughly reviewed and approved the final version of the work.

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7.0 Conflict of Interests

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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Open Educational Resources (OER) Library Service: Baguio Patriotic High School End Users' Perspective

Venus L. Fa-ed
Benguet State University, La Trinidad, Benguet, Philippines

Author Email: fvenlaw@gmail.com

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Abstract. This study aimed to assess the perspective of Baguio Patriotic High School end-users, focused on the teachers and the students, on adopting Open Educational Resources (OER) as part of library services, the level of usefulness, ease of use, and the level of acceptance. It also presents the correlation between the level of usefulness, ease of use, and acceptance of OER among teachers and students. Descriptive statistics using weighted mean and ranking were used to analyze and assess the level of usefulness of OER, the level of ease of use of OER, and the level of acceptance of OER by teachers and students. For the correlation, a Pearson Correlation Coefficient (r) was used. Results show that both teachers and students of BPHS found OER to be an invaluable resource and user-friendly for obtaining essential information for their teaching and academic work. Thus, teachers and students are open to embracing and integrating OER in library services. On the other hand, there is a positive correlation between the level of usefulness of OER, the level of ease of use of OER, and the level of acceptance of OER among students and faculty of BPHS.

Keywords: Library services; Open Educational Resources; High school.

1.0 Introduction

Article XIV, Sec 1 of the Philippine Constitution and Sections 10 and 12 of the Republic Act 10650, also known as the Open Distance Learning Act, and in response to the 2012 Paris OER protestation, the Department of Education (DepEd), the Technical Education Skills and Development Authority (TESDA), and the Commission on Higher Education (CHED), and the University of the Philippines Open University (UPOU) concertedly issue this OER policy in the Philippines to promote and support the development and use of high-quality OER to ensure inclusiveness and access to equitable literacy learning in both formal and non-formal education from a perspective of lifelong literacy, towards an applicable and effective system of delivering quality education and the attainment of sustainable development in the country (Llego, 2024).

To attain quality education, libraries help their end-users with the high cost of demand for learning materials needed for the K-12 curriculum by adopting these online resources that will help satisfy the needs of the students and teachers in their teaching and learning without thinking of high-cost payment or subscription. It helps students meet the demands of their educational requirements, and helps teachers look into additional supplements that would add to their learning lessons. Adopting OER as part of library services, as seen on Boston College's website (Boston College Libraries, 2023), will enable more learners to explore resources without worrying about where to find information beyond the books and other collections offered by the library.

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Libraries play a significant role in supporting the information needs of their stakeholders. According to the Standards for Philippine Libraries: School Library and Media Centers, an efficient library media center must address the needs of students, teachers, and other end-users. It should be adequately equipped to meet the requirements of both the users and the curriculum (DO 56, s. 2011). To keep abreast of libraries in the Philippines, they have begun incorporating OER into their services. These resources are available on library or institutional websites, making it easier for end-users to access information anytime and anywhere. For example, institutions such as the College of Education in Central Philippine University Libraries provide access to an extensive online library of Filipiniana e-books, creating easy access to valuable educational works (Central Philippine University Libraries, 2023). Additionally, textbooks at the University of the Philippines Los Baños Library (UPLB) are shared resources that can be used across multiple higher education institutions, ensuring broader dissemination and accessibility (University of the Philippines Los Baños Library, 2020). These adaptations of using OER resources are rapidly evolving in response to the standards every library must follow.

However, there are no currently existing studies on how end-users accept and utilize these resources provided by libraries to meet their information needs, especially in teaching and learning. To look further into this gap, the present study intends to explore the perspective of Baguio Patriotic High School end users, particularly students and teachers, regarding adopting OER as part of the school's library services. This sought to answer the following questions: 1. What is the level of usefulness of OER to: a. teachers, b. students; 2. What is the ease of use of OER for a. teachers, b. students; 3. What is the level of acceptance of using OER by a. teachers, b. students; and 4. Is there a correlation between the level of usefulness, ease of use, and acceptance of OER among: a. teachers, b. students.

The findings will provide valuable insights to school librarians on developing strategies and action plans to better support their users. This study will benefit the following: The institution will become more updated on the educational tools that can be useful without worrying about any cost. It will also serve as a reminder that technological innovations are rapidly advancing, and embracing these developments is essential to continue delivering quality education in the 21st century. For the teachers, OER will offer free supplementary teaching materials, which can be accessed anytime and anywhere. This flexibility can help them reach students during asynchronous learning sessions. Furthermore, it will encourage teachers to create more engaging classes, inspiring students to participate and better understand the lessons. Most especially, the students will benefit from additional learning resources that support and enhance their understanding of course content. These resources are accessible anytime and anywhere, catering to various learning styles and helping students share information with peers more effectively. As a result, their comprehension may improve thanks to the diverse formats that OER provides.

2.0 Methodology

2.1 Research Design

The study employed survey research to gauge the perspectives of BPHS teachers and students on adopting OER as part of library services. Survey research collects detailed and factual information to describe existing phenomena (Calmorin & Calmorin, 1995).

2.2 Research Participants

The total population of the study is 173, which comprises BPHS teachers and students. The respondents were all Grade 9 to 10 students and all Baguio Patriotic High School faculty employees.

2.3 Research Instrument

This study employed an adopted, modified, and validated survey questionnaire as the primary instrument and data source to answer the research questions. It adhered to ethical guidelines, and participation was voluntary for all respondents. The researcher's statistician, adviser, and panel of experts took several steps to validate the instrument. A pre-test was conducted to assess the reliability. The Cronbach's Alpha result from the pre-test was .898, which is described as good, thus validating the questionnaires.

2.4 Data Gathering Procedure

This study employed a formal letter of request addressed to the school principal to request permission to administer questionnaires to teachers and students. A consent letter was provided to the respondents before

answering the questionnaires. The school principal assisted the researcher in administering the questionnaires to the teachers, and the researcher personally retrieved them. For the students, the researcher personally administered the questionnaires to them and personally retrieved them from them.

2.5 Ethical Considerations

This research study followed ethical guidelines. The respondents' participation was voluntary. They were allowed to opt out of answering the questionnaires if they felt uncomfortable. Their participation was protected from any form of force, including physical, social, or psychological, and no other forms of coercion were used solely to gather data. In addition, the data gathered from the respondents were protected and remained confidential throughout the study.

3.0 Results and Discussion

3.1 Usefulness of OER

Table 1 presents the results regarding the usefulness of OER to teachers. As shown in Table 1, the overall mean is 3.394, with a descriptive equivalent of "very useful." This indicates that the teachers of BPHS consider OER to be a highly beneficial tool for obtaining the information needed for their teaching. This implies that by using OER, teachers have access to a flexible and diverse selection of educational resources in various formats, which they can adapt, modify, and use based on the needs of their learners. This is consistent with the research conducted by Rajabalee et al. (2023); Schroeder and Donat (2023), who found that OER is a valuable tool that empowers educators to implement teaching strategies more quickly and flexibly. OER helps them build their teaching effectiveness by providing free teaching and learning materials that facilitate the collaborative design and development of courses. Educators can integrate these materials into their teaching practices, ultimately improving educational outcomes.

Table 1. *Level of Usefulness of OER to Teachers*

	Indicators	Mean	Interpretation
1.	OER helps make my instructional materials.	3.47	Very Useful
2.	OER helps me to accomplish my work faster.	3.41	Very Useful
3.	OER boosts my output at work.	3.53	Very Useful
4.	OER helps me save time by reducing the search engines I must check for the information I need.	3.41	Very Useful
5.	OER improves my search strategies.	3.35	Very Useful
6.	OER helps me discover more topics for my students.	3.47	Very Useful
7.	I obtain references that help me teach my students using OER.	3.53	Very Useful
8.	OER motivates me to teach more since it reduces my financial stress.	3.18	Useful
9.	OER enables me to obtain resources for preparing for tests and examinations.	3.35	Very Useful
10.	OER improves my ability to teach.	3.24	Useful
Average Mean		**3.39**	**Very Useful**

Referring to the table, using OER, teachers gain valuable references that aid their instruction and enhance their work productivity. This aspect ranked the highest, with a mean of 3.53, described as "very useful". This suggests that OER is a handy tool for teachers, offering access to a wide range of multimedia content, including videos, interactive simulations, and open-source textbooks. Teachers can easily adapt these resources to meet their specific teaching needs, creating dynamic and engaging lessons that foster greater student participation and interaction, leading to a more enriching learning experience. This aligns with Sandanayake's (2019) study, which found that OER empowers researchers and students, encouraging greater innovation in teaching and learning through the openness and flexibility of the resources. Arispe et al. (2023) and Misra (2012) found that OER increases teachers' knowledge and enhances their teaching strategies. Teachers reported that OER contributes to meaningful teaching, accelerates the teaching-learning process, and fosters a culture of independent study among learners.

The next highest-ranked benefit is that OER helps teachers create instructional materials and discover new topics for their students, with a mean of 3.47, also considered "very useful." This suggests that OER's freely available instructional materials offer teachers ideas for creating engaging lessons and discovering new topics to cover. This encourages teachers to be more innovative and creative, going beyond what is available in the library to educate themselves on various teaching strategies and new subject matter. This finding is supported by Segarra-Faggioni and Romero-Pelaez (2023); Noyes et al. (2024), who found that discovering topics through OER can improve teaching and learning practices. Most instructors who used instructional materials, such as slides, worksheets, and

assessments, which they could modify and integrate into different teaching contexts, found these resources helpful for student-centered teaching practices like group work or discussions. This flexibility allows them to enhance their instructional practices and explore innovative teaching strategies.

The third-highest ranking benefit, with a tie, is that OER helps teachers complete their work more quickly and saves time by reducing the need to check multiple search engines for information, with a mean of 3.41, also considered "very useful." This indicates that OER provides a centralized platform for educational materials, minimizing the need for teachers to search multiple sources and offering time efficiency and resource accessibility. This suggests that integrating OER into library services helps teachers save time and accomplish their work faster. Rajabalee et al. (2023) support this by stating that OER helps educators reduce teaching preparation time, enhancing the quality of teaching practices and allowing for more engagement with students.

Table 2 presents the findings on the level of usefulness of OER to students at BPHS. As shown in the table, the overall average mean score is 3.078, with a descriptive equivalent of "useful," indicating that students find OER a beneficial tool for obtaining the information they need for their academic work. This suggests that, besides their textbooks and library resources, students use OER to gather additional information necessary for their subject requirements, incorporating it as one of their references. This is especially true for Grade 10 students, who use OER during their library hours for their research subject, as observed by the librarian. Grimaldi et al. (2019) support this, arguing that OER can enhance students' learning by providing access to a broader range of information. The diversity of resources helps students expand and develop their critical thinking skills. By fostering critical thinking, OER encourages students to question the information they gather, prompting them to explore different resources to gain a deeper understanding. This process empowers their knowledge, which can benefit their academic needs.

Table 2. *Level of Usefulness of OER to Students*

	Indicators	Mean	Interpretation
1.	OER is helpful for my self-learning.	3.41	Very Useful
2.	OER helps me to accomplish my learning activities more quickly.	3.15	Useful
3.	OER helps me to improve my learning results.	2.99	Useful
4.	OER helps me save time by reducing the search engines I have to check for the information I need.	3.08	Useful
5.	OER improves my search strategies.	3.16	Useful
6.	OER helps me discover beyond what is taught in the classroom.	3.13	Useful
7.	I obtain references that help me understand my lesson using OER.	3.08	Useful
8.	OER motivates me to learn more since it reduces my financial stress.	2.72	Useful
9.	OER enables me to obtain resources for preparing for tests and examinations.	3.00	Useful
10.	OER enables me to improve both my performance and grades.	3.05	Useful
Average Mean		**3.07**	**Useful**

The highest-ranked statement was that OER is helpful for students' self-learning, with a mean of 3.41 and a descriptive equivalent of "very useful." This suggests that students view OER as a highly beneficial tool for obtaining the information they need for their academic work. It indicates that students take the initiative to go beyond their textbooks and explore additional resources, fostering self-directed learning that enhances their critical thinking and self-efficacy. These findings align with the study by Li and Wong (2021), which states that OER helps learners access and use learning materials easily, leading to the successful completion of learning activities, breaking down learning barriers, facilitating the sharing of materials and collaboration, and improving learning performance. Most students who used OER reported better learning outcomes, contributing to positive experiences. This is because OER allows learners to explore diverse perspectives, promoting independent learning and critical thinking. Furthermore, Cheung et al. (2023) found that students perceive OER as particularly valuable for supplementing course materials, which enhances independent research and exploration, providing additional context, examples, and explanations beyond traditional textbooks.

The second-highest-ranked statement was that OER is a valuable tool for improving students' search strategies, with a mean of 3.16 and a descriptive equivalent of "useful." As students seek more information for their academic needs, they tend to explore various links or resources. OER enhances their ability to locate and effectively utilize educational materials, improving their search strategies. This skill allows students to access accurate information more efficiently, without wasting time browsing multiple sources. A study by Muggli and Westermann (2019)

showed that students using OER significantly improved their ability to locate relevant information, assess source credibility, and synthesize information from various sources. Thus, OER helps improve students' information-seeking skills. Applying OER as a public strategy can help improve the quality of education. In conclusion, OER was a valuable tool for improving search strategies, increasing motivation, and better learning outcomes.

The third-highest-ranked statement was that OER helps students accomplish their learning activities more quickly, with a mean of 3.15 and a descriptive equivalent of "useful." This suggests that OER is a beneficial tool for students, enabling them to promptly gather the information they need to complete their learning activities. It implies that students can meet deadlines, avoiding deductions for late submissions and unfinished tasks. By offering immediate access to resources, OER eliminates the time-consuming process associated with traditional learning methods. This idea aligns with S.R. Ranganathan's fourth law, "save the reader's time," as OER provides students with direct access to information. These findings are supported by Ikahihifo et al. (2017), who stated that the accessibility and availability of OER in various formats help students quickly find the specific information they need, especially when facing deadlines, as OER is customized and focused on specific areas relevant to students' needs.

3.2 Ease of Use of OER

Table 3 presents the findings regarding the level of ease of use of OER for BPHS teachers. As shown in the table, the overall mean is 3.30, with a descriptive equivalent of "very easy," indicating that OER is a highly convenient and comfortable tool for teachers to obtain the information they need for teaching. This suggests that the flexible nature of OER allows teachers to modify and adapt the content to fit specific topics, teaching styles, and student needs. As Blomgren (2018) noted, secondary teachers can take advantage of these resources by personalizing instruction to increase diversity and differentiate learning to meet the needs of their students better. Additionally, Arispe et al. (2023) supported this finding, emphasizing that when educators retain, reuse, adapt, and remix OER, they gain access to high-quality digital materials, enhance their teaching practices, and foster better collaboration among teachers. These resources are particularly valuable for secondary teachers where traditional resources, such as library books, may be scarce and rely heavily on donations, gifts, and giveaways.

Table 3. *Level of Ease of Use of OER to Teachers*

	Indicators	Mean	Interpretation
1.	OER is easy to use and navigate without financial concern.	3.47	Very Easy
2.	Learning to use and navigate the OER is comfortable for me.	3.18	Easy
3.	I am knowledgeable enough to utilize the OER.	3.06	Easy
4.	When I get into problems, I know I have someone to ask for help.	3.38	Very Easy
5.	OER has a help desk that can aid me with my search.	3.18	Easy
6.	OER is user-friendly due to its video tutorials and guide.	3.18	Easy
7.	OER materials have flexibility in access.	3.35	Very Easy
8.	OER is simple for me to comprehend.	3.41	Very Easy
9.	With the advent of OER, I can learn everywhere and at any time.	3.47	Very Easy
10.	OER is easy to use since the open licenses allow users to customize the resources.	3.35	Very Easy
Average Mean		**3.30**	**Very Easy**

As shown in the table (Table 3), teachers find OER easy to use and navigate without financial concern, and it helps them learn anytime and anywhere. These were equally ranked the highest, with a mean of 3.47 and a descriptive equivalent of "very easy." This implies that the ease of use of OER gives satisfaction to teachers, encouraging them to use more OER as part of their lessons and presentations, especially during times when there is class suspension due to weather calamities, when they need to send learning materials for students' self-learning, or during online classes. Using resources for free without considering any expenses is a great help for educators, especially when they only rely on minimal resources. Thinking of where to get the information needed for classroom teaching, following the upward momentum of personalized instruction, supporting instructional materials for students' engagements, and resources to add to their core curriculum can be somewhat of a struggle. However, using the provided open-access educational resources supplements teachers' teaching needs without worrying about any expenses. The result aligns with Kimmons (2015) and Wiley et al. (2012), where teachers favored the potential of OER because they could customize open-licensed resources at no cost, promising them enriched resources to help each student learn effectively.

The second-highest finding was that teachers find OER easy to comprehend, with a mean of 3.41, equivalent to "very easy." This means that due to the friendly features of OER, teachers found it very convenient to use in preparing for their lessons, so looking for resources is not a hassle. This, in turn, fuels their creativity, allowing them to develop innovative instructional strategies such as interactive exercises and simulations, which are especially useful in blended learning settings. The flexibility of OER and its simplicity of comprehension was supported by the European Commission, as stated in the study of Kurelovic (2016), stressing that OER allows more personalized learning due to its accessibility and user-friendliness, providing a better learning experience and improved use of resources, which promote equity by increasing the availability of knowledge. Thus, users like teachers can easily adapt and understand each learning material.

The third-highest ranking was when teachers faced problems while using OER; they had someone to ask for help, with a mean of 3.38, equivalent to "very easy." It means the librarian is always available whenever a client, like a teacher, needs help navigating the learning materials. Also, whenever a technical problem is encountered, the school's IT personnel are always available. This implies a collaboration between the library and IT staff to ensure a smooth flow of navigating and using the learning materials. This was supported by the study of Cannon-Rech and Mortimore (2020), which states that when teachers encounter problems while using OER, the librarian's role is to be available for assistance, as they are the front liners of every library. They support content and feature requests, help locate materials, and offer training for developing interactive tutorials and assignments.

Table 4 presents the level of ease of use of OER for BPHS students. As seen in the table, the overall average mean is 3.13 with a descriptive equivalent of "easy," which means that OER is a convenient and comfortable tool for students to use for the information needed for their academic work. This implies that the accessibility, adaptability, and customization features of OER give students easy access, allowing them to independently explore the learning materials they need for their academic requirements. This aligns with the study of Itasanmi (2020); Zaid and Alabi (2020) found that OER enhances student engagement and learning due to its easily accessible features, enabling students to learn at their own pace and convenience and helping them prepare for classes.

Table 4. *Level of Ease of Use of OER for Students*

	Indicators	Mean	Interpretation
1.	OER is easy to use and navigate without financial concern.	3.21	Easy
2.	Learning to use and navigate the OER is comfortable for me.	3.17	Easy
3.	I am knowledgeable enough to utilize the OER.	3.10	Easy
4.	When I get into problems, I know I have someone to ask for help.	2.97	Easy
5.	OER has a help desk that can aid me with my search.	3.05	Easy
6.	OER is user-friendly due to its video tutorials and guide.	3.35	Very Easy
7.	OER materials have flexibility in access.	3.10	Easy
8.	OER is simple for me to comprehend.	3.05	Easy
9.	With the advent of OER, I can learn everywhere and at any time.	3.17	Easy
10.	OER is easy to use since the open licenses allow users to customize the resources.	3.08	Easy
Average Mean		**3.13**	**Easy**

Among the given variables, OER is user-friendly due to its video tutorials and guides, with a mean of 3.35, ranked highest with a descriptive equivalent of "very easy." This means that due to the video tutorials and guides OER provides, the students can easily navigate, understand, and use the learning materials it offers, such as scientific experiments uploaded for their reference, video-recorded lessons, do-it-yourself activities, and more that are already prepared and uploaded for their convenience, especially for visual learners. This implies that, due to the features of OER, it is very convenient and comfortable to use, helping the students with their academic needs. This was supported by Tomczyk et al. (2023); William (2015), who claimed that due to the wide range of online formats, including textbooks, video-recorded lectures, YouTube clips, web-based textual materials designed for independent study, animations, and simulations, and digital diagrams, students find it beneficial and easy to use. They can pause, rewind (especially video tutorials), and revisit specific topics at their convenience, making learning more accessible, especially for visual learners, as some video tutorials allow authentic demonstrations of skills with real people through the eyes of the performer.

The second-highest rank was for the statement that OER is easy to use and navigate without financial concern, with a mean of 3.21, equivalent to "easy." This means that the students will find OER convenient and comfortable

to use when navigating and searching for the information needed for their academic needs. This implies that the students can access and navigate the learning materials without a trial stage and a subscription that only lasts for a week or a month, requiring payment after the trial phase ends. As Butcher (2015), Cheung et al. (2022), and Grimaldi et al. (2019) mentioned in their studies, OER does not require payment to gain access to education. Its open licensing policies, which allow editing and remixing, significantly benefit every student. It empowers them with the essential learning materials they need for their education.

The third-highest rank was shared equally between two statements: learning to use and navigate OER is comfortable for the students, and with OER, they can learn anywhere and at any time, with a mean of 3.17, which has a descriptive equivalent of "easy." This means the students are open to learning to use and navigate OER. They have already experienced using open-access journals for their research subjects, open tutorials, self-video lessons, and activities uploaded and shared by their teachers during the pandemic for their online classes on uLearning, an application that teachers and students used for online classes during the pandemic. This app can be downloaded on their mobile phones for easier access, allowing them to access it freely and at any time. As Lin (2019) mentioned in his study, when OER is used in a course, students should learn to navigate its content, and instructors, as well as librarians, should teach and guide students on how to use OER to enhance collaborative thinking, perspectives, and mentoring. This implies that the students are comfortable adopting OER as part of library services that they can use to support their learning. This is supported by Dempsey (2019), who said that students liked accessing digital course resources from any device, including their phones, because it is convenient and extremely easy to access the materials and study anywhere and anytime.

3.3 Acceptance of Using OER

Table 5 presents the results of the acceptance level of BPHS teachers using OER as part of library services. The table shows that the overall average mean is 3.62, which is a descriptive equivalent of highly acceptable. This means that teachers found OER to be a handy, convenient, and comfortable tool, making it a highly suitable and adaptable tool that they can use to get the information needed for their teaching. This implies that the teachers of BPHS are willing and want to adopt OER as part of a library service that they can use as a supplement to their teaching. The result was correlated with the study conducted by Llanda (2023), where findings revealed that teachers assessed the use of OER as generally high, making it a convenient and adaptable tool for accessing information for their teaching needs.

Table 5. *Level of Acceptance in Using OER by Teacher*

	Indicators	Mean	Interpretation
1.	Teachers, students, and the school will likely favor using OER.	3.65	Highly Acceptable
2.	I intend to utilize the OER as soon as it is implemented.	3.71	Highly Acceptable
3.	People who influence my work think I should use the OER.	3.41	Highly Acceptable
4.	People who are special to me think I should use the OER.	3.41	Highly Acceptable
5.	Adopting and using OER is a good idea, especially for learning and exploration.	3.82	Highly Acceptable
6.	OER makes my work/studies more interesting.	3.53	Highly Acceptable
7.	Utilizing OER is entertaining and educational.	3.53	Highly Acceptable
8.	I do not feel scared or worried that I could lose much information in using the OER.	3.59	Highly Acceptable
9.	I do not hesitate to use the OER for fear of making mistakes I cannot correct.	3.65	Highly Acceptable
10.	I am willing to learn how to use OER.	3.88	Highly Acceptable
Average Mean		**3.62**	**Highly Acceptable**

The table shows that the highest-ranked factor was the teachers' willingness to learn to use OER, with a mean of 3.88 and a descriptive equivalent of highly acceptable. This means that the teachers consider OER highly suitable for their teaching because they recognize its potential to improve productivity and foster an innovative learning environment. The researcher observed this willingness firsthand, as some teachers visited the library asking for supplementary materials and guidance on accessing the OER videos advertised as part of the library's educational services, as well as the Starbooks installed in the library. Their initiative to seek guidance and resources highlights the librarian's role in assisting and guiding teachers on navigating and using these educational tools in their lessons. With the growing number of teachers eager to learn how to access these resources, the librarian is excited to assist them. This interaction allows the library to provide teachers with the required materials while educating them about other available educational resources. In addition to providing guidance, the librarian also created a video on how to access each open educational resource, which was displayed inside the library for users' reference.

By doing so, the library supports teachers and benefits students, as the teachers now have broader access to resources they can use in their instruction. This suggests that teachers accept OER and are interested in adapting and using its educational resources. As Van Allen and Katz (2020) and Krajka (2018) noted, creating a multimedia learning environment with remixed images and videos is essential for presenting content to learners in diverse ways. Thus, teachers' willingness to use and adopt OER in their teaching reflects the opportunity to enhance their learning experiences and make learning more accessible for all students, especially those who cannot afford commercial resources.

The second highest was "adopting and using OER is a good idea, especially for learning and exploration," with a mean of 3.82, with a highly acceptable descriptive equivalent. This means that teachers highly appreciate the diverse collection of learning materials. OER allows them to explore other topics related to their teaching needs at their most convenient time. As observed, secondary teachers do not only teach one subject and one class, private or public, due to short staffing, as do the teachers at BPHS. Having multiple subject areas to teach may cause inconvenience to the teachers because they have multiple preparations to make, different instructional materials, and even different teaching methods. This implies that teachers see OER as a tool that helps them explore and adapt ideas aligned to their lessons. With this, OER helps multi-loaded teachers with an idea of how they will make multiple preparations. It provides them with instructional materials for each subject through its ready-made lessons and videos that they can explore and use. Learning and exploring the content of these learning materials guide every teacher in preparing their lessons before the start of the school year or the week, giving them ideas on making classroom learning educational and fun, and upgrading their teaching strategies as learners vary each school year. The result was supported by the study of Griffiths et al. (2022), saying that learning and exploring topics that are relevant to their students' lives and tailoring the subject features to meet their students' needs and background allow them to bring in a more diverse set of perspectives that are not presented in their textbooks, creating opportunities for knowledge and collaboration with each other.

The third highest was "teachers intend to utilize the OER as soon as it is implemented," with a mean of 3.71, having a descriptive equivalent of highly acceptable. Due to the numerous benefits the OER provides, teachers will likely utilize these learning materials as soon as it is implemented as one of the library's services. This implies that the role of the librarian in support of this is to make sure that she collaborates with the teachers to be able to know precisely what learning materials they need, to make sure that the teachers will be able to utilize the learning materials, collaborate with the school's IT personnel for any technical preparation, the school administration for support of additional computers and other equipment needed, and with the school principal to incorporate OER as one of the learning resources and references to be used by the teachers. Rajabalee et al. (2023); Tang (2020) said that adopting and utilizing OER can be an alternative pathway for K-12 teachers in support and as a supplement for resource restraints of every institution. Given the growth of digital resources and online platforms, it is easier for teachers to access and share OER, and many schools and libraries at present are actively promoting the use of OER not only to reduce cost but to increase access and improve learning outcomes for students with the help of the school administration and heads. Thus, the result was correlated with the study conducted by Yu et al. (2024), wherein results revealed that teachers intended to use and adopt OER in their teaching because of its ease of use in searching and retrieving teaching materials. Teachers' attitudes towards using OER in their teaching were positive, indicating they were confident in their ability to navigate, find, and use OERs.

Table 6 presents the results of the level of acceptance of students of BPHS in using OER as part of library services. As seen in the table, the overall average mean is 3.07, with a descriptive equivalent of acceptable, which means that the BPHS students consider OER a suitable and adaptable tool that they can use to get the information needed for their academic work. Their acceptance implies that they will utilize the OER offered by the library in addition to the information provided by the print collections inside the library for their research, assignments, and self-learning, especially since their access to the online world is only in the library. The result is correlated to the study conducted by Synder (2023). The study reveals that students view OER favorably, acknowledging the advantages they offer for their learning experience. Implementing OER in libraries contributes to improved academic performance, enhances students' perceptions of their teachers, and fosters communication beyond the classroom, indicating a significant level of acceptance among students for incorporating OER into their educational journey.

Table 6. *Level of Acceptance in Using OER by Students*

	Indicators	Mean	Interpretation
1.	Teachers, students, and the school will likely favor using OER.	3.39	Highly Acceptable
2.	I intend to utilize the OER as soon as it is implemented.	3.03	Acceptable
3.	People who are special to me think I should use the OER.	2.75	Acceptable
4.	People who influence me academically think I should use the OER.	2.94	Acceptable
5.	Adopting and using OER is a good idea, especially for learning and exploration.	2.82	Acceptable
6.	OER makes my work/studies more interesting.	3.21	Acceptable
7.	Utilizing OER is entertaining and educational.	3.23	Acceptable
8.	I do not feel scared or worried that I could lose much information in using the OER.	2.96	Acceptable
9.	I do not hesitate to use the OER for fear of making mistakes I cannot correct.	2.97	Acceptable
10.	I am willing to learn how to use OER.	3.37	Highly Acceptable
Average Mean		**3.07**	**Acceptable**

Among the given statements on the level of acceptance of BPHS students in using OER, "teachers, students, and the school will likely be in favor of using OER" was ranked the highest, with a mean of 3.39 and a descriptive equivalent of highly acceptable. This means the students see their teachers and the school administration supporting their educational needs. This implies that teachers play a role in motivating the students to learn and explore beyond their limits through adapting and marketing the learning activities and lessons provided by the OER, and the school administration in providing financial support to fulfill the necessary equipment for incorporating OER as one of the library services. As stated in the fifth law of libraries by S.R. Ranganathan (Barner, 2011), a library is a growing organism that every institution should change and adapt itself with the spirit of the time so it can best serve those who need it, who are their end users, since if a library does not change, it will become extinct. Being in favor of any development that helps boost learning for the students and the teachers, like adopting the vast non-commercial offer of OER, helps to ease and add to the resources of library end users and contributes to innovativeness and creativity. It opens an avenue between the library end users and the sources of information for independent learning that fosters literacy. Thus, the existence of OER in the library boosts its services and leads to library users' satisfaction. This was supported by the study of Griffiths et al. (2022), which found that educators and administration are open to adopting OER. Educators started adopting open and culturally responsive teaching practices while critically reflecting on the subjects they wish to teach their students because they felt empowered to address the materials they felt were a priority and of interest to their students. At the same time, educators and administrators are inspired to embrace OER as a means to promote equity through advantages such as cost savings, enhanced accessibility for learners, and relevant customizable materials.

The second highest was "the students are willing to learn how to use OER," with a mean of 3.37 and a descriptive equivalent of highly acceptable. This means the students are actively interested in using and accessing OER. It was proven during their blended learning in the pandemic because they saw it as applicable. It helped them with their information needs, especially in their research subject, where they needed a lot of references in physical form and published research that they could retrieve and access online, provided that the library lacks physical references and needs the support of online resources. In addition, part of the school's policy is not allowing the students to use their mobile phones on campus, limiting their access to information. This implies that the library must act as a bridge between the students and the online world to help them access and evaluate the information they are using through library literacy education programs. The library must educate and guide the students on how to use these resources. Educating them on using educational resources prepares them to become independent learners as they go to their higher level of education. Thus, Cheung (2019); Cheung et al. (2023); Oelfke et al. (2021), revealed from their research that students recognized the usefulness and other benefits of OER, like the quality of its materials, demonstrating a proactive approach in acquiring skills provided by their teachers in partnership with the library to engage OER in their course. They often use OER for educational purposes, viewing it as highly beneficial for enhancing course textbooks, getting more reference materials, and completing assignments and projects. With free and open availability on the internet, OER has served as a suitable and timely support for both online and face-to-face learning modes.

The third highest was "utilizing OER is entertaining and educational," with a mean of 3.23 and a descriptive equivalent of acceptable. This means that the students find OER learning materials interactive, like their videos, simulations, and gamified content, which foster a more interactive learning experience for easier understanding of their lessons. This implies that the interactive content of OER helps the students, especially visual learners, to

have a deeper understanding and retention of knowledge, making learning more enjoyable, which boosts students' motivation and helps them better understand the knowledge they have acquired from it. Cox (2019) discovered that technology-based resources like OER make learning fun and engaging for students and encourage them to invest more effort in their studies as time goes on. Even subjects that students deem challenging or tedious can become more interesting with virtual lessons, through videos and simulations, which can help students to learn complex concepts more enjoyably while mastering 21st-century skills.

3.4 Correlation between Usefulness, Ease of Use, and Acceptance of OER among Teachers and Students

Table 7 presents the correlation between the Level of Usefulness of OER, Ease of Use of OER, and the Level of Acceptance among teachers and students. The study reveals statistically significant ($p < .001$) positive correlations between the level of usefulness of OER, the level of ease of use of OER, and acceptance of OER among students and teachers. Hence, the hypothesis that there is a significant correlation between the level of usefulness, ease of use, and acceptance among students and teachers is accepted.

Table 7. *Correlation between the Level of Usefulness, the Level of Ease of Use, and the Level of Acceptance of OER among Teachers and Students*

		Acceptance	Interpretation
Students	Ease of Use	.564**	Moderate positive correlation
	Usefulness	.620**	Moderate positive correlation
Teachers	Ease of Use	.824**	High positive correlation
	Usefulness	.663**	Moderate positive correlation

**. Correlation is significant at the 0.01 level (2-tailed)

Students showed moderate positive correlations between the level of acceptance and ease of use of OER ($r = 0.564$) and the level of acceptance and the level of usefulness of OER ($r = 0.620$). These results indicate that as students perceived OER as helpful and easy to use, their acceptance of OER as part of library services tended to increase moderately. The moderate correlation coefficients indicate a noticeable but not extremely strong relationship. This implies that the student's acceptance and usage of OER as part of library services rely on how beneficial and comfortable the OER is to them for their academic needs. The findings aligned with the study conducted by Adedoyin and Altinay (2023), which revealed a positive relationship between the perceived ease of use and the usefulness of OER among students. The students' acceptability and intention to use OER are influenced by its ease of use and usefulness. This makes the students mere users of OER and partners in the OER crusade as creators.

Furthermore, teachers demonstrated a stronger correlation between the level of ease of use of OER and the level of acceptance of OER ($r = 0.824$), alongside a moderate positive correlation between the level of usefulness of OER and the level of acceptance of OER ($r = 0.663$). As the level of ease of use of OER increases, the level of acceptance of OER also tends to increase to a high positive degree. This means a strong positive relationship exists between teachers' perceived ease of OER use and willingness to adopt and incorporate it into their teaching. Moreover, as the level of usefulness of OER increases, the level of acceptance of OER increases to a moderate degree. This means that teachers will likely adopt OER when they find it beneficial to their teaching needs. These findings highlight the importance of user-friendly OER platforms where teachers can easily navigate and use the resources without hassle, and with teachers' support to maximize OER adoption and effectiveness. The findings were correlated with the study of Llanda (2023), which revealed that the teachers' assessment of the use of OER was generally high, primarily focused on its perceived ease of use and perceived usefulness. This indicates that teachers' acceptance and usage of OER rely on its functionality and usability.

4.0 Conclusion

Based on the findings of the data gathered, the following conclusions are derived: 1. Both teachers and students of BPHS found OER to be an invaluable resource for obtaining essential information for their teaching and academic work; 2. Teachers and students of BPHS found OER to be user-friendly for obtaining essential information for their teaching and academic work; 3. Teachers and students of BPHS are open to embracing and integrating OER as part of library services; and 4. There is a positive correlation between the level of usefulness of OER, the level of ease of use of OER, and the level of acceptance of OER among students and the teachers of BPHS. Further, the following recommendations are offered: 1. In order to sustain and recognize the value of OER, it is encouraged that the school administration, alongside the school principal, provides support for the implementation and utilization of OER in both teaching and learning by organizing training sessions that will

thoroughly engage the end users in the comprehensive functionalities of OER. Furthermore, it is recommended that the librarian be afforded opportunities to attend seminars, workshops, and training sessions that focus specifically on OER; 2. To promote flexible access to OER for teachers and students, it is recommended that the librarian collaborate with the school's IT personnel, with the support of the school administration, to develop a library website that incorporates user-friendly navigation tools tailored to the specific needs and objectives of both teachers and students. Additionally, the librarian may establish a library Facebook page where they can link to the library website, share all library updates for broader information dissemination and marketing, and post on the bulletin board; 3. For OER to be adopted and implemented as part of library services, the librarian should collaborate with teachers to identify appropriate OER that aligns with the school's educational objectives, curricula, and standards, and seek financial support from the school administration. Afterward, the librarian can partner with the school's IT personnel for the implementation; and 4. To enhance the effectiveness, accessibility, and engagement of OER for students and teachers, it is recommended that the school principal incorporate OER into curriculum development, allowing teachers to integrate OER into their lesson plans and curricula, thus serving as role models for students in utilizing and adapting OER. Additionally, the librarian should gather feedback from end users regarding their experience with OER to better address their needs.

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Storytelling in English with Filipino Translation and Students' Critical Thinking Skills

Mayline Y. Olino*, Cristobal M. Ambayon
Sultan Kudarat State University – ACCESS Campus, Tacurong City, Philippines

*Corresponding Author Email: mayline.olino@deped.gov.ph

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Abstract. Critical thinking development is essential for academic and practical success yet remains a significant challenge globally and in the Philippines. The 2022 PISA results showed this problem as the Philippines placed 77th out of 81 participating countries when Filipino students received scores significantly lower than the OECD average in reading comprehension. While storytelling with translation has been proposed as a potential method to enhance critical thinking skills, limited research examines their combined effectiveness in the Philippine educational context. This study investigated the impact of English storytelling with Filipino translation on the critical thinking abilities of grade 11 students at Esperanza National High School. A true experimental design divided 90 grade 11 Humanities and Social Sciences students into control and experimental groups. Both groups completed pretests and posttests measuring critical thinking skills across five indicators: analysis, inference, evaluation, induction, and deduction. The experimental group participated in English storytelling sessions accompanied by Filipino translation, while the control group engaged in storytelling without translation. Results demonstrated that although both groups significantly improved critical thinking skills, the experimental group exhibited substantially more significant gains, with most metrics reaching "strong" status. The results show that using Filipino translation as a teaching tool effectively improves critical thinking skills when teaching through English storytelling. Teachers may integrate storytelling with translation techniques to enhance students' critical thinking skills. Future researchers may investigate this method's extended impact and use in various educational environments.

Keywords: Critical thinking; English with Filipino translation; Storytelling.

1.0 Introduction

Developing students' critical thinking skills is a pressing challenge in education globally and in the Philippines. Critical thinking enables students to analyze information while evaluating it and synthesizing results to reach logical decisions, thus supporting academic success and continuous learning (Nelson, 2023). Wati et al. (2023) observed that numerous students face difficulties developing and using critical thinking skills properly, leading to poor educational outcomes.

According to the 2022 Programme for International Student Assessment (PISA), the Philippines ranked 77th out of 81 countries, and Filipino students scored far below the OECD average in reading comprehension. This underperformance shows that students have problems understanding, analyzing, and evaluating texts, which are the core components of critical thinking (OECD, 2023). Students cannot understand texts and cannot analyze and evaluate information well.

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Additionally, Shovkova (2019) suggests innovative teaching strategies, such as storytelling and translation, can foster critical thinking. Metacognitive activities like storytelling and translation discussions can help students to reflect and think critically about what they read. Furthermore, there is evidence that strong critical thinking skills benefit academic achievement, especially in language learning and translation tasks (Carter et al., 2023).

Despite this, few studies have systematically examined the combined effects of storytelling and translation on developing critical thinking skills, especially in the context of Filipino learners who face challenges with English texts. This gap is particularly relevant given the persistent difficulties in reading comprehension and critical analysis reported in local schools, such as Esperanza National High School, where many students struggle to understand and reflect on their reading stories. Thus, the researcher is motivated to conduct this study to determine if storytelling in English with Filipino translation can help Esperanza National High School students think critically and improve their critical thinking skills.

2.0 Methodology

2.1 Research Design

The study used a true experimental design, a strong scientific approach that involves manipulating independent variables, using random participant assignment, and controlling confounding variables to establish cause-effect relationships (Creswell & Creswell, 2017; Seçkin & Orcher, 2025). The research adopted this method to assess the impact of English storytelling with Filipino translation on students' critical thinking skills. The research study divided students into two groups through random selection for experimental or control groups. The randomization procedure reduces possible biases so that observed results change from the intervention while excluding initial group variations (Creswell & Creswell, 2017). 90 grade 11 Humanities and Social Sciences students at Esperanza National High School received a random assignment to form two groups within their actual classroom setting. Students in the experimental group listened to English stories translated into Filipino, while the control group received English stories without translation. The lottery method was employed as a practical means of random selection within each group. This method involves placing the names of 90 students into a lottery system, where names are drawn randomly to form the control and experimental groups. This approach minimizes selection bias and enhances the generalizability of the findings (Hansen, 2021). The research subjects from both groups took critical thinking tests before and after the study using five evaluation criteria: analysis, inference, evaluation, induction, and deduction. The study achieved high internal validity through its combination of random assignment with controlled classroom conditions, allowing researchers to precisely evaluate the intervention's effects on critical thinking performance. Educational research benefits greatly from authentic experimental designs because they help researchers identify causal relationships and reduce the impact of extraneous variables (Seçkin & Orcher, 2025).

2.2 Research Locale

The study was conducted in Esperanza National High School (ENHS), Mabolo Street, Brgy. Poblacion, Esperanza, Sultan Kudarat. Conducting the study at ENHS is justified for several compelling reasons. First, the school has a diverse student population, providing an excellent opportunity to assess the impact of storytelling in English with Filipino translation on critical thinking skills across various backgrounds and abilities. Research indicates that storytelling can enhance critical thinking skills by making learning more relatable and engaging, as it fosters emotional engagement and helps students connect with characters and narratives (Schuster, 2021). This diversity allows for a broader understanding of how different students respond to storytelling methods, as highlighted in studies that show storytelling's effectiveness in improving critical thinking skills across various demographics (Hsiu-Ling Chen & Yun-Chi Chuang, 2020). Second, there is a clear and pressing need to improve critical thinking skills among grade 11 students at ENHS, as evidenced by past performance data (Division of Sultan Kudarat, 2022). Lastly, no prior research has been conducted within the context of ENHS to investigate the proposed intervention, making this study a novel contribution to educational research. Osterrieder (2023) supports that localized studies yield insights more applicable to specific educational environments.

2.3 Research Participants

The respondents of this research were 90 Grade 11 students enrolled in the Humanities and Social Sciences at Esperanza National High School for the school year 2024–2025, of whom 45 were in the control group and 45 were in the experimental group. For the selection of the respondents, this research employed a stratified random

sampling technique that used the lottery method. Stratified random sampling is a good technique that enables researchers to guarantee representation from different subgroups of a population, an aspect of particular significance in educational research (Creswell & Creswell, 2017). The lottery system was used as an effective tool for achieving random selection in each stratum. This method calls for randomly selecting names from a lottery of population names to get the last sample. This method increases the generalizability of the research result and reduces selection bias (Hansen, 2021).

2.4 Research Instrument

The primary research instrument for this study was a set of instructional materials and a critical thinking skills test, both developed and validated to ensure quality and reliability. The instructional materials—specifically, the Storytelling in English with Filipino Translation modules were developed following the modified phases of the ADDIE Model (Seels & Glasgow, 1990, as cited in Sanchez & Abo, 2025). The development process included three phases: development, post-development, and quality testing. Seven stories from the 21st Century Literature and the World subject were translated into Filipino by the researcher, with assistance from a Filipino language expert and guidance from the research adviser. A panel of five language education experts reviewed and validated these materials using a standardized rubric that assessed content, organization, mechanics, and overall quality. The experts provided ratings and written feedback, which were used to revise and finalize the materials before classroom implementation. A researcher-made test questionnaire was constructed to measure students' critical thinking skills, initially consisting of 65 items aligned with five performance indicators: analysis, inference, evaluation, induction, and deduction. The test was pilot-tested, and item analysis was conducted to determine item quality and difficulty. After analysis, 60 items were retained for the final version of the test. The instrument's reliability was confirmed with a Cronbach's alpha value of 0.89, indicating high internal consistency.

2.5 Data Gathering Procedure

After validating the research instruments, the researcher obtained approval from the Dean of the Graduate School, the Division Superintendent of Sultan Kudarat, and the Principal of Esperanza National High School to conduct the study. Upon receiving all necessary permissions, the data-gathering process was carried out as follows: Both the control group (Storytelling in English without Filipino Translation) and the experimental group (Storytelling in English with Filipino Translation) were administered a pretest to establish baseline critical thinking scores and ensure group equivalence prior to the intervention. The intervention was implemented over six weeks, with both groups participating in regular classroom sessions. The control group used a module of Storytelling in English without Filipino Translation, while the experimental group utilized the developed Storytelling in English with Filipino Translation module. At the end of the intervention period, both groups completed a posttest using the same critical thinking skills instrument. This allowed for directly comparing pretest and posttest scores within and between groups. The collected pretest and posttest scores were compiled for statistical analysis. An independent samples t-test was used to compare the mean gain scores between the experimental and control groups, while paired t-tests were conducted within each group to assess changes over time.

2.6 Ethical Considerations

This study followed guidelines approved by the Dean of the Graduate School, the Schools Division Superintendent of Sultan Kudarat Division, and the Principal of Esperanza National High School, who granted formal permission to conduct the research. Since the participants were minors, parental consent and student assent were obtained before data collection, ensuring that participation was entirely voluntary and that students could withdraw at any time without consequence. To protect the privacy and confidentiality of all participants, personal identifiers were removed from the data, and access was restricted to the researcher only. The study was designed to minimize potential risk or discomfort to participants by ensuring that all activities occurred in a familiar classroom setting and that all materials used were age-appropriate and non-sensitive. After the study, participants were debriefed about the research purpose and outcomes. These steps ensured all participants' rights, dignity, and welfare throughout the research process.

3.0 Results and Discussion

3.1 Quality of the Developed Storytelling in English with Filipino Translation Module

The quality of the developed Storytelling in English with Filipino Translation Module was measured through its four indicators: content, organization, mechanics, and overall package (see Table 1). It yielded an overall mean of

4.83, which is very high. This finding indicates high satisfaction with the module as an educational tool. The module provides a mix of various components, which all contribute to a cohesive and engaging learning experience. The overall standard deviation was also recorded at 0.32, a very low degree of variability.

Table 1. *Quality of the Developed Storytelling in English with Filipino Translation Module*

Indicators	Mean	SD	Verbal Description
A. Content	4.90	0.19	Very High
B. Organization	4.70	0.51	Very High
C. Mechanics	4.90	0.18	Very High
D. Overall Package	4.80	0.41	Very High
Overall Mean	**4.83**	**0.32**	**Very High**

Note: *4.21 - 5.00 Very High*
3.41 - 4.20 High
2.61 - 3.40 Moderately High
1.81 - 2.60 Low
1.00 - 1.80 Very Low

The data indicates an overall mean rating of 4.83, corresponding to a Very High level. The diverse factors that compose the quality of the module consistently satisfy 91-100% of the quality needs, as indicated. This result translates to high satisfaction with the module as a learning tool. The module scored Very High Extent on all four measures: Content (4.90), Organization (4.70), Mechanics (4.90), and Overall Package (4.80). Such a broad-based success attests to the module's high quality in communicating important knowledge, well-designed organization, aesthetically elegant presentation, and intuitive feel. The 4.90 Content rating, indicating a very high level, is particularly noteworthy. According to Tan and Mante-Estacio (2021), High-quality, relevant, and culturally suitable Content significantly increases student engagement and comprehension. Therefore, the module's Content is appropriately aligned with the requirements and interests of its intended audience, increasing a greater sense of connection with the subject matter.

The organization of the module was rated Very High Extent (4.7). This indicates that the module is well-structured and easy to navigate, thus improving learning and comprehension. This assertion is echoed by Sapico (2023) and Tamrin (2023), who observe that an organized design enables students to navigate the Content easily, thus improving their comprehension and retention of the Content. The Very High Extent rating of 4.90 in Mechanics indicates the module's commitment to detail and presenting information professionally and clearly. According to Tan & Mante-Estacio (2021), proper mechanics are important in maintaining clarity and professionalism in learning materials to ensure the proper delivery of messages without confusion. Lastly, the Extremely High Extent score for the Overall Package (4.80) indicates that the module is an integrated and highly cohesive educational package. This confirms the module's effectiveness in merging diverse components into a seamless and interactive learning package for students. Orr & Bartle (2023) and Smith & Johnson (2020) state that a successful overall package means that learning resources are informative and interactive for students. Furthermore, the findings conform to Ambayon (2020), who states that the module helps to maximize the chances of student involvement in the classroom concerning accomplishing the given tasks on the spot.

3.2 Critical Thinking Skills

Control Group

The level of critical thinking skills of the control group was measured based on their pretest and posttest scores across performance indicators: analysis, inference, evaluation, induction, and Deduction (see Table 2). As shown, the assessment reveals that in the pretest, the control group exhibited "Moderate" critical thinking skills across all areas, with mean scores of 4.60 for Analysis, 5.75 for Inference, 2.09 for Evaluation, 5.67 for Induction, and 5.80 for Deduction. The control group post-test scored "Moderate" on all the tested indicators. They averaged 5.65 for Analysis, 5.91 for Inference, 3.63 for Evaluation, 6.72 for Induction, and 7.91 for Deduction. This indicates that, while they slightly shifted from the pretest, they were still at a moderate level. These results imply that the control group, which did not use English-Filipino-translated stories throughout the intervention, did not show notable improvement in their critical thinking. This supports research by Orakci et al. (2021), which found that most students lack critical thinking abilities. The fact that the control group's scores did not rise substantially indicates that conventional pedagogical practices may not be strong enough to stir critical thinking. Without systematic Evaluation and analytical training, students will not likely acquire higher-order cognitive skills to process complex information and make wise decisions, as Amnouychokanant (2023) theorized.

Table 2. *Level of Critical Thinking Skills of the Control Group*

	Mean Score	Interpretation
Control		
Pretest		
Analysis	4.60	Moderate
Inference	5.75	Moderate
Evaluation	2.09	Moderate
Induction	5.67	Moderate
Deduction	5.80	Moderate
Post-test		
Analysis	5.65	Moderate
Inference	5.91	Moderate
Evaluation	3.63	Moderate
Induction	6.72	Moderate
Deduction	7.91	Moderate

Experimental Group

The experimental group's level of critical thinking skills was measured based on their pretest and posttest scores across performance indicators: analysis, inference, evaluation, induction, and Deduction (see Table 3). The critical thinking skills of the experimental group are presented based on their pretest and posttest scores across performance indicators: Analysis, Inference, Evaluation, Induction, and Deduction. In the pretest, the experimental group exhibited "Moderate" critical thinking skills across all areas, with mean scores of 4.05 for Analysis, 6.11 for Inference, 2.66 for Evaluation, 5.86 for Induction, and 5.51 for Deduction. In the posttest, the experimental group showed significant improvement with "Moderate" ratings in Analysis (mean = 7.10) and "Strong" ratings in Inference (mean = 10.86), Evaluation (mean = 6.44), Induction (mean = 10.78), and Deduction (mean = 10.16). This significant score increase indicates that the experimental group had much to gain from the intervention through the English-Filipino-translated stories.

Table 3. *Level of Critical Thinking Skills of Experimental Group*

	Mean Score	Interpretation
Control		
Pretest		
Analysis	4.05	Moderate
Inference	6.11	Moderate
Evaluation	2.66	Moderate
Induction	5.86	Moderate
Deduction	5.51	Moderate
Post-test		
Analysis	7.10	Moderate
Inference	10.86	Strong
Evaluation	6.44	Strong
Induction	10.78	Strong
Deduction	10.16	Strong

The results show that using translated stories was the determining factor for the experimental group's critical thinking ability. This is also argued by Ontuganova and Japbarov (2020), who believed that logical and rational thinking is essential in understanding the meaning and significance of stories and thus emphasizing their pedagogical significance. The enhancement of Inference, Evaluation, Induction, and Deduction shows the effectiveness of explicit teaching interventions for developing higher-order thinking skills. Moreover, the results support Xu's (2024) study, which emphasizes the need to acquire critical thinking abilities to handle the difficulties of contemporary living.

3.3 Mean Scores of the Control Group in the Pretest and Posttest

The paired t-test results of the control group's mean scores in the pretest and posttest focus on their development of critical thinking skills (see Table 4). The result indicates a statistical difference between the posttest (Mean = 29.91, SD = 4.29) and pretest (Mean = 24.38, SD = 3.62) scores, evidenced by the value of 6.61 obtained for the t-computed and the p-value of 0.000. The 5.53 mean difference implies improved critical thinking capacity in the control group. This increase emphasizes the value of critical thinking as a mental process that allows people to analyze evidence, think objectively, and make rational judgments. Critical thinking skills are vital for success in

the 21st century because they improve understanding and allow students to make unbiased judgments (Kocak et al., 2021). The increase in the control group indicates that participation in tasks involving analysis, evaluation, and reasoning can improve skills even without further interventions. In addition, critical thinking is also described as an essential life skill that promotes intellectual development through the ability to critically examine and evaluate material (Aisyah Ainun & Bahri, 2022). This is in line with what was seen in the improvement of the control group's critical thinking skills to respond to questions on Philippine Literature, which presumably needed them to evaluate arguments and make logical conclusions.

Table 4. *Paired t-test Result of the Mean Scores of the Control Group in the Pretest and Posttest*

With translation	Mean Gain	SD	t-computed	p-value
Pretest	24.38	3.62		
Posttest	29.91	4.29	6.61	<.001
Mean Difference	**5.53**			

Significant at $\alpha = 0.05$

3.4 Mean Gain Scores of Control and Experimental Groups

The independent sample t-test result of the mean gain scores of the control and experimental groups highlights the effectiveness of storytelling in English with Filipino translation intervention (see Table 5). The findings indicate that the experimental group had a mean gain score of 21.61 (SD = 11.68), and the control group had a mean gain score of 5.53 (SD = 4.83). The difference between the two groups is statistically significant because the p-value is 0.000, and the t-value computed is 14.34. The mean difference of 16.08 further indicates the significant improvement in critical thinking ability in students in the experimental group.

Table 5. *The Independent Sample t-test Result of the Mean Gain Scores of the Control and Experimental Groups*

Groups	Mean Gain	SD	t-computed	p-value
Control	5.53	4.83		
Experimental	21.61	11.68	14.34	<.001
Mean Difference	**16.08**			

Significant at $\alpha = 0.05$

The findings of this research show that the use of storytelling in English with Filipino translation in teaching Philippine Literature significantly enhances students' critical thinking skills compared to traditional teaching practices. Critical thinking is essential for academic success because it allows one to evaluate the data and make well-informed judgments (Orakcı et al., 2021). The significant difference in mean gain scores between the two groups illustrates how successful translation is as a teaching method. This is evidenced by specific teaching approaches, such as storytelling with explanation, which can enhance critical thinking ability (Ontuganova & Japbarov, 2020).

4.0 Conclusion

This study found that storytelling in English with Filipino translation is more effective in developing critical thinking skills than storytelling in English without translation, as evidenced by the experimental group achieving "strong" proficiency across analysis, inference, evaluation, induction, and deduction, while the control group showed only moderate improvement. The results suggest that Filipino translation enhances critical thinking skills by bridging language barriers and leveraging culturally familiar contexts, enabling deeper analytical thinking. Educators may integrate bilingual storytelling modules, particularly in multilingual classrooms, ensuring content aligns with learners' cultural contexts to strengthen analytical skills. Future researchers may test this approach in other subjects, such as science or history, or with younger age groups to assess its broader educational impact and to address global critical thinking deficits identified in assessments like PISA.

5.0 Contributions of Authors

The principal author contributes to the study's writing and implementation. The co-author edits, supervises the data.

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7.0 Conflict of Interests

The authors assert no conflicts of interest regarding the publication of this paper.

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Student Engagement in Blended Mathematics Learning: The Role of Perceived Teaching Performance and Learning Attitudes

Leonardo Jr., S. Rulida
Davao del Sur State College, Digos City, Davao del Sur, Philippines

Author Email: leonardo.rulida@dssc.edu.ph

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Abstract. The engagement of college students in mathematics presents significant challenges; nevertheless, it is crucial for effective teaching and learning in higher education, particularly in blended learning environments. This study examined the combined effect of college instructors' perceived teaching performance and students' attitudes in learning on the mathematical engagement of Bachelor of Secondary Education (BSED) mathematics students. Data from 120 students were analyzed using a quantitative, non-experimental design with a predictive correlation approach. The stratified analysis showed strong correlations between the perceived teaching performance of college instructors, students' attitudes in learning, and the student's mathematics engagement. The regression analysis further demonstrated how these factors collectively influence students' engagement in mathematics. In light of these findings, educators and institutions should focus on enhancing instructional quality, fostering positive student attitudes, and creating engaging learning environments to support meaningful mathematics engagement and improved outcomes. Prioritizing faculty development and implementing targeted interventions can strengthen teaching effectiveness and student mindset—critical for sustained engagement and academic success in blended learning settings. These efforts can lead to higher performance, better learning experiences, and long-term student success.

Keywords: Attitude in learning; Blended learning environment; Engagement; Mathematics; Perceived teaching performance.

1.0 Introduction

Blended learning, which combines conventional in-person instruction with online education, has become increasingly significant in contemporary education (Alammary, 2024). However, consistent student engagement in this mixed environment remains a persistent challenge, particularly in mathematics. Research suggests blended learning can enhance student interaction, self-directed learning, and motivation—especially when supported by high-quality teaching and a positive student mindset (De Bruijn-Smolders & Persin, 2024; Shi et al., 2022). These elements underscore the central role of engagement in fostering success in mathematics education (McMullen et al., 2023).

Despite these benefits, student disengagement in mathematics remains a global concern. Studies consistently report low participation, fluctuating motivation, and negative attitudes toward mathematics (Joshi et al., 2022;

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Balentyne & Varga, 2017; Xia et al., 2022; Steele et al., 2019). In particular, disengagement is often linked to ineffective instructional approaches and student experiences that erode confidence and interest (Skilling et al., 2021; Croft & Grove, 2015; Everingham et al., 2017). This issue is equally prevalent in the Philippines, where several studies have noted persistent challenges with student engagement in mathematics, especially in blended learning contexts. For instance, Llorente and Tado (2024) and Poquita (2023) highlight low enthusiasm and a lack of student confidence, while Peteros et al. (2022) report high failure rates in math-related subjects. Manatad and Baluyos (2023) emphasizes the importance of student satisfaction and positive attitudes, which are often difficult to sustain. Furthermore, Torrejos (2024) points to the inconsistent quality of teaching performance in blended classrooms as a barrier to effective engagement.

As blended learning environments become increasingly common, it is essential to understand the relationship between instructors' perceived teaching effectiveness, their attitudes in learning, and student engagement in mathematics. A significant gap in research exists regarding the engagement of college students in mathematics, particularly within the context of higher education. Studies indicate that effective instruction positively impacts students' understanding and creates an atmosphere that promotes greater cognitive engagement. However, the existing literature lacks insights into the interplay of these factors, especially among BSED Mathematics students in blended learning settings. These deficiencies in understanding student attitudes and teaching effectiveness suggest that, without targeted interventions, student engagement in mathematics within blended learning environments may continue to diminish, ultimately affecting academic outcomes. Given these circumstances, the researcher recognizes the urgent need to conduct this study.

2.0 Methodology

2.1 Research Design

This research employed a quantitative, non-experimental design incorporating a predictive correlation approach. The quantitative method and its specific research design evaluate concepts by formulating hypotheses and collecting data to either support or refute them (Creswell, 2021). The study utilized descriptive methods to assess variables such as instructors' perceived teaching performance quantitatively, students' attitude in learning, and engagement in mathematics among BSED Mathematics students. Correlational analysis was conducted to validate significant relationships between two or more variables by enhancing statistical correlations. Specifically, the study investigated the correlation between instructors' perceived teaching performance, students' attitudes in learning, and their engagement in mathematics. Additionally, the researcher employed multiple regression analysis to explore the structural connections between observable variables and latent constructs (Hair et al., 2019). It will examine the influence of instructors' perceived teaching performance and students' attitudes in learning on their engagement in mathematics.

2.2 Research Participants

The study's respondents were the BSED – Mathematics students enrolled in the second semester for the academic year 2024 – 2025. The respondents were selected using a stratified random sampling method. A total of 120 respondents were utilized in this study.

2.3 Research Instrument

The modified Teacher Effectiveness Performance Evaluation System Questionnaire by Stronge (2012) assessed teachers' performance. In contrast, students' attitudes in learning mathematics were measured using a modified questionnaire that Kasimu and Imoro (2017) developed. Additionally, the modified Students' Involvement in Mathematics questionnaire from Flores et al. (2021) was employed to evaluate students' participation in the course. All instruments utilized a 5-point Likert scale, allowing students to rate their responses from 1 (strongly disagree) to 5 (strongly agree).

2.4 Data Gathering Procedure

Formal approval was obtained from the Dean of the Institute of Teacher Education (ITED) and the Vice President for Academic Affairs (VPAA) prior to data collection. After that, the questionnaires were distributed online via Google Forms. Respondents were invited to participate voluntarily and answered the survey honestly. Completed responses were collected, organized, and analyzed using appropriate statistical methods to interpret the results.

2.5 Ethical Considerations

Maintaining ethical norms in research is crucial for promoting integrity, protecting participants, and enhancing the legitimacy of scientific advancement (Bhandari, 2021). The researcher rigorously complied with the ethical guidelines established by RDI-DSSC (Research, Development and Innovation) to uphold this study's integrity and ethical standards. Confidentiality and anonymity will be maintained by de-identifying all data and using it solely for research purposes. The study adheres to the concepts of data privacy, security, and ethical responsibility, conforming to the moral requirements of ethical research.

3.0 Results and Discussion

3.1 Perceived Teaching Performance of Teachers and Students' Attitude and Engagement in Mathematics

As shown in Table 1, the overall perceived teaching performance of college instructors received a mean score of 4.16, indicating a "High" level of effectiveness. This suggests that students view their instructors as highly capable of delivering instruction. Instructors demonstrate strong pedagogical skills, clear communication, and effective classroom management, all contributing to a positive learning environment. The rating indicates that students feel well-supported in their academic development, which may lead to higher engagement, improved critical thinking skills, and better learning outcomes. Among the four indicators evaluated, Instructional Planning and Preparation received the highest mean score of 4.27, categorized as "Very High". This reflects that college instructors are highly effective in designing well-structured lesson plans, selecting appropriate teaching materials, and aligning their instructional strategies with learning objectives. Such investment in organizing lessons to cater to students' diverse learning needs can enhance comprehension, engagement, and overall academic performance. In contrast, Assessment and Feedback had the lowest mean score of 4.08, still classified as "High". This indicates a strong commitment from instructors to evaluate student performance and provide guidance for improvement. Instructors effectively implement assessment strategies and offer meaningful feedback that supports student learning. Additionally, students generally perceive the assessment methods as fair, relevant, and aligned with learning objectives, and constructive feedback helps them reflect on their progress.

Table 1. *Descriptive Mean Level*

Indicators	Mean	Descriptive Level
A. Perceived Teaching Performance		
1. Instructional Planning and Preparation	4.27	Very High
2. Instructional Delivery	4.13	High
3. Classroom Environment	4.14	High
4. Assessment and Feedback	4.08	High
Aggregate Result	**4.16**	**High**
B. Attitude in Learning Mathematics		
1. Anxiety	3.13	Moderate
2. Motivation	4.22	Very High
3. Usefulness	4.27	Very High
4. Confidence	4.12	High
Aggregate Result	**4.27**	**Very High**
C. Engagement in Mathematics		
1. Cognitive Engagement	4.23	Very High
2. Affective Engagement	4.12	High
3. Behavioral Engagement	4.16	High
Aggregate Result	**4.17**	**High**

The college student's attitude in learning mathematics, the overall mean score of 4.27, categorized as "Very High," reflects a predominantly positive attitude toward learning mathematics, indicating that the blended learning approach effectively supports engagement by fostering motivation and demonstrating the subject's perceived usefulness, even as Anxiety remains an area for potential intervention. The highest mean score is Motivation (4.22), indicating "Very High", suggesting that students are highly driven to engage with mathematics. This may stem from the blended learning environment's flexibility and interactive components that promote student autonomy. The lowest mean score is Anxiety (3.13), which indicates "moderate", suggesting that while students remain motivated, they still experience notable discomfort or apprehension in learning mathematics. This could be influenced by the cognitive demands of the subject or the reduced immediate support during independent online tasks.

Finally, the college students' level of engagement in mathematics is rated at 4.17, indicating a "High level" of involvement. This score reflects students who are deeply engaged in their mathematical learning, both mentally and behaviorally, while also fostering a positive emotional connection to the subject. This robust engagement across cognitive, affective, and behavioral domains suggests that students are intellectually committed to mathematical concepts, emotionally inspired, and actively participate in learning activities. Among the three dimensions, cognitive engagement received the highest mean score of 4.23, classified as "Very High." This indicates that students exert substantial mental effort in their mathematical studies, employing critical thinking, problem-solving skills, and thorough processing of concepts. In contrast, affective engagement received the lowest mean score of 4.12, also categorized as "High," indicating that students experience a positive emotional connection to mathematics, marked by interest, enjoyment, and a sense of value in learning the subject.

3.2 Relationship Between Perceived Teaching Performance, Students' Attitude, and Engagement in Mathematics

In Table 2, the correlation analysis reveals that Perceived Teaching Performance of College Instructors holds a strong positive relationship with student engagement in mathematics (r = .804, p = .000), indicating that effective instructional delivery, clear communication, and supportive teaching methods are pivotal in fostering student involvement in a blended learning environment. Similarly, Attitude in Learning Mathematics demonstrates a moderate positive correlation (r = .634, p = .000), suggesting that students with a more positive disposition toward the subject are more likely to engage actively. Both findings are statistically significant, underscoring the dual importance of instructor performance and student mindset in promoting engagement. Thus, the first null hypothesis (Ho_1) is rejected, indicating a significant relationship between the perceived teaching performance of college instructors, attitude in learning, and engagement of BSED mathematics students.

Table 2. *Correlation Between Perceived Teaching Performance, Students' Attitude, and Engagement in Mathematics*

	Engagement in Mathematics			
	r	p	Decision on Ho	Interpretation
Perceived Teaching Performance	.80	< .001	Reject	Significant
Attitude in Learning Mathematics	.63	< .001	Reject	Significant

The findings of this study align with previous research that emphasizes the critical role of teaching effectiveness in promoting student engagement in mathematics. Specifically, the results support the work of Durksen et al. (2017), highlighting the significance of teacher-student interactions in enhancing motivation and engagement in mathematics. Kunter et al. (2013) indicated that educators who demonstrate strong pedagogical skills, provide clear instruction, and use student-centered approaches are more likely to boost motivation and engagement in mathematics. Additionally, Wang et al. (2020) found that students who view their professors as intelligent, personable, and supportive are more likely to engage actively in class and develop a stronger interest in the subject. The study also aligns with the findings of Torrejos (2024) that perceived teaching performance plays a significant role in fostering engagement, with effective instructional delivery, clear communication, and supportive teaching practices positively influencing student participation.

The findings of this study align with previous research that emphasizes the significance of a positive attitude in promoting student engagement in mathematics. For instance, Balentyne and Varga (2017) found a relationship between students' attitudes and their achievements in a self-paced blended mathematics course, emphasizing the need to cultivate positive attitudes to enhance engagement. The result also corroborated the study of Manatad and Baluyos (2023) and Carcueva (2024), which found that students' positive attitudes toward mathematics are crucial for their engagement in the subject, impacting their academic achievement in blended learning contexts. Nayir (2015) supports this finding, noting a strong correlation between student engagement and their attitudes. Students with a positive attitude toward mathematics are likelier to actively participate in and engage with their math tasks (Gopal et al., 2018). This engagement is crucial for translating positive attitudes into improved academic performance (Lijie et al., 2020).

3.3 Influence of Perceived Teaching Performance and Attitude in Learning to Students' Engagement in Mathematics

Table 3 shows the regression analysis presents compelling evidence of the critical role of Perceived Teaching Performance and Attitude in Learning Mathematics in shaping student engagement in mathematics within a blended learning environment. The model's strength, reflected in R = .819 and R^2 = .671, indicates that 67.1% of the variance in student engagement is explained by these two variables — a substantial proportion underscoring their combined influence. Perceived Teaching Performance emerges as the dominant predictor (β = .669, t = 8.921, p = .000), highlighting that instructors' ability to deliver clear, engaging, and supportive lessons profoundly drives student participation. This aligns with pedagogical theories emphasizing the instructor's role as a content expert and facilitator of engagement, particularly in blended settings where independent learning is amplified. Attitude in Learning Mathematics also demonstrates a significant, though comparatively smaller, effect (β = .312, t = 2.742, p = .007), indicating that students with positive attitudes toward mathematics are more likely to engage actively in the subject. While promoting a favorable disposition toward mathematics can enhance engagement, it may not completely mitigate the disengagement caused by perceptions of ineffective teaching. The model's F-value of 99.039 and p = .000 further validate the statistical significance of these predictors, reinforcing that effective teaching practices and student attitudes are not isolated influences but interconnected drivers of engagement. Hence, the second null hypothesis (Ho_2) is rejected.

Table 3. *Regression analysis*

Independent Variables	Unstandardized Coefficients		Standardized Coefficients			Decision	Interpretation
	B	SE	Beta	t	p		
(Constant)	.06	.37		0.16	.873		
Perceived Teaching Performance of College Instructors	.66	.07	.67	8.92	<.001	Reject	Significant
Attitude in Learning Mathematics	.31	.11	.20	2.74	.007	Reject	Significant

$R = .81;\ R^2 = .67;\ F = 99.03;\ p < .001$

These results corroborate recent research emphasizing the impact of teaching effectiveness and attitudes on student engagement. According to Stronge (2018), instructors who demonstrate strong pedagogical skills, structured lesson planning, and active learning strategies create a learning environment that enhances student motivation, participation, and persistence in academic tasks. Similarly, Darling-Hammond et al. (2017) highlight that student-centered teaching approaches that integrate critical thinking exercises improve engagement levels and deepen conceptual understanding in mathematics. The study also corroborated with Torrejos (2024), stating that multiple factors, including instructors' perceived effectiveness, influence student engagement in mathematics. When students are encouraged to think critically, they develop a deeper appreciation for mathematics, leading to higher engagement and better learning outcomes (Wang & Degol, 2017). In addition, the result of the analysis is consistent with the study by Mazana et al. (2019), which found that students' attitudes toward mathematics significantly affect their learning engagement and academic performance. The findings also supported Manatad and Baluyos (2023) research, which indicated that students' positive attitudes toward mathematics play a vital role in their engagement with the subject, affecting their academic success in blended learning environments. Gopal et al. (2018) implied that having a positive attitude towards mathematics influenced students' engagement. When combined with high-quality teaching and a positive student mindset, blended learning environments have enhanced student engagement, self-directed learning, and motivation (Shi et al., 2022). This highlights the need for future research to explore interventions that simultaneously enhance teaching performance and reshape student attitudes, fostering a more resilient and motivated learner mindset — an essential factor in navigating the challenges of blended mathematics education.

4.0 Conclusion

In conclusion, the study findings underscore the significant influence of the perceived teaching performance of college instructors and their attitude in learning on students' engagement in mathematics, affirming the theory used, the Self-Determination theory. The positive correlations between perceived teaching performance, attitude in learning, and engagement in mathematics further highlight the interconnectedness of effective instruction, positive disposition, and student participation in education. This implies that instructors play a vital role in shaping student motivation and learning experiences, emphasizing the need for student-centered, interactive, and reflective teaching strategies. Additionally, the findings suggest that students who view mathematics favorably

are likelier to pursue learning independently, especially in a blended setting where self-directed learning is essential. Strengthening instructional quality and student mindset is critical to fostering sustained engagement and academic success in blended mathematics education.

Educators and educational institutions must prioritize continuous professional development programs to equip instructors with effective teaching strategies tailored for blended environments. Additionally, institutions should implement programs designed to cultivate positive student attitudes toward mathematics — such as mindset interventions, personalized learning approaches, and engaging digital resources — to foster both motivation and confidence. By investing in both instructional quality and student mindset, educators can create a more engaging, supportive, and effective blended learning experience. Further studies should be done to test the robustness of the theory used and strengthen the claims of this study's findings, which this empirical endeavor aims to establish as a foundation for subsequent research. Future research could explore how cultural and socioeconomic factors influence student engagement in blended mathematics education, as well as investigate the long-term effects of teacher training programs on instructional effectiveness. These initiatives can significantly boost students' engagement in mathematics, leading to better learning outcomes, higher academic performance, and greater long-term success.

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The sole author of this research takes full responsibility for all aspects of the study, including the conception, data collection, analysis, writing, editing, and finalizing publication.

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The Impact of Teachers' Attitude and Commitment on Job Performance

Jenefir M. Magtoltol*, Jane C. Oropa
North Eastern Mindanao State University, Tandag City, Surigao del Sur, Philippines

*Corresponding Author Email: jenefir.magtoltol@deped.gov.ph

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Abstract. This study uses a descriptive correlational research design to investigate the impact of teachers' work attitudes and commitment on job performance. Data were collected through surveys and interviews with 121 teachers from various schools. Results indicate that most participants are female (85%), aged 26-45 (69%), and hold a bachelor's degree (91%). Findings reveal that highly motivated, enthusiastic, and dedicated teachers demonstrate stronger job performance. Additionally, affective and normative commitment positively correlate with instructional quality and classroom engagement. Institutional support, professional development, and a conducive work environment are key in sustaining motivation and effectiveness. These insights underscore the need for targeted strategies to enhance teacher commitment and work attitudes, ultimately improving educational outcomes.

Keywords: Educational effectiveness; Educational outcomes; Instructional quality; Job performance; Teacher's commitment.

1.0 Introduction

Attitude and commitment are essential qualities that influence teacher effectiveness and job performance in the school system. Teachers with a positive attitude towards students, parents, administrators, and colleagues foster a more dynamic and supportive learning environment. Their enthusiasm and motivation contribute to innovative teaching strategies that enhance student engagement. On the other hand, commitment reflects a teacher's dedication to their profession, continuous learning, and sense of responsibility. A committed teacher is likelier to be diligent, punctual, and willing to extend efforts beyond formal school hours to achieve educational goals. Together, attitude and commitment shape teaching performance and contribute to the success of the school community.

School administrators regularly evaluate teacher performance to assess their effectiveness and identify areas for improvement. Research suggests that a teacher's level of commitment is a strong predictor of job performance, as it influences their work ethic, behaviours, and application of skills in the classroom. According to Paraiso et al. (2024), positive work attitudes, driven by intrinsic motivation, enhance organizational commitment, fostering a sense of loyalty and responsibility among educators. This commitment, in turn, improves performance outcomes and contributes to the overall success of the academic institution.

Despite the growing literature on the subject, most studies focus on either work attitude or commitment individually rather than examining their combined effect on teaching performance. Much of the existing research

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is based on Western educational settings, with limited studies exploring these dynamics in the Philippine Department of Education (DepEd) context. This study aims to bridge this gap by analysing how work attitude and commitment influence teacher performance. The findings of this study will provide valuable insights for teacher education programs, school administrators, and policymakers. By identifying key factors contributing to teacher performance, this research can inform strategies to foster more outstanding commitment and positive attitudes among educators, ultimately improving the quality of education in the Philippines.

2.0 Methodology

2.1 Research Design

This study employed a descriptive-correlational research design to examine the relationship between teachers' work attitudes, commitment levels, and job performance. A descriptive research approach systematically and accurately describes a population, phenomenon, or circumstance without establishing causal relationships (McCombes, 2023). This study used descriptive research to assess the extent to which work attitudes and commitment manifest among elementary school teachers. Additionally, a correlational research approach was utilized to explore the relationships between respondents' demographic profiles, work attitudes, and their levels of commitment. Correlational research measures the degree and direction of association between two or more variables without direct manipulation or control by the researcher. Correlations can be either positive or negative, helping to determine whether work attitudes and commitment significantly influence teachers' job performance. Given these objectives, the chosen research design was appropriate for understanding the factors affecting teachers' professional performance.

2.2 Research Respondents

The study involved 121 elementary school teachers from public schools in the Talacogon West District, Division of Agusan del Sur, Philippines. To ensure a representative sample, stratified sampling was employed, allowing the selection of participants based on key demographic factors. This sampling technique ensured that the study captured diverse perspectives on work attitudes, commitment, and job performance, leading to more reliable and generalizable findings.

2.3 Research Instrument

The primary data collection tool was a questionnaire checklist to measure teachers' work attitudes, commitment levels, and job performance. The questionnaire was divided into four sections. The first section gathered demographic information, including, age, gender, civil status, highest educational attainment, years in service, civil status, academic rank and position, educational qualification and income. The second section assessed teachers' work attitudes across six dimensions: attitude towards subjects taught, attitude towards superiors or school heads, attitude towards co-workers, attitude towards learners, attitude towards the school environment, and attitude towards incentives and rewards. The third section measured teachers' level of commitment in terms of affective commitment (emotional attachment to the profession), normative commitment (sense of obligation to remain in the profession), and continuance commitment (perceived cost of leaving the profession). Lastly, the fourth section evaluated teachers' job performance based on their Individual Performance Commitment and Review (IPCR) ratings for SY 2023-2024. The questionnaire underwent expert validation to ensure reliability and clarity before full deployment. A pilot test was conducted to identify and refine ambiguous questions, ensuring the instrument's effectiveness in measuring the intended constructs. Following this, the questionnaire underwent expert validation to guarantee clarity and reliability before its full deployment.

2.4 Data Gathering Procedure

The researcher followed several key procedures to ensure the systematic collection of data. First, permission was secured from the Dean of the Graduate School to conduct the study. Upon approval, a formal request was sent to the Schools Division Superintendent of Agusan del Sur Division through the office of the school principals of the sixteen identified elementary schools. Once authorization was granted, the researcher personally administered the survey questionnaires to the respondents. Clear and concise instructions were provided to ensure that participants fully understood the purpose of the survey and the correct way to answer the questions. Respondents were given ample time to complete the questionnaire, and the researcher was available to clarify any concerns. After data collection, the completed questionnaires were gathered and verified to ensure completeness. The responses were then tallied, tabulated, and analyzed using statistical methods to derive meaningful insights. By

personally overseeing the distribution and collection of questionnaires, the researcher ensured a high response rate and minimized the risk of incomplete or ambiguous responses.

2.5 Data Analysis

Appropriate statistical treatments were applied to analyze and interpret the gathered data. Frequency counts and percentages were used to summarize respondents' demographic characteristics, such as age, gender, civil status, academic rank, and years of service. This method provided a clear understanding of the distribution of respondents across various categories. The weighted mean was employed to measure the central tendency of responses related to work attitudes and commitment levels, allowing for an overall assessment of agreement or manifestation in each aspect. To determine whether significant differences existed in work attitudes and commitment levels based on demographic factors, Analysis of Variance (ANOVA) was applied. The F-value and p-value were used to assess the statistical significance of variations among different groups. Furthermore, multiple regression analysis explored how various work attitudes—such as attitudes toward subjects, colleagues, and the school environment—influenced overall commitment and job performance. The coefficient values indicated the strength and direction of these relationships, while the t-value and p-value determined their statistical significance. A p-value of less than 0.05 was considered indicative of a meaningful relationship. By employing these statistical techniques, the study ensured that findings were objective, accurate, and meaningful, contributing to a comprehensive understanding of the factors affecting teachers' job performance.

2.6 Ethical Considerations

The study adhered to ethical principles to ensure the integrity and confidentiality of the research process. The researcher maintained trustworthiness by ensuring transparency in data collection and analysis procedures. Participants voluntarily took part in the study, and their responses were recorded accurately without bias. Confidentiality was strictly observed by securely storing collected data and preventing unauthorized access. Personal identifiers were safeguarded to protect respondents' privacy, and after completing the data analysis, all research materials—including transcripts, recordings, and notes—were securely destroyed. Furthermore, anonymity was maintained by ensuring no personal information could be linked to respondents' answers. This approach encouraged participants to provide honest and accurate responses without concern for privacy violations.

3.0 Results and Discussion

3.1 Demographic Profile of the Respondents

Table 1 presents the study's respondents, focusing on age, gender, civil status, years in service, academic rank and position, highest educational attainment, and income. The age distribution of the 121 teachers surveyed reveals that a majority (69%) fall within the 26–45 age range, reflecting a predominantly young to middle-aged workforce. This trend corresponds with the findings of the National Center for Education Statistics, which indicate that public school teachers are more likely to be in their 30s and 40s than the broader U.S. workforce (Kent, 2024). Notably, only 7% of the surveyed teachers are above 56 years old, aligning with studies showing a lower proportion of older teachers than other professions (Kent, 2024). This age composition has significant implications for workforce planning, professional development, and institutional succession strategies.

Gender distribution data indicate that female educators constitute 85% of the surveyed group, with male teachers representing only 15%. The underrepresentation of male teachers is more pronounced in elementary education, where they account for just 11%, compared to 36% in secondary schools. Over the past decades, the proportion of male teachers has declined, decreasing from 30% in 1988 to 23% in recent years (Reeves, 2025). The survey also examined civil status, finding that 70% of teachers are married, 26% are single, and 4% are widowed. Research indicates that marital status influences job satisfaction, with married educators reporting higher satisfaction levels (Mocheche et al., 2018). This demographic factor is critical as it may affect work-life balance, retention rates, and overall job satisfaction.

Regarding professional experience, 57% of surveyed teachers have between 1 and 10 years of service, with 28% falling into the 1–5-year category and 29% within the 6–10-year range. This suggests a relatively young teaching workforce. Research highlights the strong correlation between teacher engagement and job performance; Siddique et al. (2023) found that work engagement significantly enhances secondary school teachers' performance.

Furthermore, Assaf and Antoun (2024) emphasize the interconnectedness of teachers' occupational well-being and job satisfaction, contributing to teaching effectiveness and student outcomes.

Table 1. *Demographic Profile of the respondents*

Categories	Frequency	Percentage
Age		
0-25	11	9.00%
26-45	83	69.0%
46-55	19	16.0%
>56	8	7.00%
Gender		
Male	18	15.0%
Female	103	85.0%
Civil Status		
Single	31	26.0%
Married	85	70.0%
Widowed	5	4.00%
Years in Service		
1-5 years	34	28.0%
6-10 years	35	29.0%
11-15 years	25	21.0%
16-20 years	7	6.00%
21-25 years	6	5.00%
26 years up	14	12.0%
Academic Rank and Position		
Teacher I	58	48.0%
Teacher II	10	8.00%
Teacher III	46	38.0%
Master Teacher I	6	5.00%
Master Teacher II	1	1.00%
Master teacher III	0	0.00%
Educational Qualification		
Bachelor's Degree	110	91.0%
Master's Degree	7	6.00%
Doctorate Degree	4	3.00%
Income		
P25,000.00 - P29,000.00	57	47.0%
P30,000.00 – P34,000.00	56	46.0%
P45,000.00 – P49,000.00	7	6.00%
P50 ,000.00 above	1	1.00%

The academic rank distribution indicates that 48% of the surveyed teachers hold the position of Teacher I, 8% are Teacher II, 38% are Teacher III, and a combined 6% occupy Master Teacher roles. This suggests that most are in their academic careers' early to mid-stages. Studies show that higher academic ranks are associated with increased job satisfaction, primarily due to salary increments and professional recognition (Mgaiwa, 2023). Additionally, academic rank has been linked to research productivity, with faculty in senior positions achieving greater academic output (Eckhaus & Davidovitch, 2020).

Regarding educational attainment, 91% of surveyed teachers hold a bachelor's degree, 6% have a master's degree, and 3% possess a doctorate. This distribution suggests that while most educators have foundational qualifications, relatively few pursue advanced degrees. Prior research underscores the significance of higher educational attainment in instructional quality, with teachers holding advanced degrees demonstrating superior classroom management and pedagogical effectiveness (Kelechi & Nnamdi, 2024). Similarly, Bacus et al. (2024) identify education level as a key predictor of teaching effectiveness, reinforcing the importance of continued professional development.

The distribution of designations mirrors the academic rank findings, with 48% classified as Teacher I, 8% as Teacher II, 38% as Teacher III, and 6% as Master Teachers. This hierarchical structure reflects a trajectory of professional growth within the teaching profession. Research suggests that higher designations often require advanced certification and more significant experience and contribute positively to teacher performance. Antoni et al. (2023) found that certified teachers exhibited enhanced motivation and teaching effectiveness, underscoring the role of credentials in improving job performance and educational outcomes.

Salary distribution among the surveyed teachers reveals that 47% earn between P25,000.00 and P29,000.00, 46% earn between P30,000.00 and P34,000.00, 6% earn between P45,000.00 and P49,000.00, while only 1% earn above P50,000.00. This indicates that most teachers fall within the P25,000.00 to P34,000.00 income bracket. Compensation plays a pivotal role in job satisfaction and retention; Fabella et al. (2022) found that 92% of public school teachers in the Philippines earn salaries within this range, contributing to increased job migration. This suggests that salary levels may influence teachers' decisions to seek employment abroad, with implications for workforce stability and policy development.

3.2 Work Attitude of Teachers

Table 2 presents the extent to which teachers manifest positive work attitudes, revealing variations across different aspects of their professional environment. Notably, attitudes toward learners (Mean = 4.39), the subjects taught (Mean = 4.37), and co-workers (Mean = 4.35) are categorized as "Extremely Manifested," indicating a strong commitment in these areas. In contrast, attitudes toward incentives (Mean = 3.845) and the school head (Mean = 4.07) are rated as "Highly Manifested," reflecting comparatively lower, yet still positive, perceptions.

Table 2. *The work attitude of teachers*

Indicators	Mean	Adjectival Rating
Subject Taught	4.37	Extremely Manifested
Superior/School Head	4.07	Highly Manifested
Co-Worker	4.35	Extremely Manifested
Learners	4.39	Extremely Manifested
School Environment	4.14	Highly Manifested
Incentives or Rewards	3.84	Highly Manifested
Overall Mean	**4.19**	**Highly Manifested**

These findings align with existing research emphasizing the pivotal role of teacher attitudes in educational settings. Berhanu (2024) found that positive attitudes toward performance appraisal systems significantly enhance job performance, particularly when coupled with high motivation levels. Similarly, Siddique et al. (2022) demonstrated that increased work engagement positively influences teachers' job performance, underscoring the importance of dedication and enthusiasm in teaching. Moreover, Han and Yin (2016) highlight the role of intrinsic motivation in job performance, suggesting that internal factors are more influential than external incentives. The comparatively lower mean score for attitudes toward incentives may reflect a broader trend wherein intrinsic motivators, such as commitment to students and passion for teaching, impact job performance more than extrinsic rewards. This perspective is supported by Han and Yin (2016), who argue that intrinsic motivation is a stronger determinant of teaching effectiveness than external incentives.

Table 3 presents a regression analysis examining the relationship between various facets of teachers' work attitudes and their job performance. The predictors include attitudes towards the subject taught, school head, co-workers, learners, environment, and incentives. The coefficients for these predictors range from 0.01 to 0.08, with corresponding t-values between 0.19 and 0.84, and p-values all exceeding 0.05. These results indicate that none of the individual predictors have a statistically significant impact on job performance. The overall model has an R-squared value of 4.2%, suggesting that the predictors explain only a small portion of the variance in job performance. The F-statistic of 0.83 with a p-value of 0.55 further confirms the lack of a significant relationship between the combined predictors and job performance.

Table 3. *Regression analysis for work attitude and job performance of teachers*

Predictors	Coefficient	t-value	P-value	Decision
Work Attitude towards Subject Taught	0.01	0.20	0.84	Not Significant
Work Attitude towards School Head	0.05	0.52	0.60	Not Significant
Work Attitude towards Co-Worker	0.06	0.70	0.48	Not Significant
Work Attitude towards Learners	0.08	0.43	0.68	Not Significant
Work Attitude towards Environment	0.07	0.32	0.75	Not Significant
Work Attitude towards Incentives	0.04	0.19	0.85	Not Significant
S=0.3052	R-Sq= 4.2%	R-Sq(adj)=0.0%		

Contrary to the findings in Table 3, several studies have identified significant relationships between teachers' work attitudes and their job performance. Jimenez (2020) conducted a study on secondary school teachers in Central

Luzon, Philippines, and found that positive work attitudes, particularly a strong sense of efficacy and community, were significantly correlated with higher teaching performance. The study utilized a descriptive-correlational method and highlighted the importance of emotional maturity and positive work habits in enhancing teaching performance. Moreover, Nwogbo and Ugwuoke (2022) explored the correlation between teachers' attitudes and job performance in secondary schools in Anambra State, Nigeria. Their research revealed a positive correlation, emphasizing that teachers with favorable attitudes towards their work tend to exhibit better job performance. The study recommended that governments should enhance the desirability of the teaching profession to foster positive work attitudes. These studies suggest that while the regression analysis in Table 3 did not find significant relationships, other research indicates that positive work attitudes can play a crucial role in enhancing teachers' job performance. The discrepancy may be due to differences in research design, sample populations, or contextual factors.

3.3 Work Commitment of Teachers

Table 4 presents the work commitment levels of teachers, revealing a strong affective commitment (M = 4.36, "Strongly Agree"), and high normative (M = 4.03) and continuance commitment (M = 4.02), both rated as "Agree." The overall mean of 4.14 indicates that teachers generally agree with statements reflecting their commitment to their profession. This suggests that teachers feel emotionally attached to their roles, recognize a sense of obligation to remain in their positions, and perceive benefits in continuing their employment.

Table 4. *The work commitment of teachers*

Indicators	Mean	Adjectival Rating
Affective	4.36	Strongly Agree
Normative	4.03	Agree
Continuance Commitment	4.02	Agree
Overall Mean	**4.14**	**Agree**

These findings align with the study by Shu (2022), which emphasized the significance of teacher commitment in influencing work engagement and well-being. Shu highlighted that committed educators are more likely to be engaged and experience higher levels of well-being, which in turn positively affects their teaching performance and student outcomes. Furthermore, the research by Türk and Korkmaz (2022) supports these results, indicating that teachers with higher levels of professional commitment and dedication exhibit more positive attitudes towards their profession. Their study found that such commitment levels are predictors of teachers' attitudes and are influenced by factors like gender, seniority, and teaching branch.

Table 5 presents a regression analysis examining the relationship between teachers' organizational commitment—specifically affective, normative, and continuance commitment—and their job performance. The analysis reveals that none of the commitment dimensions significantly predict job performance, as indicated by p-values exceeding the 0.05 threshold (affective: p=0.84; normative: p=0.60; continuance: p=0.48). The model accounts for a mere 3.9% of the variance in job performance (R^2=3.9%), suggesting that other factors may play a more substantial role in influencing performance outcomes.

Table 5. *Regression analysis for commitment and job performance of teachers*

Predictors	Coefficient	t-value	P-value	Decision
Affective	0.01	0.20	0.84	Not Significant
Normative	0.05	0.52	0.60	Not Significant
Continuance Commitment	0.06	0.70	0.48	Not Significant
S= 0.3016	R-Sq=3.9%		R-Sq(adj)= 1.4%	
Analysis of Variance				
Source	**SS**	**MS**	**F**	**P-value**
Regression	0.43	0.14	1.59	0.19
Residual Error	10.6	0.09		
Total	**11.0**			

Table 6. *Variation of the work attitude and commitment of teachers according to profile*

Sources of Variations		Computed f	P-value	Decision	Conclusion
Subject Taught	Age	2.140	0.146	Failed to Reject Null Hypothesis	Not Significant
	Gender	0.340	0.714	Failed to Reject Null Hypothesis	Not Significant
	Civil Status	0.250	0.782	Failed to Reject Null Hypothesis	Not Significant
	Years in Service	1.150	0.336	Failed to Reject Null Hypothesis	Not Significant
	Academic Rank	0.820	0.488	Failed to Reject Null Hypothesis	Not Significant
	Educational Attainment	0.200	0.896	Failed to Reject Null Hypothesis	Not Significant
	Designation	1.100	0.337	Failed to Reject Null Hypothesis	Not Significant
	Income	0.720	0.588	Failed to Reject Null Hypothesis	Not Significant
Superior/School Head	Age	0.070	0.785	Failed to Reject Null Hypothesis	Not Significant
	Gender	2.840	0.062	Failed to Reject Null Hypothesis	Not Significant
	Civil Status	1.330	0.268	Failed to Reject Null Hypothesis	Not Significant
	Years in Service	2.500	0.034	Reject Null Hypothesis	Significant
	Academic Rank	1.700	0.172	Failed to Reject Null Hypothesis	Not Significant
	Educational Attainment	0.050	0.983	Failed to Reject Null Hypothesis	Not Significant
	Designation	4.030	0.020	Reject Null Hypothesis	Significant
	Income	1.800	0.162	Failed to Reject Null Hypothesis	Not Significant
Co-Worker	Age	0.000	0.998	Failed to Reject Null Hypothesis	Not Significant
	Gender	1.960	0.145	Failed to Reject Null Hypothesis	Not Significant
	Civil Status	1.650	0.197	Failed to Reject Null Hypothesis	Not Significant
	Years in Service	0.230	0.947	Failed to Reject Null Hypothesis	Not Significant
	Academic Rank	2.930	0.037	Reject Null Hypothesis	Significant
	Educational Attainment	1.460	0.228	Failed to Reject Null Hypothesis	Not Significant
	Designation	0.140	0.866	Failed to Reject Null Hypothesis	Not Significant
	Income	3.930	0.021	Reject Null Hypothesis	Significant
Learner	Age	0.020	0.897	Failed to Reject Null Hypothesis	Not Significant
	Gender	1.190	0.307	Failed to Reject Null Hypothesis	Not Significant
	Civil Status	2.160	0.120	Failed to Reject Null Hypothesis	Not Significant
	Years in Service	0.880	0.495	Failed to Reject Null Hypothesis	Not Significant
	Academic Rank	1.590	0.195	Failed to Reject Null Hypothesis	Not Significant
	Educational Attainment	0.530	0.665	Failed to Reject Null Hypothesis	Not Significant
	Designation	0.710	0.491	Failed to Reject Null Hypothesis	Not Significant
	Income	1.690	0.185	Failed to Reject Null Hypothesis	Not Significant
School Environment	Age	0.060	0.808	Failed to Reject Null Hypothesis	Not Significant
	Gender	1.660	0.194	Failed to Reject Null Hypothesis	Not Significant
	Civil Status	2.940	0.057	Failed to Reject Null Hypothesis	Not Significant
	Years in Service	0.980	0.435	Failed to Reject Null Hypothesis	Not Significant
	Academic Rank	1.590	0.195	Failed to Reject Null Hypothesis	Not Significant
	Educational Attainment	1.650	0.182	Failed to Reject Null Hypothesis	Not Significant
	Designation	0.710	0.491	Failed to Reject Null Hypothesis	Not Significant
	Income	1.890	0.174	Failed to Reject Null Hypothesis	Not Significant
Incentives/ Rewards	Age	0.10	0.940	Failed to Reject Null Hypothesis	Not Significant
	Gender	0.140	0.874	Failed to Reject Null Hypothesis	Not Significant
	Civil Status	0.330	0.717	Failed to Reject Null Hypothesis	Not Significant
	Years in Service	1.930	0.095	Failed to Reject Null Hypothesis	Not Significant
	Academic Rank	0.180	0.908	Failed to Reject Null Hypothesis	Not Significant
	Educational Attainment	0.440	0.727	Failed to Reject Null Hypothesis	Not Significant
	Designation	0.110	0.898	Failed to Reject Null Hypothesis	Not Significant
	Income	1.890	0.174	Failed to Reject Null Hypothesis	Not Significant
Affective	Age	2.180	0.142	Failed Reject Null Hypothesis	Not Significant
	Gender	0.230	0.797	Failed Reject Null Hypothesis	Not Significant
	Civil Status	3.010	0.053	Failed Reject Null Hypothesis	Not Significant
	Years in Service	0.450	0.816	Failed Reject Null Hypothesis	Not Significant
	Academic Rank	0.650	0.588	Failed Reject Null Hypothesis	Not Significant
	Educational Attainment	2.210	0.091	Failed Reject Null Hypothesis	Not Significant
	Designation	0.260	0.772	Failed Reject Null Hypothesis	Not Significant
	Income	0.550	0.498	Failed Reject Null Hypothesis	Not Significant
Normative	Age	0.290	0.590	Failed Reject Null Hypothesis	Not Significant
	Gender	0.720	0.489	Failed Reject Null Hypothesis	Not Significant
	Civil Status	3.070	0.050	Failed Reject Null Hypothesis	Not Significant
	Years in Service	0.800	0.553	Failed Reject Null Hypothesis	Not Significant
	Academic Rank	0.480	0.699	Failed Reject Null Hypothesis	Not Significant
	Educational Attainment	2.980	0.034	Reject Null Hypothesis	Significant
	Designation	0.270	0.762	Failed Reject Null Hypothesis	Not Significant
	Income	0.340	0.397	Failed Reject Null Hypothesis	Not Significant
Continuance Commitment	Age	0.120	0.733	Failed Reject Null Hypothesis	Not Significant
	Gender	2.030	0.136	Failed Reject Null Hypothesis	Not Significant
	Civil Status	4.080	0.019	Reject Null Hypothesis	Significant
	Years in Service	1.080	0.374	Failed Reject Null Hypothesis	Not Significant
	Academic Rank	1.440	0.236	Failed Reject Null Hypothesis	Not Significant
	Educational Attainment	2.460	0.066	Failed Reject Null Hypothesis	Not Significant
	Designation	0.430	0.650	Failed Reject Null Hypothesis	Not Significant
	Income	2.240	0.167	Failed Reject Null Hypothesis	Not Significant

These findings align with the study by Pan and Arguelles (2024), which found that while affective commitment positively impacts task and contextual performance, normative and continuance commitments do not significantly influence these performance aspects. Similarly, Owan (2021) reported that staff placement and motivation significantly predict affective and continuance commitment but not normative commitment, indicating that certain organizational factors may differentially affect commitment dimensions. Furthermore, Viernes et al. (2024) observed a strong correlation between teachers' performance and their job commitment, particularly career commitment, but noted no significant relationship with organizational, service, or work commitments. These studies collectively suggest that while certain facets of commitment may influence job performance, the relationship is complex and may be moderated by other organizational and individual factors.

3.4 Work Attitude and Commitment of Teachers When Grouped According to Profile

Table 6 reveals significant differences between teachers' demographic profiles, work attitudes, and levels of commitment. The failure to reject the null hypothesis across most variables indicates that demographic factors such as age, gender, civil status, years in service, academic rank, educational attainment, designation, and income do not significantly influence teachers' perceptions of their work environment or relationships within the school setting. These findings align with research suggesting that institutional policies, leadership styles, and organizational culture have a more significant impact on teacher motivation and job satisfaction than individual demographic characteristics (Kim et al., 2023).

The analysis indicates that among various demographic factors, only a few—specifically, years in service and designation under superior/school head, academic rank and income under co-worker, educational attainment under normative commitment, and civil status under continuance commitment—show statistically significant relationships with aspects of teacher commitment. This suggests that while many demographic variables do not significantly influence teacher commitment, certain factors related to professional experience and status do have an impact. Supporting this, Balanquit et al. (2023) found that higher educational attainment among faculty members in Philippine state universities correlates with better performance in the Licensure Examination for Teachers (LET), highlighting the importance of advanced qualifications in teaching effectiveness. Additionally, study of Fang and Qi (2023) have shown that a positive school climate, characterized by supportive leadership and collegial relationships, enhances teachers' self-efficacy and job satisfaction, which are critical components of organizational commitment. These findings underscore the multifaceted nature of teacher commitment, influenced by both individual qualifications and the broader work environment.

3.5 Job Performance of Teachers

Table 7 presents the distribution of teachers' job performance based on their Individual Performance Commitment and Review Form (IPCRF) ratings. A significant majority, 85%, achieved a "Very Satisfactory" rating (3.500–4.499), while 10% attained an "Outstanding" rating (4.500–5.000). Only 5% were rated as "Satisfactory" (2.500–3.499), and notably, no teachers fell into the "Unsatisfactory" or "Poor" categories (Gragasin et al, 2023).

Table 7. *Job Performance of Teachers Based on their IPCRF*

Range	Frequency	Percentage	Adjectival Rating
4.500 – 5.000	12	10%	Outstanding
3.500 – 4.499	103	85%	Very Satisfactory
2.500 – 3.499	6	5%	Satisfactory
1.500 – 2.499	0	0%	Unsatisfactory
Below 1.499	0	0%	Poor

These findings align with recent studies highlighting factors contributing to high teacher performance. For instance, Gragasin et al. (2023) found that job satisfaction, moderate anxiety levels, and a positive attitude toward teaching significantly influence higher IPCRF ratings among teachers in the Philippines. Similarly, Cadag (2024) emphasized the role of the IPCRF as an effective evaluation tool, noting that while many teachers achieved outstanding ratings, there remains a need for technical assistance to address areas of improvement. Furthermore, Nagera and Espiritu (2024) observed that professional development initiatives positively impact teacher performance, with over half of the evaluated teachers in Antipolo City receiving "Outstanding" ratings.

Collectively, these studies suggest that factors such as job satisfaction, effective evaluation tools like the IPCRF, and continuous professional development contribute to the high performance levels observed among teachers.

4.0 Conclusion

Based on the findings, this study concludes that while certain demographic factors influence specific aspects of teachers' work attitudes, organizational commitment, and workplace interactions, they do not fully determine overall job performance. Teachers with higher academic ranks and income levels tend to have stronger relationships with colleagues, while learner relations remain stable across all groups. Similarly, perceptions of the school environment and incentives are consistent regardless of demographic characteristics, indicating a shared experience among teachers. In terms of organizational commitment, teachers with higher educational attainment show a stronger sense of moral duty to stay in the profession, while those with familial responsibilities feel a greater financial necessity to remain. However, affective commitment, which reflects emotional attachment to the job, is not significantly influenced by demographic variables. Despite these variations, most teachers in the district demonstrate high levels of performance, with the majority rated as "Very Satisfactory" or "Outstanding." Regression analyses indicate that demographic factors alone are weak predictors of work attitudes and commitment, suggesting that other elements—such as institutional support, leadership, job satisfaction, and personal motivation—may play a more significant role. To sustain teacher engagement and effectiveness, educational institutions should prioritize fostering a supportive and motivating work environment that goes beyond demographic considerations. Future research could explore these non-demographic influences further to develop strategies for enhancing teacher commitment and job performance.

5.0 Contributions of Authors

The authors of this research collaborated to review and approve the final version of the study. This ensures the study's completeness and integrity. Author Dr. Jane C. Oropa played an integral part in the editing, writing, supervision, data analysis, and encoding. Author Jenefir M. Magtoltol, concentrated on the fieldwork, distribution and retrieval of survey instruments, doing comprehensive data analysis, transcribing the gathered material, and adhering to ethical guidelines throughout the study. These complementary contributions underscore the collaborative endeavours and mutual obligations as adviser and mentee to generate a thorough and ethically robust research output.

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7.0 Conflict of Interests

As the author of this manuscript, we hereby declare the following information regarding any potential conflicts of interest that may have influenced or could be perceived to influence the research, analysis, and conclusions presented in this work:
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Personal Relationships: Disclose any personal or professional relationships that could influence the research, such as familial relationships with individual in the field, collaboration that may create bias, or personal rivalries.
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Transforming Graduate School Faculty Development: Insights from Training Needs Analysis

Eric Arthur N. Dio
University of St. La Salle, La Salle Ave., Bacolod City, Philippines

Author Email: e.dio@usls.edu.ph

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Abstract. This study aimed to identify the training needs of graduate school faculty at a private higher education institution in the Visayas, Philippines. Using a descriptive research design and total enumeration, 48 faculty members from the Arts & Sciences, Business, Education, Engineering, and Nursing programs participated. A survey questionnaire was utilized to gather data on training attended, training needs, motivating and hindering factors, and preferred training pedagogy. Descriptive statistics were employed for analysis. Results showed that most faculty had participated in development training in the past five years, particularly in educational technology, learning management systems (LMS), and research ethics. Despite being highly experienced educators with over 10 years of experience, participants expressed the need for ongoing training. The most attended training included technology use in education, LMS, research ethics, institutional research protocols, research mentoring, proposal writing, rubrics, and assessment methods. Identified training needs were instructional techniques and subject matter mastery (teaching and learning), technology use and LMS (educational technology), research publication, qualitative research, and mentoring/advising (research). Key hindrances to participation included workload, job responsibilities, limited support, cost of training, and amount of time required. Motivating factors were relevant topics, expert speakers, and convenient schedules. Preferred training modes were seminars, certification/diploma courses, and workshops. The study recommends that an effective and comprehensive faculty development program be formulated and adopted to provide continual training that would enhance the skills and knowledge of the faculty, adapting to the current demands of the educational landscape.

Keywords: Educational technology; Faculty development; Faculty training challenges; Instructional techniques; Training needs.

1.0 Introduction

Effective and efficient resource management is fundamental for organizations to meet goals, sustain operations, and support long-term growth. Among these resources, human capital remains central to achieving institutional success, particularly in knowledge-driven organizations like higher education institutions (HEIs). Human resource development, primarily through targeted training, enhances individual competencies and the institution's capacity to adapt to evolving educational demands. Contemporary models of HRM emphasize employee development as a strategic function that strengthens institutional performance (Nica, 2022).

In HEIs, training faculty is essential to maintaining academic excellence. Faculty members must continuously update their knowledge, teaching methodologies, and use of technology to meet the dynamic expectations of learners and the global academic community. Alamro (2021) emphasized the critical role of teaching in shaping competent and values-driven citizens, while Mohiuddin et al. (2022) argued that higher education institutions

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contribute significantly to societal welfare by producing a knowledgeable and engaged workforce. In the Philippines, graduate education—classified under Levels 7 and 8 of the Philippine Qualifications Framework—requires institutions to deliver advanced, integrative, and research-intensive instruction aligned with the Commission on Higher Education (CHED) Memorandum Order Number 15, Series of 2019.

Despite this mandate, faculty development programs were placed on hold during the pandemic. With the return to regular academic operations, there is an urgent need to design responsive training programs for graduate faculty. To ensure relevance and effectiveness, it is essential to assess current faculty training needs and the factors that motivate or hinder their participation. This study was, therefore, conducted to identify these needs and challenges, forming the basis for a comprehensive and future-ready faculty development program.

2.0 Methodology

2.1 Research Design

To ensure that the research objectives were addressed systematically, a suitable design was selected based on the nature of the inquiry. A descriptive approach was deemed most appropriate since the study focused on understanding current conditions and perceptions without manipulating variables. The study, therefore, utilized a descriptive research design. Stangor (2011) discussed descriptive research as describing and identifying attributes of a particular phenomenon or current state. In this study, the participants' profile was described, along with their perceived training needs and the motivating and hindering factors that affected their decision or situation to attend job-related training and activities.

2.2 Research Participants

The study's participants were the graduate school faculty members from 2019-2024. Five academic years were covered due to the unique operations of the Graduate School, wherein a faculty member may not be given an academic load continuously but may be given after 2-3 years or more years, depending on the program's need. The study included both part-time and full-time faculty, adults, but not those more than 59 years old. There are around 50-60 faculty members in the Graduate School. Total enumeration was employed; however, as an inclusion criterion, those who are retired, resigned, and those part-time faculty identified as non-rehire were not eligible to be part of the study. A total of 48 graduate school faculty members were able to participate in the study.

2.3 Research Instrument

The study utilized a survey questionnaire as its primary research instrument. The constructs were primarily based on the Catholic Educational Association of the Philippines (CEAP) framework, which was also employed in the study by Estacio et al. (2020). The original CEAP questionnaire contained only nine items and did not reflect recent educational developments, such as learning management systems. Additional variables were incorporated into the questionnaire. The instrument underwent the Good and Scates validity test. It was reviewed and validated by one School Dean, two Department Chairs, and two faculty members, resulting in an average rating of 4.89. The instrument was subjected to a reliability test, and a Cronbach's Alpha score of 0.944 was obtained, indicating high internal consistency.

2.4 Data Gathering Procedure

The study commenced by requesting the agency's consent from the university through the Assistant Vice Chancellor for Academic Affairs (AVCAA). After the approval of the AVCAA, the researcher requested the faculty list and official university email of the target participants. Emails were sent to the target participants using their institutional email addresses and informing them of the background and rationale of the study. Participants were informed of their rights as participants and their choice to participate or not to participate in the study. A link to the Google Form was attached, and they can proceed to the link if they wish to participate in the study. Before answering the actual questions of the survey, an informed consent form (ICF) was filled out by the participant indicating his or her understanding of the study and questionnaire, in addition to his or her free and voluntary participation. For the online survey, the participant indicated this by reading the informed consent form, and a button should be clicked indicating understanding and consent. The researcher explained to the participants the purpose of the study, the data-gathering process, and how the data would be used and disposed of. Before answering, the survey questionnaire was presented to the participants to assess the questions and information that needed to be gathered. Other items, such as rights to anonymity, benefits of the study, confidentiality, the

right to withdraw, and the right to a copy of the consent form, were also discussed with the participants. Although no known risk was identified and reported, this was mitigated by ensuring no personal information was gathered, and anonymity was part of the questionnaire. Furthermore, the survey used Google Drive, which has a high level of cybersecurity.

2.5 Data Analysis

Descriptive statistics, such as frequency counts and percentages, were used. The data were presented and analyzed using frequencies and percentages to identify the participants' profile, training attendance, motivating and hindering factors, and preferred training pedagogy. The mean and standard deviation were used to determine the training needs. The mean scores result was interpreted using the following guide:

Table 1. *Scale, Mean, and Verbal Description*

Scale	Mean	Verbal Description
4	3.50-4.00	Very High need for the particular training area/topic
3	2.50-3.49	High need for the particular training area/topic
2	1.50-2.49	Low need for the particular training area/topic
1	1.00-1.49	Very Low need for the particular training area/topic

2.6 Ethical Considerations

The study underwent an ethics review by the Research Ethics Review Office, which is accredited by the Philippine Health Research Ethics Board (PHREB). It began only after receiving ethical clearance from the Research Ethics Review Committee. Agency consent was secured through the approval of the Vice Chancellor for Academic Affairs. The researcher also obtained the free and prior informed consent of all participants. During the survey, participants' preferred time and location were respected. Participation was voluntary, and those who chose not to participate were fully respected. No incentives, compensation, or reimbursement were provided. Confidentiality was strictly observed, identities were not disclosed, and all raw data were destroyed after processing. To ensure safety when answering online and paper-based questionnaires, the instrument excluded personal and sensitive information and focused solely on their training needs. Survey responses were securely stored. After the study, paper forms were shredded and disposed of using environmentally friendly methods. Both raw and processed data were stored in Google Cloud Storage to prevent data breaches and protect the information. Access was strictly limited to the researcher, enumerator, data processor, and statistician. Files in Google Drive were permanently deleted after the completion of the study.

3.0 Results and Discussion

3.1 Profile of the Participants

Most participants (85.42%) have doctorate degrees in their specialization, and only 14.58% hold a master's degree. All participants have post-graduate degrees, which is a requirement for teaching in a graduate school. It is also worth noting that 32 or 85.42% of the participants are full-time faculty. These faculty members are teaching in their respective colleges. As regards the academic programs where the participants belong, 16 participants (33.33%) are from the Arts and Sciences, followed by Business with 11 or 22.92%. The number of participants per program would indicate the program's size in terms of the number of students. The number of years of teaching experience of the faculty was also determined. In Table 2, the graduate school faculty has a varied number of years of experience; 14 participants, or 29.17%, have been teaching in the graduate school, while 12, or 25%, have been teaching for more than 20 years already.

3.2 Training Attendance

In teaching and learning, 35 or 72.92% of the participants attended training and seminars on classroom management. This is followed by instructional techniques, with 33 participants attending. On the other hand, mastery of subject matter and motivational techniques were the least taught, and the learning topics the participants could attend. Around 36 or 75 % of the participants could attend the learning evaluation training. This includes evaluating students, rubrics, and assessment methods and techniques. On the other hand, educational technology training is among the highly attended training courses by the participants. This contributed to the modality change during the pandemic, wherein classes were conducted online and eventually a hybrid of online and face-to-face. Also, the university established the Academic Information Management Systems (AIMS) and, for familiarization, conducted training. A respectable number of the participants were able

to attend research-related training. Research Ethics (79.17%), Institutional Research Protocol (77.08%), Research Mentoring/Advising (75%), and Proposal Writing (75%) are among the top research topics that the participants were able to attend. Although Qualitative Research garnered the lowest, 31 or 64.58% of the participants could still attend. Data shows that in various areas, the majority of the participants could attend these trainings, with education technology training garnering the highest frequency and mastery of subject matter and motivational techniques garnering the lowest. This indicates that the graduate school faculty of the university are well-trained professionals and continually improve their skills and capabilities by attending relevant seminars and training.

Table 2. *Profile of the Participants*

Variables	Frequency	Percentage
Highest Educational Degree		
Master's Degree	7	14.58
Doctorate Degree	41	85.42
Faculty Status		
Full-Time	32	85.42
Part-Time	16	14.58
Graduate Program Where Faculty Belongs		
Arts & Sciences	16	33.33
Business	11	22.92
Education	9	18.75
Engineering	8	16.67
Nursing	4	8.33
Years of Teaching Experience In the Graduate School		
less than 5	5	10.42
5-10	14	29.17
11-15	9	18.75
15-20	8	16.67
more than 20	12	25.00

Table 3. *Training Attendance of the Participants*

Variables	Frequency	Percentage
Teaching and Learning		
Organization & Planning for Instruction	31	64.58
Mastery of Subject Matter	28	58.33
Motivational Techniques	28	58.33
Instructional Techniques	33	68.75
Classroom Management	35	72.92
Learning Evaluation		
Evaluating Students	34	70.83
Rubrics	36	75.00
Assessment Methods & Techniques	36	75.00
Educational Technology		
Use of Technology in Education	43	89.58
Learning Management System (CANVAS)	43	89.58
Academic Information Management Systems (AIMS)	35	72.92
Research		
Research Mentoring/Advising	36	75.00
Proposal Writing	36	75.00
Review of Related Literature	33	68.75
Institutional Research Protocol	37	77.08
Research Ethics	38	79.17
Quantitative Research	34	70.83
Qualitative Research	31	64.58
Research Publication	33	68.75
Others	8	16.67

3.3 Training Needs

Teaching and Learning

Teaching and learning are processes wherein the educator identifies and develops learning objectives and implements teaching strategies that combine various elements (Munna & Kalam, 2021). Among the various areas of teaching and learning, Instruction Techniques garnered the highest mean with 2.60 SD ±1.00, interpreted as High. According to Seechaliao et al. (2017), instructional techniques, also known as pedagogy, are composed of

various methods such as teaching by lecturing, teaching by demonstrating, teaching by using small group discussion, teaching by using simulations, using field trips as teaching technique, teaching by using induction and teaching by using deduction. They further added that instructional techniques are one type of educational innovation. As an educational innovation, faculty can use pedagogy to help them effectively deliver their lectures. The need for training in instructional techniques may vary from one university to another or even from one faculty member to another. Estacio et al. (2020) provided a different result, which showed that no training is needed in this area in the school of their study. On the other hand, Amparado et al. (2017) showed that developing teaching materials and tools for instruction is an immediate training need for their faculty. In graduate school, the need for training in instructional techniques may be prompted by the fact that they are dealing with post-graduate, adult learners and that the usual lecture-type, teacher-centered approach may be ineffective.

Table 4. *Teaching and Learning Area*

Indicators	Mean	±SD	Interpretation
Organization & Planning for Instruction	2.54	0.97	High
Mastery of Subject Matter	2.56	0.97	High
Motivational Techniques	2.52	1.01	High
Instructional Techniques	2.60	1.00	High
Classroom Management	2.21	0.92	Low
Overall Mean	**2.49**	**0.97**	**Low**

Mastery of subject matter follows instructional techniques in terms of the training needs of the graduate school faculty, with a Mean Score of 2.56 and SD ±0.97. Bueno (2023), in his analysis, discussed that mastery of subject matter is a key factor in achieving educational objectives. Bueno added that students' satisfaction and achievement is higher if they have highly knowledgeable professors. This would denote that ongoing professional development to enhance the faculty's subject knowledge must be done regularly (Bueno, 2023; Trivette et al., 2017). The participants' acknowledgment of continual learning to enhance and keep abreast of the latest information on their subject matter would indicate the willingness and commitment of the faculty to continual improvement.

Learning Evaluation

Table 5 shows that in terms of Learning Evaluation, there is a high need for training for Rubrics and Assessment Methods, with both having a mean of 2.69. DeLuca et al. (2019) mentioned in their study that educational policies and professional standards have prioritized assessment-driven teaching as a core instructional strategy and have established teacher assessment literacy as a fundamental competency for the contemporary educator. This thought was further supported by Ewais et al. (2020), who discussed that to meet the course objectives, learning goals, outcomes, and assessment tools must be aligned.

Table 5. *Learning Evaluation Area*

Indicators	Mean	±SD	Interpretation
Evaluating Students	2.54	0.92	High
Rubrics	2.69	1.01	High
Assessment Methods & Techniques	2.69	0.99	High
Overall Mean	**2.64**	**0.97**	**High**

Ragupathi and Lee (2020) presented the importance of rubrics as they provide scoring guides that give students a better understanding of what is being assessed, on what criteria grades are based, and what standards are expected. Furthermore, they discussed that a rubric is an assessment tool that explicitly lists the criteria for student work and articulates the levels of quality for each criterion. On the other hand, Meijer et al. (2020) discussed how assessment is becoming more of a challenge to higher education teachers due to changes in the academic landscape, such as the now popularly used approach of collaborative learning. They added that construct validity and the elicitation of the correct behavior among students in the collaborative learning approach pose challenges in assessment. Considering that most graduate school faculty employ collaborative learning as one teaching strategy, participants may have concluded that effective rubric construction and assessment are necessary.

Educational Technology

Another area assessed by this study is the use of technology in education, together with the specific use of a learning management system (LMS) and the academic information management system (AIMS). The faculty of

the Graduate School acknowledged a high need, particularly for the use of educational technology, with a mean of 2.63 SD ±0.96. The use of technology in education has become crucial at present if teachers want to connect with students. Present-day students are known to be digital natives with access to various digital platforms and technology, making information readily available through their computers, tablets, and smartphones (Jones et al., 2018), thus teachers must enhance their teaching strategies and instructional models with innovative educational technology (Jaipal-Jamani, et al., 2018). Cam et al. (2021) discussed that in the studies of Ilter (2014) and Keengwe and Georgina (2012), most teachers only use PowerPoint presentations, data storage, and downloading. Hunter (2016) espoused the use of technology in developing teaching pedagogy and instructional materials in all content courses.

Table 6. *Educational Technology Area*

Indicators	Mean	±SD	Interpretation
Use of Technology in Education	2.63	0.96	High
Learning Management System (LMS)	2.56	1.01	High
Academic Info Mgt System (AIMS)	2.52	0.99	High
Overall Mean	**2.57**	**0.99**	**High**

The faculty were also asked about their need for training on the University's LMS and AIMS, which were both recognized as high need, with a Mean of 2.56 SD ±1.01 for LMS and 2.52 SD ±0.99 for AIMS. Although both platforms have been used intensively since around 2020, some functionality and features of the two systems may not have been fully utilized. Thus, a need for training. Zanjani (2017) in his study discussed that LMSs are instrumental in providing knowledge sharing, collaboration, critical thinking, and higher-order thinking. Zanjani also discussed how LMS has become a central platform for many universities to deliver e-learning. In the case of the academic information system, or AIMS, Rachmat et al. (2022) discussed AIMS as an important support infrastructure that can facilitate academic service activities for students and teachers and promote a conducive learning atmosphere. LMS and AIMS are two important educational technology tools for the study participants. LMS is used for the enhancement of the delivery of learning, while AIMS is used for recording, grade verification, and student evaluation. The high need for training, as indicated by the study participants, may have been due to the necessity to fully utilize the systems' features.

Research

Table 7 presents that in the research area, Research Publication training posed the highest need among the graduate school faculty, with a mean of 2.85, verbally interpreted as high with SD ±0.88. This is followed by Research Mentoring and Qualitative Research, with a mean score of 2.75 (High). In their study, Abouelenein et al. (2016) recognize the need for research training in providing quality education. They have also recommended their university research training in research ethics, writing, statistics, journal editing, and publication. Commission on the Higher Education Department (CHED) 's memorandum (CMO 15; S., 2019) emphasized the importance of publishing graduate school faculty research in international, national, and local journals. Furthermore, part of the functions of the GS faculty is to mentor students in their research in course requirements, along with thesis and dissertations. In the study of Sicat et al. (2016), research advising, mentoring, and conducting qualitative methods were also recognized as urgent training needs.

Table 7. *Research Area*

Indicators	Mean	±SD	Interpretation
Research Mentoring/Advising	2.75	0.98	High
Proposal Writing	2.56	1.03	High
Review of Related Literature	2.56	0.99	High
Institutional Research Protocol	2.63	0.96	High
Research Ethics	2.63	0.96	High
Quantitative Research	2.58	0.94	High
Qualitative Research	2.75	1.02	High
Research Publication	2.85	0.88	High
Overall Mean	2.66	0.97	High

Chin et al. (2022) discussed in their study on teachers' professional development that research is one of the focus areas identified by their participants as a need for their development. This has emerged both in their qualitative and quantitative analysis. In the study of Real (2023), findings show that teachers have manifested competencies in research; however, they have further recommended the continuation of research training, particularly

attendance in conferences and seminars related to their field. This would indicate that research training is a continual process for professors to be adept in new trends, information, and skills in their field of specialization.

3.4 Factors that Motivate Participants to Attend Training

When the participants were asked about what reasons or factors would motivate them to attend faculty development training (Table 8), 31 participants, or 64.58% responded that relevant training topics, followed by speakers with high expertise with 30 participants, or 62.50%, and convenient training time with 26 or 54.17% of the participants. It can be seen that the faculty participants are willing to attend faculty development training provided that this could add value to their knowledge and skills, consequently providing personal and professional growth.

As mentioned by Dailey-Hebert et al. (2014), faculty are very particular about opportunities that capitalize on their motivation for growth and reward their investment. Consistent with the discussed barriers or hindering factors to training, which mentioned being busy at work as the topmost reason, participants are willing to attend if the time is convenient. Motivational factors may again vary per institution and person. In the study of Roodi (2023), salaries and wages, training incentives, and persuading professors are the top motivating factors. On the other hand, in the study of Dailey-Hebert et al. (2014), the desire to enhance learning, pay increases, professional growth, personal interest, and the monetary compensation for training are the topmost reasons.

Table 8. *Factors that Motivate Participants to Attend Training*

Factors	Frequency	Percentage
Relevant training topics	31	64.58
Speakers with high expertise	30	62.50
Convenient training time	26	54.17
Prestigious Certificate/diploma	24	50.00
Convenient training location	23	47.92
Available training information	20	41.67
Budget allocation for training	18	37.50
Online training	18	37.50
Enjoyable/ not boring training programs	18	37.50
Recognition of training in job promotions	18	37.50
Affordable training cost	16	33.33
Company incentives	16	33.33
Opportunities to travel if the training is outside the city	1	2.08
If friends are also attending	1	2.08

3.5 Factors that Hinder Participants from Attending Training

Table 9 presents a range of factors that may hinder participants from attending development training. Thirty of the participants, or 62.50%, believed that being too busy at work was the primary reason for not attending faculty development training. Job responsibility was also indicated by 29 or 60.42% of the participants. Limited support for training, cost of training, and the amount of time required for training are the third factors that hinder faculty participants of the study from attending training at 31.25% or 15 participants.

In their study, Chin et al. (2022) also indicated work schedule conflict as a barrier to training, as mentioned by their study participants. However, they have also included training cost and pre-requisites to training (qualifications, experience, seniority) as major barriers. In another study conducted among medical college professors in Bangladesh, findings show work overload as the second topmost reason hindering their faculty from attending training (Rahman, 2018). The study of understanding the barriers and hindering factors to attending training would help in the design of an appropriate faculty development plan or program and ensure proper attendance. In the case of Dailey-Hebert et al. (2014), scheduling, irrelevant topics, and untimely initiative are the main barriers their participants have cited. As Abouelenein et al. (2016) discussed in their study, faculty development is both a self-development and institutional development, thus, training ensures improved quality standards of an HEI.

Table 9. *Factors that Hinder Participants from Attending Training*

Factors	Frequency	Percentage
Too busy at work	30	62.50
Job Responsibilities	29	60.42
Limited support for training	15	31.25
Cost of Training	15	31.25
Amount of time required for training	15	31.25
Training topics are not relevant	14	29.17
Lack of support	10	20.83
No Information about the offered training	10	20.83
Training offered at an inconvenient /far place	8	16.67
Limited support for training	8	16.67
Family responsibilities	7	14.58
I do not feel the need for training	6	12.50
Health reasons	5	10.42
Cost of learning materials	5	10.42
Training is offered at an inconvenient time	4	8.33
No budget for training	4	8.33
Cost of learning materials	3	6.25
The topics I want do not seem to be available	3	6.25
Financial Constraints	3	6.25
No available in-house training	3	6.25
I do not feel the need for training	2	4.17
No available externally offered training	2	4.17
I do not enjoy training	1	2.08
Training topics	1	2.08

3.6 Preferred Training Pedagogy

Bilal et al. (2019), citing the works of Guraya et al. (2016), discussed that a dynamic and energetic faculty development program can lead to the enrichment of faculty skills in five domains, namely: teaching, assessment, curriculum, organizational leadership, and mentoring. It is imperative that all faculty training be aligned with the preferred delivery of the target participants. In this study, the faculty were asked about their preferred training pedagogy. Seminars proved to be the top choice with 29 participants, or 60.42%, choosing this mode of training. Certification is the next choice with 25 participants or 52.08%, followed by diploma courses with 23 participants or 47.92% favoring this training pedagogy.

Table 10. *Preferred Training Pedagogy*

Pedagogy	Frequency	Percentage
Seminars	29	60.42
Certification training	25	52.08
Diploma courses	23	47.92
Workshops	21	43.75
Online Certifications	19	39.58
Intensive training	17	35.42
Webinars	16	33.33
Online training	16	33.33
Use of Apps	8	16.67
Computer-based training	5	10.42
Hands-on training	2	4.17
Case studies	2	4.17

3.7 Summary of the Overall Mean Score per Area

The results of the training needs assessment reveal that graduate school faculty members express the highest need for development in the areas of Research, Learning & Evaluation, and Educational Technology, all of which were interpreted as High. These findings indicate that faculty members seek further support in enhancing their research competencies, improving strategies for assessing student learning, and effectively integrating educational technologies into their instruction. In contrast, the area of Teaching & Learning received a lower Mean score, with a Low interpretation. This suggests that faculty members feel relatively more confident in their current teaching methods and classroom management practices and thus perceive less need for additional training in this area. Overall, the results point to a growing demand for specialized and advanced training in research and evaluation

practices, as well as digital tools for teaching—key areas that are essential in maintaining academic excellence and adapting to the evolving demands of graduate education.

Table 11. *Overall Mean Score per Area*

Area	Mean	±SD	Interpretation
Research	2.66	0.97	High
Learning & Evaluation	2.64	0.97	High
Educational Technology	2.63	0.96	High
Teaching & Learning	2.49	0.97	Low

4.0 Conclusion

In conclusion, the findings of this research highlight the key insights and implications that address the central objectives of the study. Concerning the training attended by the participants, the top training attended was Use of Technology in Education, Learning Management System (CANVAS), Research Ethics, Institutional Research Protocol, Research Mentoring/Advising, Proposal Writing, Rubrics, Assessment Methods & Techniques. Regarding the training needs indicated by the participants, instructional techniques and mastery of the subject matter are the top two needs in the teaching and learning area. In the educational technology area, the use of technology and the Learning Management System are the two highest needs in terms of training. Lastly, research publication, qualitative research, and research mentoring/advising were recognized by the participants as training needs in the area of research.

Being too busy at work, having job responsibilities, limited support for training, cost of training and amount of time required for training were the top reasons considered by the participants as hindrances or challenges in attending faculty development training. On the other hand, relevant training topics, speakers with high expertise, and convenient training were the top considerations to motivate the graduate school faculty to participate in training using seminars, certification/diploma courses, and workshops. Generally, the graduate school faculty are highly trained in various facets of their academic function. However, this does not hinder them from continually improving their skills and knowledge by seeking training opportunities.

5.0 Contribution of Authors

The sole author reviewed the final content of the paper.

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7.0 Conflict of Interest

The author declares that there is no conflict of interest regarding the publication of this research.

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Assessment of Groundwater Quality in Barangay Poblacion, Ayungon: Water Safety Education in WinS Program

Karyl D. Malones*[1], Antonia Gueyndoline B. Despojo[2]
[1]Negros Oriental State University, Caranoche, Sta. Catalina, Philippines
[2]Foundation University, Dumaguete City, Negros Oriental, Philippines

*Corresponding Author Email: karylmalones30@gmail.com

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Abstract. Clean and safe access to water is vital in human health and wellness, and thus regular water quality assessment is very important in avoiding waterborne disease and promoting public safety. Thus, the study aimed to assess the groundwater quality in Barangay Poblacion, Ayungon, Negros Oriental focusing on both microbiological and physicochemical parameters during dry and rainy seasons. The researcher utilized descriptive designs and employed simple random sampling. The water sampling was done during both rainy and dry periods at three groundwater sources for drinking. Microbiological and physicochemical analyses of the water samples were performed by third-party laboratories. The findings revealed that while the groundwater met the 2017 Philippine National Standards for Drinking Water (PNSDW) for total dissolved solids (TDS), color, nitrate, turbidity, arsenic, cadmium, lead, hardness, and heterotrophic plate count (HPC), it failed in terms of pH levels and coliform bacteria, indicating potential contamination risks. These findings emphasize the need for continued drinking water quality monitoring, enhanced sanitation practices, and sustained public education to ensure safe water consumption and prevent waterborne diseases.

Keywords: Microbiological; Physicochemical; Water quality; Assessment of groundwater quality.

1.0 Introduction

Access to clean and safe drinking water is a global concern, especially in schools where children rely on water daily. Fayaji et al. (2019) found that groundwater quality assessments over three years indicated total dissolved solids (TDS) levels exceeding the standard limit. Meanwhile, Hassan et al. (2022) reported that 50% of sampled wells in Ad-Dawadmi, Saudi Arabia, were contaminated with total coliform bacteria. Similarly, Mahami and Odonkor (2020) stressed the importance of microbiological testing, as contaminated drinking water can lead to diarrhea and other illnesses. These findings underscore the urgent need for continuous monitoring and improvement of drinking water sources to protect public health, aligning with Sustainable Development Goal (SDG) 3, which aims to ensure good health and well-being for all.

In the Philippines, groundwater serves as a primary source of drinking water, accounting for over 50% of the nation's supply and 85% of piped water (British Geological Survey, 2021). However, during the dry season, many communities experience water shortages and must depend on potentially unsafe sources. Studies have indicated that groundwater in certain areas becomes turbid and contaminated with coliform bacteria during this period (Yazawa et al., 2024). For instance, Yazawa et al. (2024) found coliforms in household drinking water samples in

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Barbaza, Antique, posing health risks to residents. These challenges emphasize the need for improved access to clean water and sanitation, which directly supports SDG 6, centered on ensuring the availability and sustainable management of water and sanitation for all.

This study focuses on assessing groundwater quality in Barangay Poblacion, Ayungon, Negros Oriental, where groundwater serves as a vital resource for the community, including Ayungon Central School. While previous studies evaluated groundwater in different parts of the Philippines (Sudaria et al., 2020; Faulmino et al., 2023), limited research has been conducted in Negros Oriental, making this study a pioneering effort in Barangay Poblacion. The study evaluated the water quality in terms of microbiological and physicochemical parameters of Barangay Poblacion in accordance with the PNSDW (2017).

2.0 Methodology

2.1 Research Design

One liter of water was collected from each well for physicochemical analysis, while a sterile bottle provided by the testing laboratory was used to collect samples for microbiological analysis. Water samples for microbiological testing were collected during the hot period and during the rainy period. Meanwhile, samples for physicochemical analysis were also collected for the hot and rainy periods. As expected, only one sample was obtained for the rainy season due to heavy rains and the site location where the wells are near the river banks. Microbiological samples were submitted to Metro Dumaguete Water Laboratory, located at Metro Dumaguete Water Office, Diego dela Viña Road, Barangay Daro, Dumaguete City, Negros Oriental. Samples for physicochemical characterization were sent to Alpha Laboratory Calamba, Philippines Corporation, located at LTO Road, Real, Calamba, Laguna, for analysis of pH, total dissolved solids (TDS), color, nitrate, turbidity, arsenic, cadmium, lead, and total hardness. During sample collection, the presence or absence of bio-indicators was also observed at the sampling sites. The selected water parameters were based on the 2017 Philippine National Standards for Drinking Water (PNSDW) under mandatory parameter requirements. The water samples were tested to assess potability and determine whether their numerical values met or deviated from the standards.

2.2 Research Environment

The study was conducted in Barangay Poblacion, Ayungon, Negros Oriental, Philippines, a municipality located in the northern part of Negros Oriental, along the Tanon Strait, approximately 82 kilometers from Dumaguete City. Water samples were collected twice at appropriate periods from three groundwater sources. These sites were selected based on their significance as local drinking water sources, particularly for residents in Purok 4 and Purok 5. The vicinity includes residential areas, small businesses, and public institutions, making it essential to assess the water quality for community health and safety.

2.3 Research Instrument

Laboratory tests were utilized in the study to analyze the physicochemical properties of groundwater and the presence of microorganisms. The instruments used during laboratory testing were spectrophotometer, multi-tester, and classical titration set-up. This testing was done in DOH accredited laboratories.

2.4 Ethical Consideration

Research ethics was strictly observed and maintained throughout the duration of the study. First, ethical approval was obtained from the Ethics Committee of Foundation University Research Office prior to conducting this investigation. Moreover, all respondents were asked to sign the informed consent form attached to the questionnaire. The right to self-determination, confidentiality, and anonymity, as well as the benefits and risks of the study, were also emphasized and upheld. Additionally, the researcher declared that Open AI's GPT-3 and Quillbot were utilized as tools to enhance the readability of this manuscript. After using these tools, the author carefully reviewed and edited the manuscript and took full responsibility for its content.

3.0 Results and Discussion

3.1 Microbiological and Physicochemical Assessment of the Groundwater Quality in Poblacion Ayungon

Tables 1 and 2 present the microbiological analysis of groundwater in Barangay Poblacion, focusing on total coliforms, thermotolerant coliforms, and heterotrophic plate counts (HPC). The results show consistent contamination of coliforms across all tested wells (Wells 1, 2, and 3) during both rainy and dry seasons.

Table 1. *Quality of the Groundwater as Drinking Water Resource in Barangay Poblacion Microbiological Analysis Result (Hot/Dry Period)*

Parameter	Method	Limits*	Results			Mean
			Sample No. 1 *Well 1*	**Sample No. 2** *Well 2*	**Sample No. 3** *Well 3*	
Total Coliform (MPN/100mL)	Multiple Tube Fermentation Technique (MTFT)	<1.1	>8.0	>8.0	>8.0	>8.0
Thermotolerant Coliform (MPN/100mL)	Multiple Tube Fermentation Technique (MTFT)	<1.1	>8.0	>8.0	>8.0	>8.0
Heterotrophic Plate Count (CFU/mL)	Pour plate	<500	7	42	42	30

*Based on PNSDW2017

Table 2. *Quality of the Groundwater as Drinking Water Resource in Barangay Poblacion Microbiological Analysis Result (Rainy Days)*

Parameter	Method	Limits*	Results			Mean
			Sample No. 1 *Well 1*	**Sample** No. 2 *Well 2*	**Sample** No. 3 *Well 3*	
Total Coliform (MPN/100mL)	Multiple Tube Fermentation Technique (MTFT)	<1.1	>8.0	-	-	>8.0
Thermotolerant Coliform (MPN/100mL)	Multiple Tube Fermentation Technique (MTFT)	<1.1	>8.0	-	-	>8.0
Heterotrophic Plate Count (CFU/mL)	Pour plate	<500	18	-	-	18

*Based on PNSDW2017; -sampling is not possible

Total coliform levels in all samples exceeded 8.0 MPN/100 mL, which is far above the Philippine National Standards for Drinking Water (PNSDW, 2017) limit of <1.1 MPN/100 mL. This suggests possible fecal contamination, making the groundwater unsafe for drinking without proper treatment. Similarly, thermotolerant coliform levels also surpassed the allowable limits, further confirming significant microbial pollution. Moreover, heterotrophic plate count (HPC) values in Barangay Poblacion ranged from 7 to 42 CFU/mL, with an average of 30 CFU/mL in the dry season. While these values are within the PNSDW's acceptable limit of 500 CFU/mL, their presence, along with high total and thermotolerant coliform counts, suggests potential contamination risks.

A similar study in Pampanga by Cortez et al. (2023) also found high thermotolerant coliform levels in water sources near agricultural and residential areas, emphasizing the widespread problem of fecal contamination in the country. Research on the Matutinao River in Cebu also exposed elevated HPC levels, reaching as high as 4.57×10^5 CFU/mL, pointing to significant microbial activity (Bureros et al., 2022). Although HPC alone does not indicate fecal contamination, its increase alongside coliforms raises concerns about water quality. The combined results from total coliforms, thermotolerant coliforms, and HPC demonstrate microbial contamination in Barangay Poblacion's groundwater. This indicates on-going pollution, likely due to factors like agricultural runoff, septic system leaks, or improper waste disposal. Research has shown that the presence of thermotolerant coliforms and high HPC levels often correlates with a greater risk of harmful microorganisms in drinking water (Amatobi & Agunwamba, 2022).

Tables 3 and 4 show the physicochemical analysis of groundwater in Barangay Poblacion for both rainy and dry periods. The pH levels were consistently below the recommended range of 6.5–8.5, with values between 4.9 and 5.8 during rainy and dry seasons, indicating that water samples are acidic. According to Chegbeleh et al. (2020),

the acidity of groundwater can be due to carbonic acid precipitation, oxidation of sulfur and nitrogen compounds, dissociation of humic acid, the hydrolysis and oxidation of ferrous iron, and cation exchange.

Table 3. *Quality of the Groundwater as Drinking Water Resource in Barangay Poblacion Physicochemical Analysis Result (Hot/Dry Period)*

Parameter	Unit	Method	Limits*	Results			Mean
				Sample No. 1 *Well 1*	Sample No. 2 *Well 2*	Sample No. 3 *Well 3)*	
Potential hydrogen(pH)		Electrometric(SMEWW Part 4500-H+)	6.5-8.5	5.2	4.9	5.4	5.2
Total dissolved Solids(TDS)	mg/L	Conductometric Method	600	116	115	156	129
Color (Apparent)	CU	Visual Comparison (SMEWW2120B)	10	<1	<1	<1	<1
Nitrate	mg NO_3-N /L	Nitrate Electrode Method(SMEWW 4500-NO3- D)	50	<1	<1	<1	<1
Turbidity	NTU	Photometric (Nephelometric Method, SMEWW 2130B)	5.0	<1	<1	<1	<1
Arsenic	mg/L	ICP Method(SMEWW 3120B)	0.01	<0.005	<0.005	<0.005	<0.005
Cadmium	mg/L	ICP Method(SMEWW 3120B)	0.003	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	ICP Method(SMEWW 3120B)	0.01	<0.003	<0.003	<0.003	<0.003
Total hardness	mg $CaCO_3$/L	EDTA Titration (SMEWW Part 2340C)	300	62	57	86	68

*Based on PNSDW2017

Table 4. *Quality of the Groundwater as Drinking Water Resource in Barangay Poblacion Physicochemical Analysis Result (Rainy Days)*

Parameter	Unit	Method	Limits*	Results			Mean
				Sample No. 1 *Well 1*	Sample No. 2 *Well 2*	Sample No. 3 *Well 3*	
Potential hydrogen(pH)		Electrometric(SMEWW Part 4500-H+)	6.5-8.5	5.8	-	-	5.8
Total dissolved Solids(TDS)	mg/L	Conductometric Method	600	101	-	-	101
Color (Apparent)	CU	Visual Comparison (SMEWW2120B)	10	<1	-	-	<1
Nitrate	mg NO_3-N /L	Nitrate Electrode Method(SMEWW 4500-NO3- D)	50	1.2	-	-	1.2
Turbidity	NTU	Photometric (Nephelometric Method, SMEWW 2130B)	5.0	<1	-	-	<1
Arsenic	mg/L	ICP Method(SMEWW 3120B)	0.01	<0.01	-	-	<0.01
Cadmium	mg/L	ICP Method(SMEWW 3120B)	0.003	<0.005	-	-	<0.005
Lead	mg/L	ICP Method(SMEWW 3120B)	0.01	<0.01	-	-	<0.01
Total hardness	mg $CaCO_3$/L	EDTA Titration (SMEWW Part 2340C)	300	66	-	-	66

*Based on PNSDW2017; -sampling is not possible

The results indicate that Well 1 has a higher pH value during the rainy season compared to the dry period. One factor contributing to this difference is the decreased rainfall during the dry season, which reduces groundwater recharge. This reduction leads to a higher concentration of dissolved substances, including acids, thereby lowering the pH (Winter, 2000). Research suggests that the oxidation of pyrite, triggered by exposure to oxygen during periods of lowered water tables, contributes to groundwater acidification. This process intensifies during dry

seasons when reduced water tables expose more sulfide minerals to atmospheric oxygen (Medawela & Indraratna, 2024).

Furthermore, acidic water can lead to metal leaching from pipes and pose significant health risks. Research has linked it to digestive issues and metal toxicity, particularly in vulnerable groups such as children and pregnant women (Chima et al., 2020). Likewise, a study by Saalidong et al. (2022) reported similar findings, showing that 36 water samples from both groundwater and surface water had pH levels outside the acceptable standards. Ayeni et al. (2023) also conducted a monthly assessment of shallow-well water during the rainy and dry seasons and observed consistently acidic pH values. Their study also found a direct correlation between pH levels and the number of rainy days in a month.

Total Dissolved Solids (TDS) levels ranged from 101 to 156 mg/L, remaining well within the 600 mg/L limit set by the Philippine National Standards for Drinking Water (PNSDW). These levels indicate a safe amount of dissolved minerals, which can enhance taste and reduce scaling in pipes (Pushpalatha et al., 2022). Notably, Well 1 had a higher TDS value during the dry season (15 mg/L higher than in the rainy period), possibly due to less recharge from rain fall and lowered water tables (Muselli et al., 2021; Medawela & Indararatna, 2024). Furthermore, a study by Shah et al. (2022) found an average TDS value of 444 mg/L in Pakistan, which also met the standard limit. However, TDS levels alone do not confirm water safety, as harmful substances such as heavy metals and nitrates may still be present (Ahmad et al., 2023).

The water's color was consistently below 1 CU, within the 10 CU limit set by PNSDW, meaning it appears clear. Similar results were found in a study by Magwilang et al. (2023), where water samples had an apparent color of 0 CU, meeting the standard. Having clear water, however, does not always mean it is free from harmful substances. Nitrate levels (as NO3-N) were low; however, it can be observed that the values are <1 during the dry season while the rainy season has a value of 1.2. This increase in nitrate values can be due to the runoff from nearby households or agricultural areas. Studies have found that nitrogen from agricultural activities is the primary source of nitrates in rivers and groundwater (Wang et al., 2020; Yang et al., 2020; Chegbeleh, et al., 2020). On the other hand, though nitrates were detected, the nitrate level still did not reach the maximum allowable limit established by DOH and PNSDW. This suggests that the water is not significantly affected by agricultural runoff or wastewater contamination (Patel et al., 2022). A study by Van den Brand et al. (2020) found similar low nitrate concentrations in water samples from the Netherlands. While current levels are safe, continuous monitoring is necessary as land use changes could increase nitrate contamination over time.

Turbidity levels were consistently below 1 NTU, within the 5 NTU limit set by PNSDW. Low turbidity implies that the water is visually clear and free from large suspended particles. These findings correspond with the studies by Senapilo et al. (2024) and Fetrat and Islam (2024), which reported similar turbidity levels. However, turbidity alone does not confirm water safety, as suspended particles can shield pathogens from disinfection (Muoio et al., 2020). Heavy metals, including arsenic, cadmium, and lead, were all below detection limits, meaning the groundwater does not currently pose a risk from these contaminants. Saalidong et al. (2022) found an average arsenic concentration of 0.005 mg/L in their study, also within safe limits. In contrast, Poonia et al. (2021) observed arsenic levels as high as 1.36 mg/L, which is over a hundred times higher than the limit. Similarly, cadmium concentrations in this study were <0.005 mg/L, aligning with the results of Besagas et al. (2022), who recorded 0.002 mg/L in Cagayan de Oro. For lead, levels remained <0.01 mg/L, which agrees with Senapilo et al. (2024) but contrasts with Chegbeleh et al. (2020), who found much higher concentrations of 0.04 mg/L. Since lead contamination can come from industrial activities and old pipes (Madhav et al., 2021), regular monitoring is necessary.

Total hardness levels ranged from 57 mg/L to 86 mg/L, staying well below the 300 mg/L limit. This means the water has hardness but not harmful. By examining the results, Well 1 has a higher total hardness value of 4 during rainy season compared to the dry period. In congruent to the study, a study by Ayeni et al. (2023) also found that hardness was observed to be highest on rainy and lowest on dry period from hand-dug wells. Similar results, which passed the DOH standard and PNSDW, were also found in the study by Chegbeleh et al. (2020), where the total hardness was 205 mg/L. While hard water is not a health risk, it can cause scaling in pipes. Some studies even suggest that calcium and magnesium in hard water may have health benefits (Kozisek, 2020).

The results presented in Table 5 show that during both the rainy and hot/dry periods, there was an absence of bioindicators in all samples from the three wells in Barangay Poblacion, as indicated by the "A" (absence) results. The absence of bioindicators suggests that the groundwater in the area is not contaminated by pathogenic microorganisms or pollutants that would typically support the growth of such organisms. This is a positive indication of the water's microbiological safety, and it reflects favorable conditions for human consumption. The result aligns with the study by Teixeira (2020) who revealed that the absence of visible bioindicators during both seasonal periods indicates a low risk of biological contamination in the water sources of the barangay, which is crucial for the health and safety of the local population.

Table 5. *Quality of the Groundwater as Drinking Water Resource in Barangay Poblacion: Bioindicators*

Period	Method	Results			Average	Maximum Level or Characteristics
		Sample No. 1 *(Well 1)*	Sample No. 2 *(Well 2)*	Sample No. 3 *(Well 3)*		
Rainy Days	Observation	A	-	-	A	-
Hot/Dry Period	Observation	A	A	A	A	-
Average	**Observation**	**A**	**A**	**A**	**A**	**-**

A-absence of bioindicators; P- presence of bioindicators; -sampling is not possible

The results from Table 1 to Table 5 collectively highlight a concerning pattern of groundwater quality issues in Barangay Poblacion. The microbiological analyses in Table 1 and Table 2 reveal consistent failures in meeting safety standards due to the presence of total coliform and thermotolerant coliform during both rainy and hot/dry periods, indicating fecal contamination risks. Despite the absence of bioindicators (Table 5), which typically signal the presence of living organisms that could pose additional threats, the high coliform levels signal potential human health risks, such as waterborne diseases. Furthermore, Tables 3 and 4, which contain physicochemical analyses of parameters, provided important insights into the water's overall safety. These parameters mostly meet the required standards for drinking water, with values either falling within acceptable limits or passing the test, which indicates that the physical properties of the water, such as taste and appearance, are less of a concern compared to the microbiological safety.

The overall water quality concerns raised by the microbiological tests in Tables 1 and 2 are reinforced by the pH value of the physicochemical results in Tables 3 to 5, especially when considering the human health impacts of microbiologically unsafe water. Although the physical and chemical parameters of the water meet the safety guidelines (except for pH) of the DOH and PNSDW for drinking water, the persistent contamination by coliforms indicates that the water pose a health risk, particularly in terms of gastrointestinal diseases. While no significant bioindicators were observed, the high coliform levels in the groundwater necessitate further intervention to ensure the safety of drinking water and the health of the community. Regular monitoring, coupled with proper water treatment measures, would be essential to mitigate these risks and provide safe drinking water to the residents of Barangay Poblacion.

4.0 Conclusion

Access to potable water is essential for public health, yet many communities face challenges in maintaining water quality and awareness of related issues. This study assessed the groundwater quality in Barangay Poblacion in Ayungon. While groundwater met several key parameters of the 2017 Philippine National Standards for Drinking Water (PNSDW), the presence of coliform bacteria and low pH values signals potential health risks. Ensuring access to clean water directly supports Sustainable Development Goal 3 (Good Health and Well-being) by preventing waterborne diseases and promoting healthier living conditions. Clean water is not just a necessity; it is a safeguard against disease and a foundation for a healthier future. By ensuring the sustainability of safe water practices, communities can protect public health, enhance educational outcomes, and contribute to long-term development. The commitment to clean water must remain a shared responsibility, reinforcing the vital role of proper sanitation and hygiene education in achieving both health and educational goals.

5.0 Contributions of Authors

The authors confirm their equal contribution to every part of this research. All authors reviewed and approved the final version of this paper.

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7.0 Conflict of Interests

This study has no conflict of interest of any sort.

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A Phenomenological Inquiry on First-Time Fathers' Experiences as Postpartum and Newborn Primary Caregivers

Theresa Marie D. Munsayac*, Gwyneth Kate A. Lising, Noroul-ain B. Mohidin, Jose C. Dagoc, Jr.
Notre Dame of Dadiangas University, General Santos City, Philippines

*Corresponding Author Email: munsayactheresamarie1@gmail.com

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Abstract. This study explores the under-researched experiences of first-time fathers who take on the role of primary caregiver during the postpartum period—an area often overshadowed by maternal perspectives. The aim was to understand the challenges these fathers face, how they adapt emotionally, and the support systems they rely on. Using snowball sampling, the study gathered insights from 6 first-time fathers. Thematic analysis revealed three key findings: (1) Navigating Challenges and Adjustments in Fatherhood, (2) Emotional Growth and Strengthening Family Bonds, and (3) Importance of Support Systems and Coping Strategies. Participants reported difficulties balancing work and caregiving, experiencing emotional stress, and undergoing identity shifts. However, these challenges also increased resilience, confidence, and deeper connections with their children and partners. Support from family, healthcare professionals, and online communities played a critical role in their adjustment. This study highlights the need for more inclusive parenting programs and targeted mental health resources for fathers, contributing to a more holistic approach to postpartum care.

Keywords: First-time fathers; Newborn primary caregiver; Postpartum; Newborn care.

1.0 Introduction

Transitioning into fatherhood is a primary social process with significant psychological and emotional consequences. While the postpartum period has traditionally focused on mothers, the role of fathers, especially first-time fathers acting as primary caregivers, remains underexplored in research and practice (Burgess, 2018). This lack of attention overlooks the increasingly shared nature of newborn care and the evolving dynamics of modern families (Dyer et al., 2020). As more fathers assume caregiving responsibilities, understanding their experiences becomes essential to promoting inclusive, effective support systems.

A first-time father, a man navigating parenthood for the first time, often faces challenges such as adapting to a new identity, meeting caregiving demands, and coping with emotional changes (Gonzalez et al., 2021). The transition can be especially intense when these fathers become primary caregivers—those who assume the main responsibility for a child's daily care and emotional nurturing (Palkovitz et al., 2020). However, most existing

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literature remains centered on maternal experiences, with limited exploration of how fathers manage the emotional, practical, and identity-related shifts in early parenting (Hodgkinson & Cummings, 2021).

This gap in understanding restricts the development of programs and resources tailored to fathers' needs during the postpartum period. Without recognizing their unique struggles, first-time fathers may feel isolated, underprepared, or undervalued in their caregiving roles. Therefore, this study addresses the research question: How do first-time fathers experience being primary caregivers during the postpartum period?

Understanding these experiences is important for several reasons. First, it broadens the current knowledge of the postpartum period by including paternal perspectives. Second, it supports the development of targeted interventions and mental health services that consider fathers' specific concerns. Finally, it promotes a more balanced and inclusive view of parenting that acknowledges and values the active role of fathers in the early stages of child development.

This phenomenological study explored the lived experiences of first-time fathers as primary caregivers. Through in-depth interviews with 6 participants, the study uncovered key emotional, practical, and relational challenges faced by these men. The findings highlight the shifting dynamics of caregiving, the emotional growth fostered by active fatherhood, and the importance of support systems in easing the transition. These insights can guide healthcare professionals and policymakers in developing programs that better support paternal well-being and family cohesion during the critical postpartum period.

Increased paternal involvement is also linked to improved mental health outcomes for fathers themselves. Studies show that engaged fathers report lower stress levels, higher life satisfaction, and stronger family relationships (Nomaguchi & Milkie, 2020; Sevilla & Sanchis-Guarner, 2020). When fathers feel supported and empowered in their caregiving role, they are more likely to form secure bonds with their children and contribute positively to their children's development (Pruett & Pruett, 2020).

Furthermore, research shows that father involvement benefits children's emotional, social, and cognitive development. Children with actively engaged fathers demonstrate better emotional regulation, social competence, and academic performance (Hofferth & Goldscheider, 2019; Murray et al., 2019). By sharing diverse experiences and perspectives, fathers enrich their children's upbringing and help foster trust, stability, and long-term psychological well-being.

2.0 Methodology

2.1 Research Design

This study employed a qualitative descriptive phenomenological design to explore the lived experiences of first-time fathers serving as primary caregivers during the postpartum period. Rooted in the work of Giorgi (2009), phenomenological research aims to uncover how individuals perceive and make sense of their experiences in a specific context. This approach was chosen to capture the subjective realities of new fathers, an often overlooked perspective in postpartum care. The researchers applied bracketing to set aside their own assumptions and biases during data collection and analysis, as Finlay (2011) described. This involved maintaining reflexive journals and regular debriefings to remain focused on participants' authentic narratives.

2.2 Research Participants

Participants were selected using snowball sampling, a method appropriate for reaching individuals with specific, shared experiences. An initial group of first-time fathers was identified through barangay health centers, and subsequent participants were referred by earlier interviewees. The study included eight participants, all of whom met the following criteria: resident of General Santos City; first-time father; father of infant aged 0–12 months and; serving as the primary caregiver for their child and postpartum partner. Data collection continued until thematic saturation was reached—when no new themes emerged from subsequent interviews.

2.3 Research Instrument

The primary research instrument was a semi-structured interview guide, consisting of eight core questions with relevant follow-up prompts. The guide was designed to explore emotional, social, and practical aspects of

caregiving. It was informed by existing studies on paternal involvement and reviewed by experts in qualitative methodology prior to use.

2.4 Data Gathering Procedure and Analysis

Participants were contacted through referrals and barangay health unit recommendations. Before interviews, participants received an explanation of the study's purpose, procedures, and their rights. Written informed consent was obtained, and participation was entirely voluntary, with the option to withdraw at any time. Data collection was carried out through in-depth interviews, guided by the validated instrument. Each session aimed to uncover personal stories about fatherhood, caregiving responsibilities, emotional adaptation, and support systems. After recording and transcription, participants were contacted for member checking to ensure the accuracy of their accounts and interpretations. The researchers applied Braun and Clarke's (2006) thematic analysis framework, which involved familiarizing with data, generating initial codes, identifying themes, reviewing and defining themes, and producing a report. Coding was conducted manually by the main researcher, with periodic cross-checks by a peer reviewer to enhance consistency and reliability.

2.5 Ethical Considerations

This study was reviewed and approved by the research adviser of the authors. All ethical procedures followed the guidelines of Bryman and Bell (2007). Participants were treated with dignity and respect throughout the research process. Written informed consent was obtained before participation, with full transparency about the study's purpose, procedures, and the participants ' right to withdraw at any time. Anonymity was preserved using coded identifiers and pseudonyms, and data were securely stored in password-protected files. To ensure confidentiality, no identifying details appeared in the transcripts or final report. Bracketing procedures also supported ethical integrity by minimizing researcher bias and safeguarding the authenticity of participants' experiences.

3.0 Results and Discussion

The identified themes are presented based on first-time fathers' experiences as postpartum and newborn primary caregivers. The data have been organized to highlight their journey in terms of navigating challenges and adjustments in fatherhood, emotional growth and strengthening family bonds, and the importance of support systems and coping strategies.

3.1 Navigating Challenges and Adjustments in Fatherhood

The transition into fatherhood presents many challenges and adjustments, particularly for first-time fathers navigating their new roles as primary caregivers. Participants in this study shared their struggles with time management, exhaustion, and the emotional toll of balancing their responsibilities. They described the difficulty of adapting to disrupted routines, the anxiety of handling a newborn, and the pressure of supporting their partners through postpartum recovery. These experiences highlight the complexities of fatherhood, emphasizing the resilience and patience required to fulfill both their child's and their partner's needs. Participant 3 shared his struggle with time management and the exhaustion of adjusting to a new routine:

"Then, uhm, she takes care of the baby first, and I take over afterward. That is our daily routine. I don't sleep next to my baby. It's a bit difficult at this stage because sometimes we are really busy."

Another father expressed his fear of making mistakes while handling his newborn:

"During the baby's first month, I was afraid to hold them. But over time, it got better, and I got used to it."

The participants also acknowledged the significant mental and emotional toll of caregiving, particularly in balancing their partners' postpartum recovery with the demanding responsibilities of ensuring their newborns' well-being. They expressed feelings of exhaustion, anxiety, and the pressure of meeting both their child's and their partner's needs simultaneously. As Participant 4 described:

"That would probably cause confusion – there are several mood swings, but the man has to increase his patience and tolerance for everything because the situation is very different from normal. That's all."

Participant 6 acknowledged that while he had made efforts to prepare for fatherhood, actual readiness is ultimately unattainable, as no amount of preparation can fully anticipate the unique and ever-evolving challenges that come with parenting. He emphasized that each experience is distinct, shaped by the individuality of the child, the dynamics of the family, and the unpredictable nature of the journey*:*

"Maybe I wouldn't say that I wasn't prepared, but there's really no such thing as being fully prepared for creating a family, becoming a father, or being a husband because it's something totally new for everyone. And not everyone has the same experience. So I can't compare my experience as a father to my own father's experience. My journey is completely unique. Preparation is really just part of the growth process with the family. The family grows as the baby grows, and we mature together."

Participant 6 recognized the ongoing need to continuously adapt as the baby grew, acknowledging that each developmental stage brought new challenges, responsibilities, and learning experiences. He emphasized that fatherhood required patience, flexibility, and a willingness to evolve alongside his child, as what worked in one phase might not be effective in the next:

"With the baby, uhh... we observed that every month, there are changes in their progress, especially regarding their attitude and curiosity towards us and their surroundings. So, we also had to adjust, especially with their sleeping habits. Their milk intake varied, and their movements, like arm movements, also increased."

Participant 5 shared that he was separated from his partner during her pregnancy, which significantly affected his preparation for fatherhood. The physical and emotional distance limited his involvement in prenatal experiences, making it more challenging to connect with the reality of impending fatherhood. He expressed feelings of uncertainty and concern about how the separation would impact his ability to support both his partner and their child:

"Of course, we broke up when she was pregnant, right? My parents only found out after the baby was born. We reconnected when the baby was around five months old, and they started visiting our home. Sometimes, I would also assist her when we were there."

Participant 5 acknowledged that learning new skills, particularly those essential for soothing and comforting his baby, was especially challenging. He expressed that while he was eager to be a hands-on father, the trial-and-error process of understanding his newborn's needs often left him feeling frustrated and uncertain. From deciphering different cries to mastering techniques like swaddling and rocking, he found that each day presented new learning curves that required patience, persistence, and emotional resilience:

"Maybe when it comes to calming the baby, that is one of the hardest parts because it is tough to soothe them if you do not know how. There are times when the baby is just uncomfortable for no specific reason."

The participants underscored the emotional strain they experienced, particularly during conflict and self-doubt when their responsibilities felt overwhelming. Juggling the demands of caregiving, work, and personal well-being often led to heightened stress, frustration, and occasional disagreements with their partners. The emotional toll of constantly striving to meet their child's needs while navigating their anxieties made the journey rewarding and exhausting. As Participant 5 described:

"When I come home from being out, I am already exhausted, and then everything happens at once – one gets mad at me, and the other starts crying."

The transition to fatherhood entails significant adjustments, particularly in balancing caregiving responsibilities with personal and professional obligations. Similar to the findings of Cabrera et al. (2018), who emphasized that fatherhood requires adaptability, the participants in this study faced challenges such as sleepless nights, time constraints, and learning new caregiving tasks. Many expressed initial struggles in managing household chores, changing diapers, and feeding their newborns, especially without prior caregiving experience. These findings

align with Cabrera and Tamis-LeMonda (2013), who highlighted that involved fathers often experience stress in their early caregiving roles but develop confidence over time.

Moreover, the study revealed that unanticipated situations, such as emergency cesarean sections or their partner's emotional struggles, heightened the fathers' anxieties. This aligns with previous research stating that first-time fathers often experience heightened stress levels during childbirth and postpartum due to uncertainty in their roles (Darwin et al., 2017). However, as they navigated these challenges, they gradually developed a sense of competence and resilience, indicating a shift from apprehension to active engagement in caregiving responsibilities.

The mental well-being of new fathers is a significant but neglected aspect of parent transition. Postpartum depression is estimated to occur in about 14.1% of U.S. men, with the highest incidence three to six months after the baby is born (Paternal Depression, 2025). Contributing factors are hormonal fluctuations, sleep deprivation, and challenges in juggling work and family demands. Prevalent as it is, paternal depression is underdiagnosed and undertreated, and this makes raising awareness and the need for support for new fathers all the more critical.

Social conventions and traditional gender roles make it difficult to transition to fatherhood. Although modern narratives reveal greater paternal involvement in childcare and household work, there are still huge gaps. Scheduling children's activities and cleaning the house are often left to mothers, contributing to their mental load (Cartigny, 2024). To address this, there needs to be more emphasis on a more balanced division of homework and on expanding shared parenting roles to better benefit both parents.

The age of men at fatherhood also influences their experience and difficulties. Older fathers, especially in the 60s and 70s, also report their parenting experiences to be richer and more profound because of their age (Godwin, 2025). However, they can also face special difficulties, such as social perceptions of age and health problems with the children. Most older fathers, with greater financial security and life experience, are more engaged and available than they would have been at an earlier age.

Some strategies have been proposed to make the transition to fatherhood smoother. These include mentally preparing oneself for future changes, resting adequately, and strategically planning paternity leave (Herald Sun, 2025). Preparation early on for work and discussion on parenting responsibility are also important, as such an arrangement affects long-term family life. In addition, creating an open forum where the mental health of fathers is recognized and supported is important.

The first emergent theme highlights the challenges and adjustments that first-time fathers faced as primary caregivers. Participants described significant disruptions in their daily routines, including sleepless nights, struggles with time management, and difficulty balancing work with caregiving responsibilities. The transition from independent individuals to hands-on caregivers was physically, emotionally, and mentally demanding. Many fathers also encountered unexpected challenges such as emergency cesarean section, their partners' postpartum emotional struggles, and financial pressures. The lack of prior caregiving experience heightened their anxieties, making them second-guess their ability to handle their newborns properly.

3.2 Emotional Growth and Strengthening Family Bonds

Fatherhood brings challenges, fosters emotional growth, and strengthens family bonds. As first-time fathers navigate their new roles, they experience a profound transformation in their relationships, shifting their focus from individual pursuits to shared responsibilities and collective well-being. Participants in this study described how the presence of their child deepened their connection with their partners, creating a stronger sense of unity and purpose. Through late-night feedings, teamwork, and the joy of witnessing their child's milestones, they developed greater patience, understanding, and commitment, reinforcing the foundation of their family.

Participant 3 described how having a child was a unifying force that solidified their family bond. He shared that the arrival of their baby brought a newfound sense of purpose and connection, strengthening the emotional ties between him and his partner. Through shared responsibilities, late-night feedings, and the joys of witnessing their

child's milestones, he felt an overwhelming sense of togetherness and commitment, reinforcing the foundation of their family:

"Maybe, uhm, because of our baby, our family became stronger. It feels like the baby is the one bringing us happiness."

Participant 3 highlighted the profound shift in their mindset as a couple after becoming parents. He shared that while their relationship once revolved around their personal goals and shared experiences as partners, the arrival of their child redefined their priorities. Their focus shifted toward teamwork, mutual support, and the well-being of their growing family. He emphasized how this transformation required greater patience, understanding, and a deepened sense of responsibility, ultimately strengthening their bond as they navigated the challenges and joys of parenthood together:

"Uhm, I feel like my bond with my wife has become stronger because before, we used to focus on luxuries and material things. However, now, it is different – our focus is entirely on the baby."

Participant 5 expressed that he initially had little experience with babies and was unprepared for the required care and attention. He admitted that while he anticipated sleepless nights and frequent diaper changes, the constant demands of feeding, soothing, and ensuring the baby's comfort were more overwhelming than he had imagined. The realization of just how much effort and patience newborn care entailed made the transition into fatherhood both challenging and eye-opening:

"I never really cared for a baby before, so now I am just shocked by everything – from holding the baby to changing diapers and everything else."

Participant 5 also highlighted his stronger emotional connection with the baby:

"We became closer because we are always together now. We are more open with each other since we live in the same house and go out together, and now, the baby is always laughing."

Participant 6 expressed how fatherhood profoundly shifted his self-perception, reshaping his identity and sense of purpose. While he had always envisioned himself as independent and in control, becoming a father introduced a new level of responsibility that challenged and transformed him. The experience pushed him to be more patient, selfless, and emotionally attuned, as he now saw himself as an individual and a protector, provider, and role model for his child. He verbalized:

"It is like – I forgot the term – but it is not that I completely forgot about myself, but I set myself aside because I prioritize the two. That is really how it is. Especially last year, the baby was hospitalized twice, and my wife also had to go back for check-ups multiple times. So yeah."

Participant 6 also expressed an evolving understanding of fatherhood:

"So, the understanding between us grew. If I could rate it, maybe around 8 to 9, because supporting them is not just about finances. Especially at night, you cannot just say, "I have work," and expect my wife to handle everything, because she also works. So, we consider each other's situations and share responsibilities in caring for the baby."

Participant 6 highlighted how he grew closer to his partner and child:

"I can say that our emotional connection is more intense now because the baby has brought us even closer together."

Despite the difficulties, fatherhood fosters deep emotional growth and strengthens family relationships. Participants in the study reported increased patience, emotional intelligence, and a stronger connection with both their partners and newborns. These findings are consistent with the work of Lamb (2010), who stated that hands-on fathers develop stronger emotional ties with their children, leading to long-term positive developmental outcomes.

A recurring theme among participants was the newfound appreciation for their partners and the teamwork required in raising a child. Many recognized that effective communication and shared responsibilities reduced conflicts and strengthened their bond as a couple. This is supported by Kuo et al. (2018), who found that co-parenting significantly enhances both parents' relationship satisfaction and emotional well-being. Furthermore, the participants expressed that fatherhood gave them a renewed sense of purpose, shifting their priorities from personal indulgences to family-centered decision-making. The father's role has also been transformed, and greater involvement has led to enhanced relationships, cognitive, socio-emotional, psychological, and academic performance in children. Active father involvement has been associated with children's enhanced IQ, language, and emotional health. This engagement also leads to enhanced couple relationships and less stress in mothers, reflecting interdependent benefits for the family (Singapore Dads for Life).

In other instances, unconventional co-parenting arrangements have been adopted to maintain children's best interests. One example is a mother of three who opted to reside in a granny flat on her ex-husband's property, in a close family bond despite the divorce. The arrangement allows the two parents to remain actively involved in their kids' lives, demonstrating flexibility and dedication to co-parenting (Chapman, 2025). Celebrity life also reflects the co-parenting relationships of success. For example, Gigi Hadid and Zayn Malik have focused on respect and flexibility in parenting. By pre-scheduling custody but being flexible, they offer emotional stability to their child, reflecting the importance of cooperation and empathy in shared parenting (Halkidis, 2025).

While fatherhood is challenging, it also has the potential to enhance emotional development and family relationships. Being active and cooperative parents is very beneficial to the children's development, their quality of relationships, and their parents' personal development. Fostering effective communication, embracing flexibility, and sharing responsibility are some strategies for contemporary parenthood. Despite their challenges, many fathers expressed that their caregiving experience deepened their emotional bond with their children and strengthened their relationship with their partners. Through sleepless nights, moments of doubt, and the demands of nurturing a newborn, they discovered a profound sense of fulfillment in their caregiver role. They realized patience, teamwork, and kindness were essential in navigating postpartum responsibilities, fostering a deeper appreciation for their partners and greater unity within their growing families. Fathers reported that their children became their source of motivation, pushing them to work harder and become more responsible. The experience of caring for a newborn transformed their priorities, shifting their focus from personal interests to family well-being.

3.3 Importance of Support Systems and Coping Strategies

Navigating the complexities of fatherhood requires strong support systems and effective coping strategies. First-time fathers rely on open communication with their partners to manage parenting challenges, emphasizing teamwork in making decisions for their child's well-being. In addition to their partners, they seek guidance and reassurance from their extended families, whose advice and shared experiences help them adapt to their new roles. By fostering strong support networks and maintaining open discussions, these fathers develop strategies to cope with the demands of parenting, ultimately strengthening their confidence and ability to provide for their child. Participant 3 emphasized the crucial role of effective communication in co-parenting, highlighting how open and honest discussions with his partner helped them navigate the challenges of raising a child together. He shared:

"Yes, of course. We talk whenever something needs to be fixed or discussed, especially regarding our baby. Teamwork is essential."

Participant 3 also shared how family members played a crucial role in providing invaluable advice and support throughout his journey into fatherhood. He expressed:

"Yes, my family and my partner's family give us advice and ideas on raising the baby."

Healthcare professionals also played a vital role in ensuring the fathers' confidence in their caregiving skills:

"Yes, we have a pediatrician we always consult whenever we have concerns about the baby. They have been a big help, especially during the first few months."

Some fathers also developed coping strategies to manage stress and maintain their well-being, such as engaging in physical activities:

"Uhh… Last year, none. However, this year, I am trying to get back into running. Before my wife and I got together, I was really into running—I used to join marathons and events like that. Back then, because of COVID, everything was virtual. However, now, I am trying to find balance again."

Participant 5 expressed ways on how to balance personal time and caregiving responsibilities:

"Before I leave, I bathe the baby and put them to sleep."

Participant 6 cited his Catholic upbringing as a significant factor in his confidence and perseverance in fatherhood:

"I believe so. With the guidance of my in-laws and, of course, my own family, it helps. Our faith also plays a big role—our Catholic faith—since we were raised religiously. So, we are following that path, and I think that gives us confidence."

The participants emphasized the challenge of balancing traditional parenting practices with modern approaches, striving to honor cultural wisdom while adapting to new insights and resources. Many fathers found themselves navigating generational differences, carefully integrating advice from their elders with contemporary parenting techniques:

"Uhmm… Our cultural beliefs are slightly different because my wife's family is more traditional, while my family is more modern. We prioritize medical check-ups and going to the doctor first. However, as much as possible, we consider both sides. So, we make sure to have a check-up first, and if my in-laws prefer traditional hilot, we also consider that."

The presence of strong support systems played a crucial role in helping first-time fathers navigate their new responsibilities. Many participants relied on their parents, in-laws, and healthcare professionals for guidance, echoing previous research highlighting the significance of intergenerational support in easing the transition into fatherhood (Habib & Lancaster, 2010). Fathers who had access to emotional and practical support were better able to manage stress and develop effective caregiving strategies. Additionally, digital resources, particularly parenting content on social media platforms such as TikTok and Facebook, were frequently mentioned as sources of information. This finding aligns with recent studies on digital parenting, which highlight the increasing reliance of new parents on online platforms for quick and accessible childcare information (Chung et al., 2022).

Regarding coping strategies, time management emerged as a key factor in balancing work, caregiving, and personal well-being. Participants emphasized the importance of structuring their daily routines to accommodate their child's needs while ensuring self-care. This aligns with previous findings by Nomaguchi and Milkie (2020), who argued that effective time management reduces parental stress and improves overall well-being. With these challenges, many fathers opt for safer and less public platforms. Tinybeans, a family photobook application, is one such platform that enables parents to capture, organize, and share kids' life stories on a secure, controlled platform (Tinybeans, n.d.). Such platforms respect users' privacy, and families can find an occasion to post without risking public exposure. This approach helps fathers preserve the memories of their children safely while being discreet, demonstrating how technology can be harnessed to support parenthood with responsibility.

Apart from seeking external help, the respondents also highlighted the significance of having internal coping strategies, most notably, effective time management. Coping with work, caregiving, and self-care entailed planning and organizing schedules carefully. These findings attest to research studies by Nomaguchi (2020), which claimed that effective time management reduces parental stress and optimizes overall well-being. Fathers who could incorporate caregiving into the daily schedule without compromising opportunities for self-care reported high levels of satisfaction and emotional well-being. Being able to do this was viewed as key in coping with the multi-faceted role of fatherhood (Nomaguchi & Milkie, 2020).

Both conventional and web-based support systems facilitate first-time fathers' management of fatherhood. Even though web support is socially conducive and easy to access, the highest level of caution has to be observed when handling privacy issues. Moreover, individual coping skills, such as efficient time management, also enhance fathers' caregiving ability and health. By integrating such coping skills, fathers can better manage their roles and establish healthy family relationships.

To navigate their new roles as caregivers, fathers leaned on various support systems to help them adapt and gain confidence. Many sought guidance from their parents and in-laws, drawing from their wisdom and firsthand experiences in parenting. Others turned to healthcare professionals for expert advice on newborn care, feeding, and postpartum recovery. Additionally, in the digital age, some fathers found valuable support through online resources, engaging with parenting communities on social media platforms like TikTok and Facebook. These platforms provided them with accessible tips, tutorials, and shared experiences from other parents, offering reassurance and practical strategies for managing the challenges of fatherhood. Open communication with their partners also played a crucial role in balancing caregiving responsibilities with work and personal well-being. Fathers emphasized that teamwork and shared responsibilities were essential in managing their daily tasks.

4.0 Conclusion

This study contributes to a deeper understanding of first-time fathers' emotional, psychological, and social transformations during the postpartum period as primary caregivers. It highlights how these men navigate an evolving journey, from initial uncertainty and emotional vulnerability to developing confidence, resilience, and a strong paternal identity. By centering on their lived experiences, the study underscores the complexity of modern fatherhood and challenges traditional perceptions of paternal roles. At the heart of this transformation is a significant shift in identity. The fathers in this study did not merely acquire new caregiving skills; they redefined their sense of self, reshaped their priorities, and embraced more nurturing and emotionally engaged roles within the family. Their progression from self-doubt to competence was not linear but shaped by personal growth, the demands of caregiving, and the evolving dynamics within their households.

A recurring theme was the importance of social and emotional support. Fathers cited partners, family members, online parenting communities, and digital resources as essential in helping them adapt and cope. These support systems offered practical advice, emotional reassurance, and a sense of solidarity that alleviated feelings of isolation. Many fathers also developed their coping strategies, including time management, teamwork with their partners, and self-reflection, which strengthened their confidence and emotional stability. As fathers encountered small yet meaningful victories, such as bonding with their newborns and mastering daily caregiving, they began to see themselves as capable, nurturing, and essential co-parents. These moments fostered a more profound sense of purpose and pride, contributing to the broader redefinition of fatherhood as emotionally present and actively involved. This shift reflects a growing cultural movement toward shared parenting responsibilities and challenges outdated gender norms.

These findings have clear implications for multiple stakeholders. Healthcare providers should include fathers more intentionally in postpartum care, offering them guidance, support, and mental health screenings. Educators and parenting programs could develop workshops or resources focusing on father-inclusive caregiving strategies. Policymakers must advocate for parental leave policies and workplace flexibility that enable fathers to be more present during this crucial time. Future research should explore first-time fathers' experiences across diverse cultural, socio-economic, and familial contexts. Comparative studies between fathers and mothers, or between cohabiting and non-cohabiting fathers, may also yield valuable insights into the evolving dynamics of caregiving roles.

5.0 Contributions of Authors

The authors contributed equally to the completion of this research. Theresa edited the entire document, gathered related literature, interviewed first-time fathers as postpartum and newborn primary caregivers, and led the study's conduct. Gwyneth assisted in reviewing related literature, conducting interviews, and transcribing data. Noroul-ain contributed to transcribing and interpreting the data. Lastly, the research adviser, Jose, supervised the entire research process.

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7.0 Conflict of Interests

There is no conflict of interest in the study's conduct.

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ICT Landscape and Digital Literacy Skills of Basic Education Teachers

Rocelino C. Magtoltol*, Jane C. Oropa
North Eastern Mindanao State University, Tandag City, Surigao del Sur, Philippines

*Corresponding Author Email: rocelino.magtoltol@gmail.com

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Abstract. In today's digital age, integrating Information and Communication Technology (ICT) in education is crucial, yet many teachers struggle with digital literacy due to institutional and personal barriers. This study examined the digital literacy skills of teachers and the ICT landscape in basic education. It explores teachers' profiles, including age, gender, position, years of service, ICT-related training, educational attainment, and the ICT resources available in their schools. Using a quantitative research design, data were collected through a validated questionnaire from 174 teachers across 16 schools with the majority (70%) aged between 26 to 45 years, predominantly female (82%), and holding positions mainly as Teacher I (42%) and Teacher III (42%). Many teachers lack formal ICT training, and factors such as training attendance, years in service, age, and position significantly influence their digital literacy. Significant barriers to ICT integration include inadequate infrastructure, limited equipment, lack of stable internet connection (3.89), licensed software tools (3.56), access to computer hardware (3.53), and training in ICT use (3.66). Additional concerns included a lack of technical support, limited expertise, and insufficient time for ICT integration, leading to an overall mean barrier rating of 3.335, categorized as serious. To address these challenges, the study recommends comprehensive training programs and improved ICT resources to support teachers in enhancing their digital skills.

Keywords: Digital competency; Digital literacy; Educational technology; ICT challenges; ICT integration.

1.0 Introduction

In modern education, digital literacy has become essential for elementary school teachers to enhance students' learning experiences. The rapid advancement of 21st-century technology has transformed teaching methodologies, requiring educators to effectively integrate Information and Communication Technology (ICT) into their daily instructional practices. Technological innovations provide various tools to improve the learning process, but their successful implementation depends on teachers' ability to use them effectively (Warden et al., 2020). Recognizing this, DepEd Order No. 016, series of 2023, aims to equip schools with quality ICT infrastructure, ensuring teachers access necessary digital tools. However, achieving meaningful technology integration remains challenging, particularly in developing countries where access to digital resources is often limited (Bedir, 2019).

Recent studies emphasize the role of continuous professional development in enhancing teachers' digital competencies. Dragana (2024) emphasizes that teachers need ongoing education in digital literacy, enabling educators to impart necessary knowledge to their students effectively. This was supported by the study of Napitupulu et al. (2024), which found that effective training programs should combine hands-on experience with

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pedagogical strategies, collaboration, and ongoing support. Mpuangnan (2024) further identifies factors such as age, qualifications, and professional experience as influential in technology adoption while acknowledging challenges like infrastructure limitations and resistance to change. Moreover, Kibirige (2023) found that infrastructure and internet connectivity are among the obstacles that hinder teachers' capacity in ICT integration. Despite efforts to enhance digital literacy, primary school teachers in the Philippines face difficulties due to inadequate ICT resources and training opportunities (Teye & Duah, 2022).

Given these challenges, this study aimed to examine the level of digital literacy among elementary school teachers and its impact on classroom performance. It seeks to identify barriers to effective ICT integration and explore factors influencing teachers' ability to utilize digital tools. Understanding these aspects will help design better technology integration strategies in basic education. Future research may build on these findings to improve the use of emerging technologies in teaching and learning.

2.0 Methodology

2.1 Research Design

This study employed a quantitative research approach to assess teachers' digital literacy skills and the information and communication technology (ICT) landscape in basic education. A descriptive-correlational design was utilized to examine the relationships between various factors influencing digital literacy among teachers. The study gathered data through a structured survey questionnaire and analyzed the responses using statistical methods to determine trends, relationships, and patterns.

2.2 Research Participants

The study was conducted in all public elementary schools within the Talacogon West District, Division of Agusan del Sur, Philippines. The district comprises sixteen (16) primary schools, and all teachers from these schools were invited to participate. The study ensured inclusivity by incorporating respondents from diverse backgrounds, teaching experiences, and educational levels. This helped capture a comprehensive perspective on teachers' digital literacy skills and the ICT landscape in basic education.

2.3 Research Instrument

The primary instrument used for data collection was a self-constructed survey questionnaire. The questionnaire measured teachers' digital literacy skills, access to ICT resources, challenges in ICT integration, and perceptions of ICT's impact on instructional competence. Educational research and ICT experts validated the instrument to ensure its reliability and appropriateness. A pilot test was conducted on 25 teachers from a non-participating school to assess reliability and usability. Cronbach's alpha was calculated to determine internal consistency, with acceptable values above 0.84; no revisions were made based on pilot results.

2.4 Data Gathering Procedure

The researcher first sought approval from the Dean of the Graduate School to conduct the study. After securing initial approval, a formal request was sent to the Office of the Division Superintendent of Agusan del Sur, requesting permission to conduct research within the identified district. Upon receiving authorization, the researcher presented the approval letter to the District Supervisor of Talacogon West District and the respective school heads of the sixteen participating schools.

Following administrative approval, the researcher distributed printed copies of the survey questionnaire to the teachers. The researcher personally visited each school to facilitate data collection, ensuring that respondents fully understood the purpose and instructions of the survey. Teachers were given ample time to complete the questionnaire, and responses were collected immediately. To enhance the reliability of the findings, data collection occurred at multiple time points to account for variations in ICT usage and integration over time. Ethical approval for this study was obtained from the Institutional Research Ethics Committee of North Eastern Mindanao State University-Tandag Campus. All participants were provided with an informed consent form outlining the study's purpose, procedures, voluntary nature of participation, and data confidentiality. Only those who provided signed consent were included in the study.

2.5 Statistical Treatment

The collected data were recorded, analyzed, and interpreted using appropriate statistical treatments to ensure objective and meaningful results, such as: a) Frequency Counts and Percentages were used to summarize respondents' demographic profiles, including age, gender, position, years of service, training attended, and educational attainment. This statistical technique provided a clear overview of the participants' characteristics, b) Measures of Central Tendency, particularly the mean, were employed to evaluate the level of teachers' digital literacy skills and the perceived barriers to ICT integration, c) Weighted Mean was used to assess the severity of issues related to digital literacy among teachers, and d) Analysis of Variance (ANOVA) was applied to examine differences in teachers' digital literacy skills based on key demographic factors, including age, position, years of service, training, and educational attainment. ANOVA determined whether these variables significantly influenced teachers' proficiency in digital technology usage, operational skills, and self-efficacy in ICT integration. The computed F-values and corresponding p-values were used to decide whether to reject or fail to reject the null hypothesis, ensuring an objective assessment of significant relationships.

3.0 Results and Discussion

3.1 Profile of the Respondents

Table 1 presents the study respondents, focusing on their age, gender, position, years in service, training related to ICT, educational attainment, and the respondents' school, which focuses on ICT equipment and ICT infrastructure.

Table 1. *Profile of the Respondents*

Age Bracket	Frequency	Percentage
Age		
Below 26 years old	17	10.00%
26 -45 years old	122	70.00%
46 to 55 years old	21	12.00%
56 years old or above	14	8.00%
Gender		
Male	31	18.00%
Female	143	82.00%
Position		
Teacher I	73	42.00%
Teacher II	16	9.00%
Teacher III	73	42.00%
Master Teacher I	10	6.00%
Master Teacher II	1	1.00%
Master teacher III	0	0.00%
Others	1	1.00%
Years in Service		
1-5 years	53	31.00%
6-10 years	58	33.00%
11-15 years	26	15.00%
16 years above	37	21.00%
Training Related to ICT		
With training attended	34	20.00%
No training attended	140	80.00%
Educational Attainment		
Bachelors Degree	159	91.00%
Masters Degree	13	7.00%
Doctorate Degree	2	1.00%
ICT Equipment		
Laptop	49	28.00%
Television	51	29.00%
Tablet	21	12.00%
Printer	116	67.00%

Seventy percent of the respondents are educators in the middle of their careers, aged 26 to 45. This age distribution points to a workforce that combines flexibility and experience, which is advantageous for incorporating contemporary teaching methods like data and digital literacy (Cui & Zhang, 2022). Only 20% of people are over 45, consistent with stories of early retirements from work-related stressors (Basiron, 2024). This could present long-term difficulties for institutional knowledge retention.

There is an apparent disparity in the gender distribution: 82% of teachers are female. This supports worries about the dearth of male role models in primary education, even though it parallels nationwide trends in the teaching profession (Sebastian et al., 2022). While intermediate and advanced designations, such as Teacher II (9%) and Master Teacher roles (combined 7%), are substantially underrepresented, Teacher I and Teacher III hold the majority of teaching posts in terms of rank (42% each). Despite Executive Order No. 174 (2022) introducing the Expanded Career Progression System, this discrepancy indicates promotion bottlenecks. These results suggest that in order to promote professional development and retention, advancement pathways need to be made more transparent and easily accessible. Although the profession seems to have a high admission rate, mid-career attrition may occur, since 64% of teachers have served for 10 years or fewer. Frequent turnover has been shown to impair student learning and financially strain educational institutions (Learning Policy Institute, 2024).

Despite the growing demand for digital education, it is concerning that only 20% of respondents said they have attended ICT-related training. Lack of access, institutional support, or a low priority for technology in professional development are probably obstacles (Haarala-Muhonen et al., 2023). There is an urgent need for structured training programs since ICT integration improves participation and teamwork (Timotheou et al., 2022). There are disparities in access to ICT equipment. Although 67% of people have access to printers, just 28% have laptops, or 12% have tablets, essential tools for engaging, dynamic instruction. Even in high-income nations, there is a general worldwide trend toward less technology use in classrooms (UNESCO GEM Report, 2023). These infrastructure and training deficiencies severely hampered the successful incorporation of technology in the classroom.

3.2 Digital Literacy

The evaluation of teachers' digital literacy, based on UNESCO's core competencies, reveals a generally favorable self-assessment (see Tables 2 and 3), with an overall mean score of 3.858, classified as "Agree". This suggests that educators view themselves as capable in various aspects of digital engagement. Notably, social use of technology scored the highest (4.021), indicating strong confidence in using digital tools for communication, collaboration, and engagement—increasingly essential skills in modern classrooms. However, the lowest score was in information navigation skills (3.676), which exposes a critical weakness: the ability to locate, evaluate, and effectively apply digital information. This shortfall points to a gap in higher-order digital literacy skills, where teachers may be proficient users but lack the evaluative skills needed for discerning credible, relevant, and pedagogically sound content. This gap is particularly concerning in the current digital landscape, where misinformation and an overload of content can hinder instructional quality and student learning.

Table 2. *Digital Literacy Skills of Teachers*

Indicators	Mean	Adjectival Rating
Access to Digital Technologies	3.83	Agree
Familiarity with Technological Concept	3.87	Agree
Utilization of Digital Technology	3.94	Agree
Operational Skills	3.86	Agree
Information Navigation Skills	3.67	Agree
Social Use of Technology	4.02	Agree
Content Creation Skills	3.83	Agree
Self-Efficacy and Technology Integration	3.82	Agree
Overall Mean	**3.85**	**Agree**

The findings align with recent research. Temirkhanova et al. (2024) emphasize the evolving complexity of digital literacy and the need for continuous, targeted professional development to keep pace with technological shifts. Similarly, Jung et al. (2024) identified significant struggles among elementary school teachers in effectively navigating digital resources during remote instruction, highlighting the persistent challenges even in digitally mediated environments. These insights underscore that while operational and technical competencies are reasonably well-developed, critical and evaluative digital skills remain underdeveloped. This calls for systematic, context-specific training programs beyond tool usage to address strategic, informed, and ethical use of digital technologies in teaching. Empowering teachers in this way can ensure digital participation, but meaningful integration of ICT that enhances student learning outcomes.

Table 3. *Level of Implementation of the UNESCO Framework on Digital Literacy Skills*

Indicators	Mean	Adjectival Rating
Information and Data Literacy	4.14	Agree
Communication and Collaboration	4.04	Agree
Digital Content Creation	3.92	Agree
Safety	4.36	Strongly Agree
Problem-Solving	3.88	Agree
Overall Mean	**4.07**	**Agree**

These results are consistent with recent studies emphasizing the necessity of instructors possessing a wide range of digital competencies. Teachers in Southern Mindanao showed excellent levels of digital literacy, pedagogy, and research abilities, which greatly enhanced their professional efficiency, according to Disonglo and Limpot (2023). According to Abella and Rosa (2023), pre-service training, having access to ICT resources, and having a favorable attitude toward technology use all contributed to the higher levels of digital literacy displayed by instructors with less than ten years of experience. In order to guarantee relevant and successful technology integration in the classroom, these studies highlight the significance of ongoing professional development, especially in underdeveloped areas like information navigation.

3.3 Digital Literacy among Teachers when Grouped According to their Profiles

Table 4 highlights significant differences in teachers' digital literacy levels based on age, years in service, position, and ICT training, while gender and educational attainment show no notable impact. Teachers with more years of service and training access digital tools more readily ($p = 0.046$; $p = 0.008$), and older, experienced, and trained educators show stronger familiarity with digital concepts ($p < 0.01$). Utilization of digital technologies is shaped by position, age, experience, and training ($p < 0.05$), reflecting how professional roles and sustained exposure influence effective tech use.

Table 4. *Level of Digital Literacy among Teachers when Grouped According to their Profiles*

Sources of Variations		F	p	Significance
Access to Digital Technologies	Gender	0.06	.814	Not Significant
	Position	0.28	.838	Not Significant
	Age	1.37	.253	Not Significant
	Years in Service	2.73	.046	Significant
	Trainings	7.23	.008	Significant
	Educational Attainment	0.51	.602	Not Significant
Familiarity with Technological Concept	Gender	0.02	.875	Not Significant
	Position	2.02	.113	Not Significant
	Age	4.32	.006	Significant
	Years in Service	7.02	.000	Significant
	Trainings	8.19	.000	Significant
	Educational Attainment	0.51	.604	Not Significant
Utilization of Digital Technologies	Gender	0.00	.989	Not Significant
	Position	3.44	.018	Significant
	Age	5.63	.001	Significant
	Years in Service	6.27	.000	Significant
	Trainings	10.92	.001	Significant
	Educational Attainment	0.18	.835	Not Significant
Operational Skills	Gender	0.91	.343	Not Significant
	Position	2.58	.055	Not Significant
	Age	5.77	.001	Significant
	Years in Service	2.23	.000	Significant
	Trainings	10.22	.002	Significant
	Educational Attainment	0.00	.741	Not Significant
Information Navigation Skills	Gender	0.13	.720	Not Significant
	Position	1.85	.140	Not Significant
	Age	5.82	.001	Significant
	Years in Service	6.42	.000	Significant
	Trainings	7.89	.006	Significant
	Educational Attainment	0.11	.896	Not Significant
Social use of Technology	Gender	0.36	.548	Not Significant
	Position	3.41	.019	Significant
	Age	7.89	.000	Significant

	Years in Service	6.42	.000	Significant
	Trainings	10.62	.001	Significant
	Educational Attainment	0.50	.610	Not Significant
Content Creation Skills	Gender	0.17	.682	Not Significant
	Position	1.49	.219	Not Significant
	Age	3.83	.011	Significant
	Years in Service	9.22	.000	Significant
	Trainings	6.87	.010	Significant
	Educational Attainment	0.17	.842	Not Significant
Self-Efficacy and Technology Integration	Gender	0.39	.531	Not Significant
	Position	3.30	.022	Significant
	Age	5.77	.001	Significant
	Years in Service	10.34	.000	Significant
	Trainings	5.59	.019	Significant
	Educational Attainment	0.26	.770	Not Significant

Operational and information navigation skills are similarly impacted by age, experience, and training, supporting findings from the Journal of Digital Learning in Teacher Education (2022), which stress the role of experience and continuous learning in enhancing online information evaluation. Teachers in leadership roles or with more training also excel in social use of technology ($p < 0.05$), suggesting that professional advancement is linked to digital collaboration skills. Content creation and tech integration confidence are likewise influenced by age, experience, and training ($p < 0.05$), reinforcing evidence from the International Journal of Educational Technology (2024) that ongoing professional development fosters meaningful digital integration. Overall, these findings affirm UNESCO's (2023) call for strategic, targeted up-skilling to close gaps in digital literacy and promote effective technology adoption in education.

3.4 UNESCO Framework Digital Literacy Skills when Grouped According to Profile

Table 5 shows the relationship between the level of implementation of the UNESCO framework and digital literacy skills when grouped according to profile. The analysis of variations in digital literacy skills based on the UNESCO framework highlights the impact of key demographic and professional factors on teachers' competencies. The findings indicate that gender and educational attainment do not significantly influence digital literacy across all indicators, as their p-values exceed the 0.05 threshold. This aligns with OECD (2022), which emphasizes that access to digital education and training opportunities plays a more critical role in ICT proficiency than inherent demographic characteristics. However, position, age, years in service, and training significantly affect multiple indicators, suggesting that professional experience and exposure to digital training programs are key determinants of teachers' digital literacy levels.

Significant variations in digital literacy skills across the UNESCO framework were observed based on position, age, years in service, and training. For Information and Data Literacy, these factors ($p < 0.05$) highlight how experience enhances data-handling skills, though structured training remains essential (UNESCO, 2023). Similarly, Communication and Collaboration skills improve with experience and role ($p < 0.05$), affirming that professional exposure, supported by targeted training, fosters effective digital interaction (Rajasekaran et al., 2024).

In Digital Content Creation, differences tied to the same variables reinforce the value of ongoing ICT-based professional development, echoing ISTE (2023) findings that trained, experienced educators produce more dynamic content. For Safety, significant results across age, service years, and training reflect how exposure and formal instruction enhance digital security awareness (OECD, 2022).

Interestingly, Problem-Solving skills were significantly shaped by experience (position, age, years in service) but not by training ($p = 0.063$), suggesting these abilities evolve more through practice than instruction (European Commission, 2022). Overall, the findings underscore the critical need for continuous, role-specific ICT training to complement experiential learning, particularly in areas like data literacy, content creation, and digital safety, as UNESCO's 2023 Global Education Monitoring Report advocates.

Table 5. *UNESCO Framework on Digital Literacy Skills when Grouped According to Demographic Profile*

Sources of Variations		F	p	Significance
Information and Data Literacy	Gender	0.47	.494	Not Significant
	Position	2.87	.039	Significant
	Age	4.04	.008	Significant
	Years in Service	24.48	.000	Significant
	Training	12.16	.001	Significant
	Educational Attainment	0.14	.869	Not Significant
Communication and Collaboration	Gender	1.43	.234	Not Significant
	Position	3.87	.010	Significant
	Age	3.54	.023	Significant
	Years in Service	8.79	.000	Significant
	Training	8.41	.004	Significant
	Educational Attainment	0.08	.925	Not Significant
Digital Content Creation	Gender	1.82	.179	Not Significant
	Position	3.08	.029	Significant
	Age	3.83	.011	Significant
	Years in Service	7.95	.000	Significant
	Training	8.71	.004	Significant
	Educational Attainment	0.28	.753	Not Significant
Safety	Gender	0.74	.390	Not Significant
	Position	1.93	.126	Not Significant
	Age	3.04	.031	Significant
	Years in Service	4.61	.004	Significant
	Training	13.73	.000	Significant
	Educational Attainment	0.23	.794	Not Significant
Problem Solving	Gender	0.27	.607	Not Significant
	Position	4.24	.006	Significant
	Age	5.09	.002	Significant
	Years in Service	8.44	.000	Significant
	Trainings	3.49	.063	Not Significant
	Educational Attainment	1.35	.262	Not Significant

3.5 Challenges Encountered

Table 6 highlights teachers' significant challenges in integrating ICT into instruction, with an overall mean of 3.335, indicating a serious level of concern. The most pressing issues are unstable internet connectivity (3.890) and limited access to the internet (3.870), both rated as very serious, pointing to persistent infrastructural deficits. These findings echo UNESCO (2023), identifying connectivity as a significant barrier to ICT integration in developing regions. Other critical obstacles include the lack of genuine or licensed software (3.560) and limited access to computer hardware (3.530), emphasizing that the digital divide extends beyond connectivity to include the quality and availability of essential ICT tools. This supports OECD (2022), underscoring that effective digital integration requires robust infrastructure and adequate technological resources. Addressing these challenges is vital for equitable and meaningful technology use in education.

Table 6. *Challenges encountered by the teachers*

Indicators	Mean	Adjectival Rating
1. Teacher lacks expertise in integrating ICTs	2.94	Serious
2. Teacher lacks technical support	3.36	Serious
3. Teacher lacks genuine/licensed ICT Software tools	3.56	Much Serious
4. Teacher lacks a stable internet connection	3.89	Much Serious
5. Teacher lacks internet connection	3.87	Much Serious
6. Teacher lacks time to integrate ICT into classroom teaching	3.14	Serious
7. Teacher lacks confidence in using ICT in classroom teaching	2.82	Serious
8. Teacher lacks training in using ICT in classroom teaching	3.66	Much Serious
9. Teacher lacks interest in using ICT in the classroom	2.58	Less Serious
10. Teacher lacks availability of access to computer hardware	3.53	Much Serious
Overall Mean	**3.33**	**Serious**

The data reveal a critical gap in professional development, with a lack of ICT training (3.660, Much Serious) emerging as a significant barrier. This underscores the World Bank's (2024) call for structured, ongoing training to build teachers' digital competencies. Additional challenges include limited technical support (3.360) and time

constraints (3.140), both rated Serious, suggesting that external factors, rather than willingness, limit effective ICT use. Teacher confidence remains a concern (2.820), aligning with ISTE (2024), highlighting digital self-efficacy as key to technology adoption. Positively, low concern over teacher interest (2.580, Less Serious) suggests a strong willingness to integrate ICT. However, the lack of expertise (2.940, Serious) indicates a skills gap in applying technology effectively in pedagogy. Addressing these issues demands a holistic strategy—improving infrastructure, ensuring access to quality software, expanding training, and offering technical support. As emphasized in UNESCO's 2023 Global Education Monitoring Report, digital transformation hinges on access and equipping educators to leverage technology fully.

4.0 Conclusion

The findings of this study contribute to the field of education by emphasizing the critical role of ICT in modern teaching and the existing gaps in teachers' digital literacy. The study highlights that while most educators are within a productive age range and have substantial teaching experience, many lack formal ICT training. This gap hinders their ability to effectively integrate digital tools into instruction, limiting the potential benefits of technology in the classroom. The research also reveals that while teachers excel in social technology use and safety awareness, they struggle with information navigation skills, underscoring the need for targeted skill development. Key determinants of digital literacy, such as training attendance, years in service, age, and position, reaffirm the importance of continuous professional development. The study aligns with prior research, confirming that inadequate ICT resources, poor internet access, and insufficient training opportunities remain significant barriers to effective technology integration. Addressing these challenges requires policy-driven interventions, including expanding ICT training programs, improving access to digital tools, and enhancing technical support to empower educators.

For future research, longitudinal studies should assess the long-term impact of ICT training programs on teaching effectiveness and student outcomes. Additionally, evaluating policy initiatives aimed at improving digital literacy among educators could provide valuable insights into the most effective strategies for bridging the digital divide in education. By implementing these recommendations, the education sector can move toward a more adaptive, technology-driven learning environment that enhances teaching and student engagement.

5.0 Contributions of Authors

The authors of this research worked collaboratively to ensure its accuracy, completeness, and integrity, each contributing their expertise throughout the process. Dr. Jane C. Oropa, as the research adviser, played a pivotal role in shaping the study's conceptual framework and methodology, ensuring its feasibility and academic rigor. She provided critical guidance on refining research questions, selecting statistical methods, and structuring the study. Additionally, she supervised data analysis, reviewed interpretations for accuracy, and meticulously edited the manuscript to enhance clarity, coherence, and scholarly quality. She also ensured ethical compliance by overseeing research protocols, maintaining participant confidentiality, and upholding academic integrity.

As the primary researcher, Rocelino C. Magtoltol was responsible for fieldwork, including the distribution and retrieval of survey instruments, ensuring accurate and comprehensive data collection. He conducted statistical analysis, organized findings into meaningful insights, and transcribed the gathered data. He also drafted key sections of the manuscript, aligning the narrative with the analysed data and adhering to academic writing standards. Furthermore, he ensured ethical implementation by securing necessary permissions, obtaining participant consent, and maintaining data confidentiality.

The synergy between Dr. Oropa and Mr. Magtoltol highlights their shared commitment to academic excellence. Their complementary roles in research design, data analysis, writing, and ethical compliance strengthened the study's validity, reliability, and overall contribution to the field.

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Financial Interest: The authors declare they have no financial conflict of interest.
Personal Relationships: Disclose any personal or professional relationships that could influence the research, such as familial relationships with individuals in the field, collaborations that may create bias, or personal rivalries.
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Classroom Management among Pre-service Elementary Teachers in Buguias

Alfred M. Aguindang
Benguet State University- Buguias Campus, Loo, Buguias, Benguet, Philippines

Author Email: aagui955@gmail.com

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Abstract. The educators, who are the classroom supervisors, determine a suitable learning environment. Classroom management is essential in creating this kind of learning environment, which becomes a struggle for beginning teachers, including pre-service teachers. This study examines the level and relationship of awareness and knowledge concerning various classroom management approaches. Specifically, it discovered the (1) level of awareness and knowledge of Pre-service elementary teachers regarding classroom management, and the (2) relationship between awareness and knowledge of the different classroom management approaches. Prior research indicates a necessity to examine pre-service teachers' awareness and knowledge of classroom management. A structured questionnaire based on Ornstein's discussion was distributed to all pre-service elementary teachers formally enrolled in the campus's teacher education program. The means were analyzed using a Pearson correlation to comprehend the relationship between the levels of awareness and knowledge. Data analysis indicated elevated levels of awareness and knowledge, along with a positive association between these two variables. This suggests that a pre-service teacher's awareness is likely correlated with their expertise. The findings indicate that pre-service elementary teachers possess awareness and expertise in various classroom management strategies. It is recommended that teacher education programs continue to emphasize both the theoretical and practical applications of diverse classroom management approaches. Further research could explore the long-term impact of this strong foundation on their actual classroom practices and students' outcomes once they enter the profession. Additional research may be conducted to corroborate the study's findings.

Keywords: Classroom management; Classroom management approaches; Pre-service teachers.

1.0 Introduction

"Education is the most powerful weapon used to change the world", Nelson Mandela (Waluyo et al., 2025). The power of education lies in its ability to transform individuals and, by extension, transform the world. Teachers are at the heart of this transformative process. They are the ones who impart knowledge, skills, and values to their students. They create learning environments where students can explore, discover, and grow. Every educator envisions an ideal learning environment characterized by managed behavioral issues, a stress-free atmosphere that fosters the growth mindsets of both students and teachers, and a setting conducive to optimal instructional efficacy. Nonetheless, realizing this aspiration may hinge on the teacher's classroom management skills. The classroom climate is determined by the teachers, who serve as managers. Studies indicate that the strength of teacher-student connections underpins all other facets of classroom management (Göktaş & Kaya, 2023). Classroom management is a significant difficulty for educators, particularly during the initial stages of their careers. This encompasses novice educators and pre-service teachers.

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Pre-service teachers are those engaged in professional training to qualify as educators. Training is a crucial component of the teacher education curriculum, equipping individuals to become certified educators (Ulla, 2016). A recent study indicates that beginning educators frequently encounter difficulties in proficient classroom management, notwithstanding their robust professional skills, owing to insufficient training in this essential domain (Xu & Jin, 2021). At their initial entry, Pre-service teachers encounter considerable difficulties in organizing and managing their classrooms. Teachers' competency in classroom management is a crucial determinant of their effectiveness as educators since it establishes the groundwork for their future teaching practices.

The research on pre-service teachers is expanding globally. A study by Van Katwijk et al., (2023) in the Netherlands, reveals a favorable assessment of pre-service teachers as a research subject. This research can assist in 'future-proofing' educators. A study by Zulkifli et al. (2019) in Malaysia indicated that a skilled pre-service teacher in classroom management is likely to become an effective educator once entering the profession. A study by Tantoy and Gemota Jr., (2018) In the Philippines, pre-service teachers exhibited teachers' personalities and lesson preparation skills during actual exposures, but were deficient in other domains, particularly classroom management. Consequently, assessing pre-service teachers' awareness and understanding of classroom management approaches is essential.

This study examines the awareness and knowledge of classroom management strategies of pre-service elementary teachers at Benguet State University-Buguias Campus. The study's findings may benefit the College of Education professors, campus administrators, and other researchers. This study is based on the premise that pre-service teachers' competence in classroom management strategies is crucial for their future effectiveness as educators.

This research is underpinned by the notion that enhancing pre-service teachers' awareness and understanding of effective classroom management strategies can substantially improve their teaching proficiency and capacity to cultivate a conducive learning environment. The assumption is that the connection between pre-service teachers' awareness and expertise in classroom management strategies is that the elements jointly affect their ability to execute effective classroom management tactics in their future teaching practice. The paradigm of the study is presented in Figure 1.

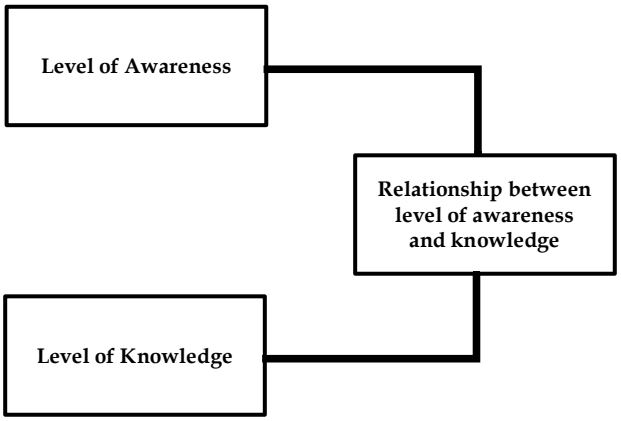

Figure 1. *Paradigm of the Study*

Tolentino (2020) regarded classroom management as a critical teaching component and a significant educational problem. Junker et al. (2021) identified it as a fundamental element of effective teaching, linked to student motivation and academic success. Mustafida (2021) asserts that the teacher must provide a comfortable classroom environment for students. Student achievement is intrinsically linked to an effective classroom management system. The classroom learning environment depends on teachers' efficacy in establishing efficient management systems. It contributes to the student's well-being during the learning process. Teachers typically employ many strategies to establish an effective classroom management system (Wahdah et al., 2023). Teachers' awareness and understanding of various classroom management strategies can aid in preventing and addressing difficult

behaviors. The educator acquainted with various classroom management techniques can discern the most appropriate tactics for implementation (Wolff et al., 2021). Ornstein (1990) underscores the significance of classroom management as a fundamental component of effective teaching. He contends that an effectively managed classroom offers a secure, nurturing, and conducive atmosphere where students can excel intellectually and socially. This is the discourse on the approaches:

An assertive approach allows the educator to develop skills and confidence in managing student misconduct, establish clear rules and repercussions for non-compliance, and foster a composed connection between the teacher and the student. A fundamental element of the assertive approach is delineating explicit expectations and standards for student conduct (Liao, 2018). Yazdi et al. (2019) assert that an assertive strategy improves students' mastery objectives.

Business-Academic approach is an organized strategy that prioritizes the effective and productive utilization of time for academic activities. It derives inspiration from corporate ideas, including planning, organization, and accountability, to establish a favorable learning environment. The teacher sets his/her standards for the pupils before they engage in work, organizes students' work, keeps the students on task, monitors their work, gives them feedback, and holds them accountable for the failure or success of their work by providing rewards and penalties. The teacher involves pupils in additional tasks to maintain focus and prevent misconduct.

Behavior-Modification approach is a therapy method that aims to alter specific behaviors by systematically implementing learning principles. It is based on the idea that behavior is influenced by its consequences, and by modifying these consequences, we can change behavior (Martin & Pear, 2024). The teacher spends little time on the students' personal histories or on searching for the problem of misbehavior. The educator strives to increase the occurrence of appropriate behavior through rewards and reduce the occurrence of misbehavior through punishments. The educator reinforces positive conduct through rapid rewards and activities while disregarding rule violators.

Group Managerial approach is a leadership approach that prioritizes cooperation, teamwork, and collective decision-making in a group context (Northouse, 2021; Yukl, 2017). The teacher keeps students busy with classroom group activities, controls and responds immediately to students' misbehavior before it emerges through varied group activities, and uses desist techniques, keeping themselves moving and focusing attention on groups of students.

Group Guidance Approach is a strategy that focuses on providing students with a supportive and inclusive environment where they can develop social, emotional, and academic skills through group activities and discussions. According to Wiyono et al. (2025), this approach involves small group activities in which students are divided into small groups for various activities, such as discussions, problem-solving, and role-playing.

Acceptance Approach. According to this book by Gonzaga et al. (2022), this approach emphasizes creating a supportive and inclusive environment where students feel valued, respected, understood, and accepted. Being accepted in the classroom leads to a stress-free environment. This approach means that the teacher provides leadership by establishing consequences, allows students to participate in decision-making and make a choice, and makes every student feel that he or she is accepted by peers, teachers, and others who are important to them.

Success Approach focuses on creating an environment where students are motivated to achieve their best. Changing the mindset of every student can boost their achievement (Healy, 2025). The teacher who doesn't deal with inappropriate behavior and the consequences. Instead, the teacher deals with the psychological and social conditions where these problems are rooted; he/she does not excuse inappropriate behavior but suggests alternatives to the pupils, and students choose the behavior they want, but they must face the consequences.

2.0 Methodology

2.1 Research Design

The study utilized a quantitative methodology to fulfill the research objectives. The researcher used a simple correlation research design to determine the relationship between awareness and knowledge of pre-service

teachers regarding classroom management. Quantitative research is a methodology that emphasizes the collection and analysis of numerical data. It entails employing statistical methods to assess and quantify variables, frequently to evaluate hypotheses or ideas (Sciberras & Dingli, 2023). Correlation research design examines relationships between two variables (Padilla, 2023). A structured survey questionnaire assessed the level and relationship of awareness and knowledge of pre-service elementary teachers regarding classroom management approaches. A survey questionnaire is a systematic collection of inquiries intended to gather information from a cohort of persons. It is a prevalent instrument utilized in research, marketing, and diverse domains to collect data on opinions, attitudes, behaviors, or demographics (Chowdhury et al., 2022).

2.2 Research Respondents

The research population consists of 57 pre-service elementary teachers enrolled in the Teacher Education Program, motivated by the potential to enhance educational practices, inform policy, tackle regional challenges, improve professional development, and cultivate a culture of inquiry within the program.

2.3 Research Instrument

The instrument used to determine the level and relationship of awareness and knowledge of the pre-service elementary teachers is a structured questionnaire used in a previous study based on the classroom management approaches discussed by Ornstein (1990). To improve reliability, revisions were incorporated to accommodate the nature of respondents.

2.4 Data Gathering Procedure

The data-collection techniques are outlined below: The researcher secured the requisite licenses and authorization from the administration of Benguet State University—Buguias Campus to conduct the study. Subsequently, the researchers requested the participation of all enrolled pre-service primary teachers from the university in the study. The participants were requested to complete the survey questionnaire, which was conducted in person. The collected data undergo rigorous analysis and interpretation of quantitative information.

2.5 Ethical Considerations

This study project complied with ethical standards. The researcher secured consent and elucidated the research purpose to the respondents before conducting the survey questionnaire. The provision of respondents' identities was optional, and the gathered replies were preserved with the highest level of secrecy, with inquiries addressed courteously.

3.0 Results and Discussion

3.1 Level of Awareness of the Pre-Service Elementary Teachers Regarding Classroom Management Approaches

The data outlines the classroom management approaches: aggressive, business-academic, behavior-modification, group managerial, group directing, acceptance, and success. The total weighted mean for the awareness level of classroom management approaches is 2.97 (Much Aware). Pre-service elementary teachers demonstrated a high degree of comprehension of the business-academic approach, evidenced by a cumulative mean of 3.50 (Very Much Aware), followed by the assertive approach at 3.26, group managerial approach at 3.14, the acceptance approach at 2.86, the success approach at 2.74, and lastly, the group guiding approach at 2.38.

Table 1. *Level of Awareness of Pre-service Teachers Regarding Classroom Management Approaches*

Classroom Management Approaches	Weighted Mean	Descriptive Equivalent
Assertive Approach	3.26	Very Much Aware
Business- Academic Approach	3.50	Very Much Aware
Behavior-Modification Approach	2.90	Much Aware
Group Managerial Approach	3.14	Much Aware
Group Guidance Approach	2.38	Less Aware
Acceptance Approach	2.86	Much Aware
Success Approach	2.74	Much Aware
General Weighted Mean	**2.97**	**Much Aware**

The results imply that Pre-service Elementary Teachers have a strong understanding and appreciation of various classroom management approaches. This level of awareness has positive implications for their future teaching careers (Zulkifli et al., 2019). The findings align with Paghasian's (2017) study, which indicates that pre-service

teachers acquire various classroom management strategies during learning. Nkhata et al. (2023) demonstrated that pre-service instructors must possess a profound comprehension of classroom management, irrespective of their originating institution. Huth (2015), as cited in Schulze et al. (2025), identified four classroom management stages that provide a foundation for practical learning experiences. This platform encompasses awareness, environment, direction, and pedagogical philosophy. This indicates that Pre-service Elementary Teachers perceive classrooms as enterprises in which they function as "CEOs." Conscious of holding their students responsible for the outcomes of their work, they instead address their behavior in group settings.

3.2 Level of Knowledge of Pre-service Elementary Teachers Regarding Classroom Management Approaches

Table 2 displays the knowledge level of pre-service elementary teachers regarding classroom management strategies. The general weighted mean is 2.83, indicating a good level of expertise. The assertive method and group managerial strategy rank highest with a weighted mean of 3.26, followed by the behavior-modification, business-academic, acceptance, and group guidance and success approaches.

Table 2. *Level of Knowledge of Pre-service Elementary Teachers Regarding Classroom Management Approaches*

Classroom Management Approaches	Weighted Mean	Descriptive Equivalent
Assertive Approach	3.26	Very Highly Knowledgeable
Business- Academic Approach	2.90	Highly Knowledgeable
Behavior-Modification Approach	2.95	Highly Knowledgeable
Group Managerial Approach	3.26	Very Highly Knowledgeable
Group Guidance Approach	2.43	Moderately Knowledgeable
Acceptance Approach	2.60	Highly Knowledgeable
Success Approach	2.43	Moderately Knowledgeable
General Weighted Mean	**2.83**	**Highly Knowledgeable**

Legend: 2.51-3.25 Highly Knowledgeable

The findings indicate that Pre-service Elementary Teachers possess an extensive understanding of classroom management approaches. It signifies their ability to select and apply various classroom management strategies with expertise. The outcome aligns with the research of (Slater & Main, 2020), which asserts that classroom management is a crucial competency required for educators.

3.3 Relationship between the Level of Awareness and the Level of Knowledge

The correlation coefficient of 0.74 signifies a robust positive link between the awareness and knowledge levels of Pre-service Elementary Teachers concerning classroom management strategies. The findings suggest that increased awareness correlates with enhanced knowledge of classroom management among Pre-service Elementary Teachers. Johnson and Poore (2025) assert that teachers should develop their awareness of classroom management as their knowledge also increases.

Table 3. *Correlation between the Level of Awareness and the Level of Knowledge*

	Level of Awareness	Level of Knowledge
Level of Awareness	1	
Level of Knowledge	.74	1

Legend: 0.7- 0.99 Strong Positive Correlation

4.0 Conclusion

This study indicates a favorable prognosis for the future of primary education. The pre-service elementary teachers had extensive awareness and knowledge of classroom management approaches. The notable positive association between awareness and knowledge indicates that a more profound comprehension of these approaches correlates with heightened awareness of their significance and use. This foundation in classroom management principles equips future educators to establish good and productive learning environments for their pupils. These findings highlight the efficacy of existing teacher training programs in preparing pre-service teachers with vital classroom management competencies. It is recommended that teacher education programs persist in prioritizing both theoretical understanding and practical implementation of varied classroom management strategies, promoting an ongoing cycle of learning and enhancement to adequately equip future educators to address the diverse needs of their students. Subsequent studies might investigate the enduring effects of this robust foundation on their classroom practices and student outcomes upon entering the profession.

5.0 Contributions of Authors

This research has sole authorship. Thus, the author served as principal investigator, data analyst, and writer, taking ownership of the entire research process and ensuring the integrity and rigor of the study.

6.0 Funding

The researcher solely funds this research.

7.0 Conflict of Interests

The author affirms no affiliations or involvement with any organization or institution possessing financial or non-financial interests in this publication's subject matter or materials.

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Integrating Design Thinking in Teaching High School Physics

Markpoalo Cañada, Kenny James Cubero, Queennie Del Agua, Rizza Nikka Gerona, Dominic Libres, Resel Ligue, Jonathan Mauring Jr., Hans Adam Padilla, John Paul Quiña, Rochin Ramos, Ofelia Aljade E. Ramos*
University of the Philippines Cebu, Lahug, Cebu City, Philippines

*Corresponding Author Email: oeramos@up.edu.ph

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Abstract. This study examined the implementation of Design Thinking (DT) in teaching high school physics through a comprehensive two-day seminar workshop. A mixed methods approach was employed to assess its effectiveness, combining quantitative and qualitative data collection and analysis. The study involved 21 pre-service teachers (PSTs) majoring in General Science from a state university in Cebu City, Cebu. The DT Framework, which comprised the following phases: Empathy, Define, Ideate, Prototype, and Test, guided the PSTs in demonstrating their teaching strategies, with the researchers evaluating their performance at each stage. Findings indicate that the Empathy phase was strengthened by effective pre-interviews, role assignments, resource availability, and structured organization. In the Define phase, PSTs successfully facilitated problem identification and encountered difficulties in guiding learners to translate questions into actionable insights. The Ideate phase encouraged creativity and collaboration, yet PSTs struggled to clarify the distinction between originality and novelty. During the Prototype phase, they promoted adaptability and resourcefulness but lacked a clear timeline for task completion. Finally, in the Test phase, while PSTs emphasized iterative improvement, they did not provide a rubric for design assessment or a structured approach to gathering end-user feedback. Overall, PSTs expressed high satisfaction with the workshop, praising the topic's relevance, the presenters' expertise, and the engaging activities. Despite these successes, recommendations include refining feedback mechanisms and incorporating a broader range of activities to enhance future workshops. This study highlights the potential of DT in enriching physics education and focuses on areas for further refinement in teacher training programs.

Keywords: Design thinking in Physics; Design thinking workshop; Pre-service teachers.

1.0 Introduction

In today's rapidly evolving world, the need for innovative, adaptive problem-solving approaches in education has never been more urgent. Design Thinking (DT), a human-centered and iterative methodology, offers a promising framework for reimagining classroom instruction by fostering empathy, creativity, and critical thinking (Malaluan & Landicho, 2022). More than a process, DT is a mindset that empowers learners to understand user needs, challenge assumptions, and develop unconventional solutions to real-world problems. Originally a practice among designers, DT has now gained traction across industries and educational institutions. Companies like Apple and Google use it to drive innovation, while universities like Stanford and Harvard have incorporated it into their curricula (Deepa, 2020). Its educational value lies in its alignment with constructivist teaching

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philosophies rooted in the works of Bruner (1961) and Vygotsky (1962), where learning is an active, collaborative, and reflective process.

In educational contexts, DT supports the development of key 21st-century skills such as critical thinking, collaboration, adaptability, and creative problem-solving (David Lee, 2018). Scheer and Plattner (2011) emphasize that DT phases mirror constructivist principles by facilitating meaningful engagement, self-directed learning, and metacognitive growth. A unique feature of DT is the framing of problems by students, promoting ownership and deeper reflection throughout the learning process (Melles et al., 2015). When integrated into Science and Math instruction, DT enhances conceptual understanding and nurtures empathy in STEM contexts (McCrudy et al., 2020; Painter, 2018). It also encourages differentiation and supports inclusive learning strategies (Lambert et al., 2021). However, despite its benefits, DT presents implementation challenges. Assessment is complex due to the diversity of student-generated prototypes, and aligning solutions with varied stakeholder needs can strain classroom resources (Hennessey, 2020; Diefenthaler et al., n.d.).

In teacher preparation, DT also serves as a tool for teacher growth. Educators who adopt its processes become more innovative, experimental, and collaborative (Diefenthaler et al., n.d.). However, the integration of DT must be context-sensitive, particularly in environments shaped by cultural and logistical constraints (Thoring et al., 2014; Smith et al., 2015). Despite increasing global interest, research exploring the specific application of DT in physics education remains limited. Little is known about how DT impacts pre-service teachers' (PSTs) instructional practices, reflective thinking, and satisfaction. This study addresses these gaps by implementing a DT-based seminar-workshop in physics education and examining its outcomes among PSTs.

2.0 Methodology

2.1 Research Design

The research methodology in this study adopted a mixed-methods study using both quantitative and qualitative data collection and analysis, specifically, a quasi-experimental method with a one-group posttest-only design to assess pre-service teachers' performance in using the intervention through teaching demonstration and to observe the effective integration of design thinking in lesson planning to teach physics. The study used a thematic analysis approach to thoroughly examine the qualitative data, which consists of comments made by the pre-service teachers in the workshop evaluation. This approach is employed to determine relationships and patterns of pre-service teachers' conceptions regarding the workshop seminar's overall impact on design thinking.

2.2 Research Locale

The researchers conducted the seminar at the same university for the following reasons: The university is well known for its credibility in producing globally competitive teachers. It is accredited by the Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACUP) with a level IV status. Most of the researchers were graduates of the university and aimed to render their services back to their alma mater. The researchers aimed to target future educators and be trained with current and available teaching methods, rather than traditional ones.

2.3 Research Participants

The sample population was gathered from the pre-service teachers taking up a Bachelor of Secondary Education (BSEd) Major in General Science at one of the universities in Cebu City. The study used a convenience sampling non-probability design. 46 enrolled pre-service teachers were on the list, and only 21 participants were available because some pre-service teachers were assigned to their local National High School for practicum. All 21 participants were involved in the qualitative and quantitative data collection.

2.4 Research Instrument

This study used a 20-item evaluation tool in observable actions based on the 5 phases of DT. The criteria of observable actions were grouped into five phases. The empathic phase comprises interview, observation, immersion, research, and an empathy map. The first phase consisted of 9 items in total, the define phase consisted of 3 items, the ideate phase consisted of 2 items, the prototype phase consisted of 4 items, and lastly, the test phase consisted of 2 items. All items were carefully analyzed to effectively assess the quantitative performance of the pre-service teachers based on their teaching demonstrations with the application of the intervention.

This study also included a workshop evaluation tool to quantify the level of satisfaction of student interns after receiving the DT seminar-workshop. The tool is designed to assess the performance of the workshop speakers in terms of the history and definition of DT, the introduction and related literature and studies of DT, the intergenerational intervention procedures of lesson designing, and the overall workshop seminar impact. The tool also included 4 essay questions to be coded into themes for the qualitative data.

2.5 Data Gathering Procedure

Before the beginning of this study, a formal communication was sent to the school head and administration requesting permission to conduct a seminar workshop. Upon approval of the intent, the researchers created a strategic program matrix, which was proposed and then implemented. The participants signed informed consent forms to ensure proper permission in gathering the data.

This study began in March 2024 with a 20-hour duration of the seminar-workshop in 2 consecutive days. An online orientation was conducted before the seminar workshop to explain the objectives and discuss the proposed workshop overview, and informed consent was obtained. During the seminar workshop, the participants were exposed to the DT intervention as an alternative teaching method for learning physics. After the workshop, the participants were grouped into groups of five. Each team decided on varied topics to use to fit the DT intervention. Three evaluators assessed team demonstration based on each item in the observable actions. At the end of the seminar-workshop, a workshop evaluation tool was given to all participants to give feedback to the speakers and assess their performance.

This study utilized descriptive statistics to analyze both the teaching demonstration performances and the level of agreement regarding pre-service teachers' satisfaction with the seminar-workshop. The data were organized by frequency, and the mode was calculated to determine the most common level of compliance. Three evaluators assessed the performance of the teacher-demonstrators using a 5-point rating scale for each criterion. A total of 21 participants were divided into five teams, four teams with four members each and one team with five members, to collect quantitative data on the application of the demonstration teaching (DT). The same participants also provided individual data for the satisfaction rating and evaluation of the seminar-workshop and the qualitative analysis of pre-service teachers' engagement levels, regardless of their team assignments. Finally, qualitative data gathered from participant comments were thematically coded and categorized to support in-depth analysis following the completion of the seminar-workshop.

2.6 Ethical Considerations

In conducting this study, appropriate measures were taken to uphold ethical standards to ensure the protection and well-being of the participants. The following section outlines the ethical considerations that guided the design and implementation of this study. The approval letter was forwarded to the University President, Supervisor, and BSEd General Science Teacher Mentor for review and approval. The pre-service teachers were provided with detailed information regarding the study's purpose, procedures, and benefits. Informed consent was also obtained before participation, ensuring their voluntary participation agreement. They were made to understand that their decision to participate or withdraw would be respected without any repercussions. Measures were also taken to protect the confidentiality of the participants' identities and responses. Any personal information shared by the participants was kept confidential, and the data were anonymized during analysis. Data collected during the study were handled with care and integrity. All data was securely stored and accessed only by authorized personnel to maintain confidentiality and privacy. Fostering fairness and equity was also considered when selecting the participants to guarantee that the preservice teachers were all given equal opportunities to participate in the study, irrespective of individual background or attributes. The research aimed to promote the participants' professional development and pedagogical effectiveness by introducing them to innovative teaching methodologies. Efforts were made to ensure that the research process and outcomes would ultimately benefit participants and the broader educational community.

3.0 Results and Discussion

Table 1 displays the observable actions pre-service teachers took during the Empathy phase of the DT. Five items were rated as Meticulously Observed. However, Item 2 displayed the lowest rate with hardly observed descriptors. Items 5, 6, and 7 displayed no remarks. Five items out of nine were rated as Meticulously Observed, while Item 2 displayed the lowest rate with hardly observed descriptors. Three items, 5, 6, and 7, displayed no remarks and were not applicable.

Table 1. *PSTs' Observable Actions - Empathy Phase*

Subvariables	No.	Criteria/ Observable Actions	Mode	Description
Interview	1	The PSTs encouraged students to brainstorm questions.	5	Meticulously Observed
	2	The PSTs contacted and screened the end users for safety purposes.	2	Hardly Observed
Observation	3	The PSTs assigned 1-5 students per interviewee.	5	Meticulously Observed
	4	The PSTs ensured roles in the interview group.	5	Meticulously Observed
Immersion	5	The PSTs allowed students to observe end users and how they interact with their environment and activities.	-	-
	6	The PSTs encouraged the What? How? Why? (WHW) tool in observation.	-	-
	7	The PSTs allowed the students to submerge themselves into the users' experiences.	-	-
Research	8	The PSTs provided learning resources, such as books, videos, and educational games, to help students acquire knowledge and skills.	5	Meticulously Observed
Empathy map	9	The PSTs allowed the students to use a graphic organizer to organize information during empathy work.	5	Meticulously Observed

Note: (-) signifies a not applicable item, the number of items in the empathy phase

The PSTs effectively demonstrated the Empathy phase of the DT process. They encouraged learners to participate in brainstorming activities that foster creativity and critical thinking, aligning with Hennessey's (2020) and Noel and Tiu's (2016) statements. Assigning an adequate number of students to each interviewee and ensuring that every group member had distinct roles facilitated effective communication and collaboration. Additionally, providing various learning resources and allowing learners to utilize graphic organizers during the empathy phase deepened their understanding and engagement with the material, ultimately enhancing their learning experience. However, the evaluators disregarded items 5, 6, and 7 due to difficulties meeting stakeholders and safety concerns about bringing students into specific environments. The PSTs also found this immersion stage of empathy challenging to implement, which supports the statement of (Diefenthaler et al., n.d.).

The empathy phase is crucial in implementing DT. Physics teachers would find it hard to nurture the students' skills if they cannot communicate and relate to the specific problem the end-users face. PSTs ensure the technicalities in the empathy phase, but must observe their topic and plans. Moreover, in physics concepts, if students do not take note of the scientific implications of why empathy is done in the first place, the following steps will fall short, leading to a tiring repetition of DT processes. Teachers must ensure the concept aligns well with the students' interview objectives. Despite this limitation, the quantitative data for the empathic phase remained valid, as other sub-variables were considered within the nine observable actions.

Table 2 displays two items with an adequately observed rate in synthesizing end-users' needs and developing an action statement. In contrast, one item showed minimal observability in transforming problem statements into "HMW" questions. The results indicate that pre-service teachers effectively demonstrated the Define phase of the DT process by guiding learners in converting their findings into new ideas and insights and designing appropriate problem statements. This aligns with the works of Smith et al. (2015) and Diefenthaler et al. (n.d.), which emphasize the role of educators in enhancing students' capacity to become designers. However, the PSTs encountered challenges in assisting students with translating formulated problem statements into actionable questions, highlighting an area for further improvement in the Define phase.

Table 2. *PSTs' Observable Actions - Define Phase*

No.	Criteria/ Observable Actions	Mode	Description
10	The PSTs were able to guide students in synthesizing the findings into needs and insights.	4	Adequately Observed
11	The PSTs helped the students develop an actionable problem statement.	4	Adequately Observed
12	The PSTs guided the students in transforming problem statements into "how might we" (HMW) questions.	2	Hardly Observed

Physics teachers should not undermine the use of "HMW" questions, as this would showcase the ability of physics learners to think critically and transition to forming ideas to take action on the problem. The physics concepts might come in very handy because of the mathematical foundations; if physics teachers are trained enough to incorporate DT, especially in the design phase, effectively, one would not miss the opportunity to specify the needs of the end-users and consider addressing them objectively. One of the key actions in this phase for the physics teachers is to enumerate objectives for each of the problems identified.

Table 3 revealed that one item regarding collaboration was adequately observed in the pre-service teachers' performance. In contrast, the other was never observed in their actions during the Ideate phase of the DT process. The results indicate that throughout the Ideate phase, the PSTs ensured effective collaboration, demonstrating an awareness of the DT processes, particularly the importance of teamwork, as supported by Diefenthaler et al. (n.d.). However, the PSTs did not showcase originality or novelty in their ideas, suggesting a gap in their understanding of idea generation within the DT framework.

Table 3. *PSTs' Observable Actions - Ideate Phase*

No.	Criteria/ Observable Actions	Mode	Description
13	The PSTs ensured collaborative work in generating and creating ideas.	4	Adequately Observed
14	The PSTs explained that originality does not mean novelty.	1	Never Observed

Ideas form in many ways, primarily how students address the known problem. Physics teachers must scaffold students in forming ideas and ask questions when a plan is crafted. The teacher must ensure that there is collaboration within the group, and they must do a self-evaluation of the plans created. Students should also be reminded to suggest ways that would be very feasible and applicable in reality, as one wanting to create an original might end up overcomplicating the design for the sake of novelty.

The data in Table 4 displayed positive results in most aspects of the Prototype phase, particularly in allowing time for prototype adjustments, accepting model imperfections, and encouraging the use of locally available materials, all of which were meticulously observed. The results indicate that pre-service teachers effectively demonstrated the Prototype phase, aligning with the findings of Smith et al. (2015) and Cassim (2009), who emphasize that engaging in a nonlinear, action-based experience with real-world problems fosters critical thinking and enhances learners' ability to become designers. However, setting a deadline for prototyping was hardly observed. This makes the Prototype phase one of the most critical and challenging stages, allowing students to explore various models and solutions. Setting deadlines remains essential for successfully conducting this phase. To effectively address end-user needs, prototypes should be developed within structured timelines. As Diefenthaler et al. (n.d.) suggest, limited resources and student constraints can impact the strict enforcement of deadlines.

Table 4. *PSTs' Observable Actions - Prototype Phase*

No.	Criteria/ Observable Actions	Mode	Description
15	The PSTs set deadlines for prototyping.	2	Hardly Observed
16	The PSTs could allot time for the necessary adjustments for the prototype.	5	Meticulously Observed
17	The PSTs reiterated that models do not have to be perfect.	5	Meticulously Observed
18	The PSTs encouraged the students to use locally available materials.	5	Meticulously Observed

The failure of most PSTs to set or assign deadlines for prototyping is related to the criteria or observable actions that are never observed in the subsequent Design Thinking phase. The prioritization of prototype development has allowed PSTs to allocate resources and attention towards the development of the prototype itself. Consequently, setting deadlines was inadvertently overlooked. While this approach allowed for the creation of quality prototypes, it also left a gap in the supposed structured timeline of the design thinking process. Failure to

set deadlines can significantly impact the progression of the instructional process, as delays in one stage or phase inevitably affect the timeline and quality of the succeeding, equally important phases.

The data in Table 5 revealed that Items 19 and 20 were never observed in the actions taken by the PSTs during the Test phase of the DT process. Specifically, there was an absence of a designed rubric or criteria for prototype assessment and a meeting with end-users for testing. This lack of assessment criteria highlights a limitation in the PSTs' understanding of the role of evaluation in prototype development. Additionally, failing to engage end-users in the testing phase resulted in a missed opportunity to gather feedback for improving the prototype design.

Table 5. *PSTs' Observable Actions - Test Phase*

No.	Criteria/ Observable Actions	Mode	Description
19	The PSTs designed a rubric or criteria for prototype assessment.	1	Never observed
20	The PSTs set a meeting with the end-users for testing.	1	Never observed

According to the PSTs, these criteria or observable actions for the test phase were never observed in the demonstration of Design Thinking instruction because the PSTs wanted to streamline the development process to meet stringent time constraints. Because they chose to streamline the process, they optimized the design phase and left the test phase with lower priority. These findings suggest a gap in the PSTs' application of the Test phase, which is essential for refining and validating design solutions.

The evaluation results from 21 participants provide valuable insights into the overall satisfaction levels of pre-service teachers regarding the seminar speakers' performance in a comprehensive seminar-workshop (see Table 6). The speakers received predominantly positive ratings across various aspects, including clarity of communication, meeting workshop objectives, preparation, engagement, relevance of topics, organization of content, usefulness in work, facilitator knowledge, and adequacy of time and facilities. Participants largely agreed that the workshop objectives were clearly defined, met, and well-prepared, and they found the sessions engaging, organized, and easy to follow. However, some areas, such as the relevance of topics and distribution of materials, received mixed feedback. Overall, these findings highlight the effectiveness of the seminar speakers in delivering an informative and engaging experience while also identifying areas for improvement to enhance the learning experience for pre-service teachers further.

Table 6. *Pre-service Teachers' Satisfaction Rate in Frequency based on the Performance of the Speakers in the Overall Seminar-Workshop*

Statement of Performance	Level of Agreement and the Frequency per Statement				
	1	2	3	4	5
The objectives of the workshop were clearly defined.				2	19
The workshop objectives were met.				2	19
The workshop was well prepared.				2	19
The workshop was engaging.				2	19
The topics covered were relevant to me.				1	20
The content was organized and easy to follow.				2	19
Participation and interaction were encouraged.					21
The materials distributed were helpful.					21
This workshop experience will be helpful in my work.				1	20
The facilitators were knowledgeable about the workshop topics.					21
The time allotted for the training was sufficient.					21
The meeting room and facilities were adequate and comfortable.					21

The thematic map of pre-service teachers' engagement levels in seminar workshops using Design Thinking highlights key aspects of their experience (see Table 7). Participants noted several positive aspects, including knowledgeable presenters who were responsive to interns' needs, engaging activities that enhanced social skills and critical thinking, and relevant content that made the workshop informative and meaningful, which supports the study of Westover (2025). However, areas for improvement were also identified, such as the need for better feedback mechanisms emphasized in the study of Tariq et al. (2019), more precise instructions as stated by Andrew et al. (2024), and a greater diversity of activities, particularly more sample demonstrations to illustrate classroom applications. The workshop also influenced participants' teaching practices, with many expressing plans to integrate Design Thinking into lesson planning to foster curiosity and higher-order thinking skills. Some

participants reported behavioral changes, such as a commitment to expanding their teaching methods and a stronger connection with students.

Table 7. *Thematic Map of Pre-service Teachers' Engagement Levels in Seminar Workshops Using Design Thinking*

Theme	Subtheme	Sample Quote
Positive Aspects of the Workshop	Knowledgeable Presenters	*"The speakers. They are all responsive to the needs and queries of the interns."*
	Engaging Activities	*"The workshop is very engaging and informative. I learned so many things, which enhance my social skills and critical thinking."*
	Relevance of Content	*"The workshop is very engaging and informative. I learned so many things, which enhance my social skills and critical thinking."*
Areas for Workshop Improvement	Suggestions for Enhancements	*"Probably the only part of the workshop that we all agreed upon that needs improvement is the feedback part."*
	Clarification Needed	*"Clear instructions."*
	Diversity of Activities	*"I think their sample demonstration was well delivered and done, and we need more of it to show how it is done in the classroom setting."*
Changes in Practice Resulting from the Workshop	Implementation Plans	*"I would like to keep this approach at lesson planning since it is excellent at stimulating the students' curiosity and higher-order thinking skills. Furthermore, it gives students purposeful activities as they could see with real-world scenarios."*
	Behavioral Changes	*"To broaden my knowledge and to never limit the methods in conducting the class/presenting the topics".*
	Perceived Impact	*"There are a lot of ideas and strategies that I have learned in this seminar-workshop. I learned how to connect with my students."*
Overall Evaluation of the Workshop	Satisfaction Levels	*Goals were achieved, and a good rapport was established. Therefore, I can say that this training/workshop is satisfactory."*
	Learning Outcomes	*"I was finally able to understand what D.T. is, and I might be considering (using) it in my future lesson plans."*
	Suggestions for Future Workshops	*"The overall workshop is fun, and I would like my other classmates who are currently having their off-campus to experience the workshop and seminar."*

Overall, the seminar-workshop was well-received by the PSTs, who found the sessions insightful and highly relevant to their future instructional practices. The Design Thinking strategy in teaching high school Physics provided practical pedagogical solutions to common classroom problems and offered innovative approaches to enhance student engagement and learning outcomes. As a result, many PSTs expressed strong interest in incorporating the newly learned strategy into their teaching, recognizing their potential to improve the delivery of the Physics curriculum and student achievement.

4.0 Conclusion

Integrating Design Thinking (DT) into lesson planning for high school physics has shown clear educational benefits, as demonstrated by the findings of this study. Focusing on pre-service teachers (PSTs), the research highlighted how DT fosters empathy, creativity, collaboration, and critical thinking skills crucial for effective science instruction. The seminar-workshop offered a supportive and engaging environment where PSTs could move beyond abstract pedagogical theories and experience realistic, hands-on teaching practices. Many participants reported high satisfaction levels, describing the workshop as memorable and transformative.

Several recommendations are proposed for future research and implementation to build on these positive outcomes. First, the sample size should be expanded by including a more diverse group of PSTs from multiple institutions to improve the generalizability of the results. Extending the duration of the study would also allow for a deeper understanding of how DT is applied over time, particularly as participants transition into full-time teaching roles. Adopting a more robust mixed-methods approach—combining quantitative and qualitative data—could offer richer insights into how participants internalize and apply DT principles.

Moreover, the development and validation of more comprehensive assessment tools are necessary. This includes refining the DT evaluation tool used during workshops and creating an end-user rubric to assess prototypes during testing. Enhanced statistical analysis should also be employed to identify significant patterns and relationships in the data. A follow-up study is recommended to evaluate long-term retention and continued use of DT in classroom practice.

Future researchers are encouraged to explore additional physics topics and subject areas where DT may be applicable and settings where its integration might be limited. In parallel, educators should create opportunities for students to engage in community-based problem-solving, using DT as a framework to generate diverse and practical solutions. Finally, academic administrators should promote intuitive, action-based learning by embedding performance tasks in the curriculum, cultivating critical thinking, adaptability, and learner agency.

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Gen Z in Investing: Exploring Intentions Through the Theory of Planned Behavior

Jilla Mae D. Susada
Davao Oriental State University - Cateel, Davao Oriental, Philippines

Author Email: jillamaedsusada@gmail.com

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Abstract. This study examines the investment intentions of Generation Z, focusing on BSBA students in Cateel, Davao Oriental, Philippines, through the Theory of Planned Behavior (TPB). It explores how attitudes, subjective norms, and perceived behavioral control influence financial decisions amid evolving digital investment trends. Employing a quantitative descriptive-comparative design, data were gathered from 191 students via stratified random sampling. Surveys were used as the primary tool, and results were analyzed using ANOVA and multiple regression through SPSS. Findings reveal that perceived behavioral control, linked to financial literacy and self-efficacy, is the strongest predictor of investment intention. At the same time, attitudes are generally positive and subjective norms have a moderate influence. Significant differences were observed across age and year level, but not gender. The study recommends integrating financial literacy into academic programs and enhancing regulatory measures for digital investment platforms.

Keywords: Financial literacy; Generation Z students; Investment intentions; Theory of planned behavior.

1.0 Introduction

As global financial markets evolve, Generation Z has emerged as a significant demographic, particularly in developed economies like the United States, where they increasingly engage with the financial sector. The rapid expansion of financial technology, social media influences, and an increased focus on financial independence drive this engagement. While Gen Z's participation is noteworthy, their investment behaviors are characterized by a cautious approach, favoring sustainable and ethically responsible investments. Despite their growing involvement, many young investors demonstrate erratic behaviors influenced more by peer interactions than by a solid financial education.

In the Philippines, the rise of digital financial services has notably increased young people's access to financial markets. This access, however, has not necessarily translated into financial literacy, with many in Gen Z lacking a fundamental understanding of investment risks, asset diversification, and long-term financial planning. The situation is compounded by cultural preferences prioritizing savings over investments, which may inhibit wealth accumulation through diversified portfolios. Digital investment platforms play a critical role in shaping the financial decision-making of Filipino Gen Z investors by providing convenient access to markets and influencing investment attitudes through digital trends and social networks. However, while these platforms enhance market participation, they expose users to speculative behaviors and misinformation, notably when lacking financial literacy (Klana & Muttaqin, 2025; Utami et al., 2025).

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Research underscores the pivotal role of financial literacy in guiding investment decisions among young investors. Enhanced financial knowledge helps mitigate poor investment choices and fosters active participation in capital markets (Sobaih & Elshaer, 2023; Malkan et al., 2022). The Theory of Planned Behavior (TPB) is particularly effective in explaining Gen Z's investment intentions, as it captures the roles of attitudes, subjective norms, and perceived behavioral control factors shaped by education and digital engagement. In the Philippine context, TPB offers a robust framework to understand how financial literacy mediates the influence of peer norms and enhances confidence in financial decision-making, ultimately leading to more deliberate and informed investment behaviors (Gumasing & Niro, 2023). This is supported by local studies showing that perceived value, trust, and access to information significantly shape Gen Z investment intentions, particularly in real estate and capital markets (Driving Forces, 2023; Etrata & Raborar, 2022).

Recent studies continue to highlight significant gender differences in financial literacy and investment behavior, with women generally exhibiting less confidence and a greater tendency toward conservative and herd-driven investment strategies, despite achieving comparable returns to men (Carneiro & Quelhas, 2025; Budiyono & Tololiu, 2025). Furthermore, the understanding of market mechanisms and the importance of perceived behavioral control are crucial in shaping investment decisions. Those with higher financial literacy and confidence are more likely to engage in the investment process (Al-Faryan & Ansari, 2023; DeVries, 2016; Nugraha & Rahadi, 2021; Hamidah & Putra, 2024), while value-driven behaviors, such as environmental and ethical considerations, also play a role in Gen Z decision-making (Filip et al., 2025).

Despite the wealth of studies on financial literacy and its impacts, there remains a notable gap in specific research exploring how these factors influence the investment intentions of Filipino Gen Z through the lens of the Theory of Planned Behavior. This study aims to fill that gap by examining the interplay between financial education, digital platform influence, and investment behaviors in the Philippine context. This research is designed to provide empirical insights into the investment behaviors of Gen Z in the Philippines, aiding educators, policymakers, and financial institutions in crafting programs that enhance financial literacy and promote informed investment decisions. By understanding these dynamics, the study seeks to foster a financially capable generation equipped to navigate complex financial environments effectively, ultimately contributing to broader economic stability and personal financial security.

2.0 Methodology

2.1 Research Design

The study utilized a quantitative design with descriptive and comparative elements to examine the investment intentions among BSBA students across different year levels in Cateel, Davao Oriental. Descriptive statistics summarized the responses, while comparative analysis, including ANOVA with post hoc tests and correlation analysis, explored the relationships between variables derived from the Theory of Planned Behavior (TPB). Multiple regression analysis was further applied to pinpoint factors predicting investment intentions.

2.2 Research Locale

The study was carried out at Davao Oriental State University, located in Cateel, Davao Oriental. This institution was specifically chosen for its comprehensive BSBA program, which attracts a diverse range of students from various socioeconomic backgrounds. Thus, it is an ideal setting for investigating the investment intentions of Generation Z students.

2.3 Research Participants

The population consisted of 556 BSBA students from the first to third year at a local academic institution. A stratified random sampling method based on year level was employed to ensure diverse representation, resulting in 191 participants, slightly more than the 183 calculated via the Raosoft Sample Size Calculator for a 90% confidence level.

2.4 Research Instrument

A structured survey questionnaire, adopted from a previous study by Pandurugan and Al Shammakhi (2023), was used to measure investment intentions based on the Theory of Planned Behavior (TPB) framework. The

questionnaire comprised sections on demographic information, attitude toward investment, subjective norms, perceived behavioral control, and investment intention, with responses recorded using a 5-point Likert scale.

2.5 Data Gathering Procedure

The university administration approved the questionnaire to meet ethical guidelines. The questionnaire was distributed in printed form to randomly selected students, ensuring informed consent was obtained from all respondents and clarifying the study's purpose, participant rights, and data confidentiality.

2.6 Data Analysis

The study utilized SPSS (Statistical Package for the Social Sciences) to analyze the data, employing descriptive and inferential statistical methods to address the research questions comprehensively. Descriptive statistics were used to summarize the overall distribution and trends of investment intentions among Filipino Gen Z respondents, providing a foundational understanding of their financial behaviors. To explore variations across different demographic groups, t-tests and ANOVA were applied, enabling the identification of statistically significant differences in investment intentions based on factors such as gender, age, and income. These tests helped highlight which subgroups might require more targeted financial education or policy interventions. Furthermore, correlation analysis was conducted to examine the relationships between the Theory of Planned Behavior (TPB) constructs—attitude, subjective norms, and perceived behavioral control—and investment intentions, shedding light on how strongly these psychological factors are linked to financial decision-making. Finally, regression analysis was utilized to determine the extent to which these TPB constructs predict investment intentions, quantifying their individual and collective influence. This approach validates the theoretical framework and identifies which components are most impactful in shaping the investment behaviors of Gen Z in the Philippine context.

2.7 Ethical Considerations

This research study adhered to the ethical principles outlined in the Declaration of Helsinki and followed the American Psychological Association (APA) Ethical Guidelines, emphasizing respect for persons, beneficence, and justice. Approval was granted by the university administration, ensuring institutional oversight and compliance with standard ethical protocols. Informed consent was obtained from all participants through signed ethical clearance forms, which clearly explained the study's purpose, procedures, potential risks, and the voluntary nature of participation. To ensure data confidentiality and participant anonymity, no personally identifiable information was collected, and responses were coded and stored securely in password-protected files accessible only to the researcher. All data were reported in aggregate form, preventing the identification of individual respondents and safeguarding their privacy throughout the research process.

3.0 Results and Discussion

This part presents the study's findings on the investment intentions of Generation Z students in Cateel, Davao Oriental, through the Theory of Planned Behavior (TPB) lens. The results are systematically analyzed to address the research objectives, including the assessment of investment intentions based on demographic factors such as age, gender, engagement in investment, and type of investment made. Additionally, statistical analyses determine significant differences among the identified factors and explore the relationships between attitudes, subjective norms, and perceived behavioral control in shaping investment intentions.

3.1 Level of Investment Intention

Table 1 indicates a high average rating of 3.89, suggesting that respondents generally perceive speculative market investments positively. Speculative markets—such as those involving stocks, cryptocurrencies, or forex—refer to investment environments where high risks are paired with the potential for substantial returns, often relying on market predictions rather than guaranteed outcomes. Among the items evaluated, participants rated "Understanding the speculative market makes us aware of options in the investment market" the highest at 4.07, underscoring the perceived educational value of engaging with such markets. This aligns with findings by Klana and Muttaqin (2025), who reported that Gen Z investors are increasingly influenced by social media and financial motivation when engaging with high-risk investments, and by Utami et al. (2025), who highlighted the role of financial knowledge and attitude in mediating investment behavior. Moreover, the study supports the insights of Sobaih and Elshaer (2023) and Malkan et al. (2022), who emphasize that financial literacy significantly shapes

investment decisions, particularly in markets that require a deeper understanding of risk and volatility. These results suggest that when paired with educational support, speculative investment exposure can enhance young investors' awareness and strategic decision-making in complex financial environments.

Table 1. *Level of Investment Intention in terms of Behavioral Outcome*

	Indicator	Mean	SD	Interpretation
1	Investment in a speculative market is a wise choice	3.75	0.76	High
2	Investing in a speculative market motivates me to save money	3.72	0.74	High
3	Investment helps to know more about the investment tools	4.01	0.79	High
4	Understanding the speculative market makes us aware of options in the investment market	4.07	0.79	High
	Aggregate Result	**3.89**	**0.56**	**High**

Table 2 shows a generally positive perception toward the benefits of investing, with a grand mean of 3.49, though responses reflect a mix of attitudes. The highest-rated belief, "Investing money makes me economically independent" (mean = 3.66), highlights financial independence as a key motivator for Gen Z investors. Additionally, the accessibility of online investment platforms received a mean score of 3.49, indicating that digital tools significantly encourage positive investment attitudes by making participation easier and more convenient. Conversely, the association between investing in stocks or cryptocurrency and intellectual status was weaker, with a mean score of 3.32, suggesting that respondents do not strongly equate speculative investing with higher social or intellectual standing. These findings suggest that while economic empowerment and ease of access drive Gen Z's interest in speculative markets, such as stocks and cryptocurrencies, there is less concern about social status. This aligns with prior research by Sobaih and Elshaer (2023), Malkan et al. (2022), and Klana and Muttaqin (2025), who emphasize the role of financial literacy and digital accessibility in shaping positive investment behaviors among young investors, underscoring the importance of both knowledge and platform convenience in fostering greater investment participation.

Table 2. *Level of Investment Intention in terms of Behavioral Belief*

	Indicator	Mean	SD	Interpretation
1	Investment in the Stock market, Forex Market, and Cryptocurrency makes me feel intelligent	3.32	0.70	Moderate
2	Investing money makes me economically independent	3.66	0.73	High
3	Investment in the Stock market, Forex Market, and Cryptocurrency is online, which is easy to operate and time-saving	3.49	0.78	High
	Aggregate Result	**3.49**	**0.58**	**High**

Table 3 shows that normative belief, with a grand mean of 2.82 (moderate), reflects a notable concern about speculative investments among Gen Z respondents. Family and peer influence emerged as significant factors, with perceptions of speculative markets as unsafe receiving ratings of 2.87 and 2.86, respectively. Additionally, concerns about setting a negative example for younger siblings (mean = 2.73) suggest that social accountability within close-knit circles may inhibit investment engagement. These findings indicate that while social pressure does not entirely deter participation in speculative markets, it poses a moderate barrier that influences decision-making. This is consistent with the findings of Utami et al. (2025), who highlighted that social influence impacts investment intention primarily when mediated by financial attitudes and literacy. Similarly, Pandurugan and Al Shammakhi (2024) found that subjective norms, such as peer approval, had a limited direct impact unless supported by financial knowledge. These insights affirm that normative concerns, though not overwhelmingly strong, still shape how young investors perceive and approach speculative investments.

Table 3. *Level of Investment Intention in terms of Normative Belief*

	Indicator	Mean	SD	Interpretation
1	My family members feel that investing in a speculative market is not a safe decision	2.87	0.76	Moderate
2	My friends feel that investing in a speculative market is not a safe decision	2.86	0.68	Moderate
3	My family members feel that I am setting a wrong example for my siblings by investing in a speculative market	2.73	0.81	Moderate
	Aggregate Result	**2.82**	**0.57**	**Moderate**

Table 4 shows that motivation to comply, with a grand mean of 3.75 (High), suggests that respondents highly consider social influences when making investment decisions. The strongest indicator, "I consider my family members' opinions before making any investment decision" (4.10), shows that family approval significantly impacts investment behavior. Friends' opinions (3.62) and the desire to be seen as conventional in investment

decisions (3.72) also play a role, demonstrating a need for social validation. Additionally, social media's role as an educational tool (3.54) highlights the influence of digital platforms in shaping investment behavior. While respondents seek independent financial growth, they still value social and familial approval. As discussed by Sipangkar and Wijaya (2020) and Dogra et al. (2022), digital platforms influence young investors significantly, often dictating their investment choices. Consistent with the studies by Nugraha and Rahadi (2021) and Hamidah and Putra (2024), our findings suggest that a deep understanding of market mechanisms enhances investment decisions.

Table 4. *Level of Investment Intention in terms of Motivation to Comply*

	Indicator	Mean	SD	Interpretation
1	I consider my family members' opinions before making any decision on investment	4.10	0.83	High
2	It is important to listen to friends' opinions, as it helps me to maintain the image of a good friend	3.62	0.90	High
3	I want to be viewed as conventional in decisions regarding investment	3.72	0.68	High
4	Social media groups are very educational and encouraging to invest in the Stock market, Forex Market, and Cryptocurrency	3.54	0.81	High
	Aggregate Result	**3.75**	**0.57**	**High**

Table 5 indicates a high level of perceived behavioral control (grand mean = 3.97), suggesting that respondents feel confident making informed investment decisions. The top-rated item, "I always try to get information from various sources…" reflects proactive financial behavior, while responses to items on evaluating returns and avoiding uninformed decisions show risk awareness.

Table 5. *Level of Investment Intention in terms of Perceived Power*

	Indicator	Mean	SD	Interpretation
1	I always try to get information from various sources to make an learned decision in investing money	4.16	0.74	High
2	My decision to invest is based on the past and future financial returns in the market	3.81	0.82	High
3	I never blindly get into any investment without any knowledge of the instrument	3.94	0.78	High
	Aggregate Result	**3.97**	**0.62**	**High**

Although actual investment actions were not measured, these high ratings imply that students are already engaging in preparatory behaviors—such as researching investment options and building financial knowledge—which reflect the early stages of investment activity. This aligns with the Theory of Planned Behavior, where strong perceived behavioral control can influence intention and action. Consistent with local studies (Gumasing & Niro, 2023), the findings suggest that financial confidence and literacy enable Filipino Gen Z students to move from intention toward concrete investment readiness.

In summary, the data reveal respondents' overall positive attitude towards speculative investment, driven by self-efficacy, access to information, and motivation to conform to social norms. However, some social doubts persist, particularly regarding safety, as reflected in the moderate normative belief scores.

3.3 Relationship Between Investment Intentions and Profile

The ANOVA results in Table 6 indicate that among all the factors tested, only Perceived Behavioral Control—measured through financial literacy—showed a significant difference between age groups. This means that individuals' confidence and ability to manage investments are influenced by their age, with older members of Gen Z possibly feeling more equipped to make informed financial decisions. This finding aligns with Sobaih and Elshaer (2023) and Malkan et al. (2022), who emphasized financial literacy as a key driver of investment behavior. It also supports the work of Al-Faryan and Ansari (2023) and DeVries (2016), who found that perceived behavioral control strongly influences one's intention to invest. Moreover, local research by Gumasing and Niro (2023) affirms that Filipino Gen Z investors' decisions are significantly shaped by their confidence and knowledge, particularly when navigating the complexities of digital and speculative markets. This underscores the critical role of targeted financial education in enhancing perceived behavioral control across age brackets within the Gen Z population.

Table 6. *Differences in investment intentions in terms of Age*

Factors		Sum of Squares	Df	Mean Square	F	p	Interpretation
Attitude (Behavioral Outcome)	Between Groups	0.01	2	0.00	0.02	.980	No signficant difference
	Within Groups	60.69	188	0.32			
	Total	**60.70**	**190**				
Attitude (Behavioral Belief)	Between Groups	0.07	2	0.03	0.11	.895	No signficant difference
	Within Groups	65.66	188	0.34			
	Total	**65.73**	**190**				
Subjective Norm (Normative Belief)	Between Groups	1.27	2	0.63	1.94	.146	No signficant difference
	Within Groups	61.77	188	0.32			
	Total	**63.05**	**190**				
Subjective Norm (Motivation to Comply)	Between Groups	0.52	2	0.26	0.78	.458	No signficant difference
	Within Groups	63.22	188	0.33			
	Total	**63.74**	**190**				
Perceived Behavioral Control (Perceived Power / Financial Literacy)	Between Groups	3.60	2	1.80	4.75	.010	Has significant difference
	Within Groups	71.23	188	0.37			
	Total	**74.83**	**190**				
Overall Behavior	Between Groups	0.19	2	0.09	0.66	.514	No signficant difference
	Within Groups	27.44	188	0.14			
	Total	**27.64**	**190**				

The post hoc results in Table 7 reveal that respondents aged 20–24 exhibit significantly higher financial confidence and literacy than those under 20. This supports earlier research suggesting that financial awareness increases with age and experience, particularly during early adulthood when individuals begin handling their finances and encountering real-world financial decisions (Sobaih & Elshaer, 2023; Gumasing & Niro, 2023). This development aligns with findings by Utami et al. (2025), who noted that financial knowledge significantly improves investment attitudes among university-age Gen Z. Interestingly, no significant differences were observed between the 25-and-above group and the younger cohorts, indicating a leveling-off effect in financial confidence after the early twenties. This pattern suggests that foundational financial growth occurs early, and further increases may depend more on experience and formal financial education rather than age alone (Malkan et al., 2022).

Table 7. *Post Hoc Results in terms of Age*

Dependent Variable			M_{diff}	SE	p	95% Confidence Interval	
						Lower Bound	Upper Bound
Perceived Behavioral Control (Perceived Power / Financial Literacy)	Below 20	20-24	-0.25	0.09	.021	-0.474	-0.032
		25 and above	0.37	0.36	.564	-0.487	1.230
	20-24	Below 20	0.25	0.09	.021	0.032	0.474
		25 and above	0.62	0.36	.195	-0.225	1.474
	25 and above	Below 20	-0.37	0.36	.564	-1.230	0.487
		20-24	-0.62	0.36	.195	-1.474	0.225

Table 8 shows that there are no statistically significant gender differences across all measured factors, including Attitude (Behavioral Outcome and Behavioral Belief), Subjective Norms (Normative Belief and Motivation to Comply), Perceived Behavioral Control (Financial Literacy), and Overall Investment Behavior. All p-values were above 0.05, suggesting that responses were consistent regardless of gender. This result aligns with studies by

Sobaih and Elshaer (2023) and Malkan et al. (2022), who emphasized financial literacy over gender in shaping investment behaviors. Similarly, Vuk et al. (2017) and Pizzetti et al. (2021) highlighted the importance of subjective norms in investment decisions, which this study also found consistent across genders. Perceived behavioral control, a key element in the Theory of Planned Behavior, remains a significant predictor of investment intentions regardless of gender, echoing findings by Al-Faryan and Ansari (2023) and DeVries (2016).

Table 8. *Differences in investment intentions in terms of Gender*

Factors		Sum of Squares	Df	Mean Square	F	p	Interpretation
Attitude (Behavioral Outcome)	Between Groups	0.84	3	0.28	0.87	.453	No significant difference
	Within Groups	59.86	187	0.32			
	Total	60.70	190				
Attitude (Behavioral Belief)	Between Groups	0.68	3	0.23	0.66	.577	No significant difference
	Within Groups	65.04	187	0.34			
	Total	65.73	190				
Subjective Norm (Normative Belief)	Between Groups	2.57	3	0.85	2.65	.050	No significant difference
	Within Groups	60.47	187	0.32			
	Total	63.05	190				
Subjective Norm (Motivation to Comply)	Between Groups	0.80	3	0.27	0.80	.495	No significant difference
	Within Groups	62.94	187	0.33			
	Total	63.74	190				
Perceived Behavioral Control (Perceived Power / Financial Literacy)	Between Groups	1.03	3	0.34	0.87	.454	No significant difference
	Within Groups	73.79	187	0.39			
	Total	74.83	190				
Overall Behavior	Between Groups	0.21	3	0.07	0.49	.684	No significant difference
	Within Groups	27.42	187	0.14			
	Total	27.64	190				

Although Normative Belief yielded a borderline p-value of 0.050, it is still not statistically significant, implying that social influence slightly varies but not enough to form firm conclusions about gender-based differences. Locally, Gumasing and Niro (2023) found that Filipino Gen Z investment behavior is driven more by knowledge, digital accessibility, and risk tolerance than by gender, reinforcing gender neutrality in investment contexts. This also supports Nugraha and Rahadi's (2021) and Hamidah and Putra's (2024) conclusions, who argue that a deeper understanding of financial systems and tools enhances decision-making more than demographic factors do. The data confirms that gender does not significantly shape investment-related attitudes or behaviors in this study's context.

Table 9. *Differences in investment intentions in terms of Year Level*

Factors		Sum of Squares	Df	Mean Square	F	p	Interpretation
Attitude (Behavioral Outcome)	Between Groups	0.53	2	0.26	0.83	.435	No signficant difference
	Within Groups	60.16	188	0.32			
	Total	60.70	190				
Attitude (Behavioral Belief)	Between Groups	0.81	2	0.40	1.18	.309	No signficant difference
	Within Groups	64.92	188	0.34			
	Total	65.73	190				
Subjective Norm (Normative Belief)	Between Groups	1.88	2	0.94	2.89	.058	No signficant difference
	Within Groups	61.16	188	0.32			
	Total	63.05	190				
Subjective Norm (Motivation to Comply)	Between Groups	1.25	2	0.62	1.88	.155	No signficant difference
	Within Groups	62.49	188	0.33			
	Total	63.749	190				
Perceived Behavioral Control (Perceived Power / Financial Literacy)	Between Groups	5.78	2	2.89	7.86	.001	Has significant difference
	Within Groups	69.05	188	0.36			
	Total	74.83	190				
Overall Behavior	Between Groups	0.85	2	0.42	3.00	.052	No signficant difference
	Within Groups	26.78	188	0.14			
	Total	27.64	190				

The ANOVA results in Table 9 show that only Perceived Behavioral Control (Financial Literacy) yielded a statistically significant difference between groups based on year level ($p = 0.001$), indicating that perceived financial knowledge varies across educational stages. Other factors—Attitude, Subjective Norms, and Overall

Investment Behavior—showed no significant differences ($p > 0.05$), though Normative Belief ($p = 0.058$) and Overall Behavior ($p = 0.052$) were near the threshold, suggesting potential trends. These results are consistent with Sobaih and Elshaer (2023) and Malkan et al. (2022), who highlighted financial literacy's central role in investment decisions. They also align with Vuk et al. (2017) and Pizzetti et al. (2021) on the subtle influence of subjective norms. Notably, the significance of perceived behavioral control supports conclusions by Al-Faryan and Ansari (2023) and DeVries (2016). It echoes Filipino findings by Gumasing and Niro (2023), who emphasized that financial knowledge and risk perception vary by age and education, influencing investment confidence among Gen Z.

The post hoc results in Table 10 highlight that 2nd-year students report significantly higher perceived financial literacy than both 1st-year ($p = 0.000$) and 3rd-year students ($p = 0.025$). In contrast, the difference between 1st and 3rd-year students is not significant ($p = 0.485$). This suggests that confidence in financial decision-making may peak during the second year, likely due to increased academic exposure or practical experiences, then slightly plateaus. These findings align with Sobaih and Elshaer (2023) and Malkan et al. (2022), who emphasize the formative role of financial literacy in investment behaviors. They also support Al-Faryan and Ansari (2023) and DeVries (2016) on the influence of perceived behavioral control in investment intentions, and resonate with Filipino research by Gumasing and Niro (2023), who observed similar patterns of confidence linked to academic progression among Gen Z investors.

Table 10. *Differences in investment intentions in terms of Year Level*

Dependent Variable			M_{diff}	SE	p	95% Confidence Interval	
						Lower Bound	Upper Bound
Perceived Behavioral Control (Perceived Power / Financial Literacy)	1st year	2nd year	-0.42	0.10	.000	-0.676	-0.169
		3rd year	-0.12	0.10	.485	-0.367	0.127
	2nd year	1st year	0.42	0.10	.000	0.169	0.676
		3rd year	0.30	0.11	.025	0.030	0.574
	3rd year	1st year	0.12	0.10	.485	-0.127	0.367
		2nd year	-0.30	0.11	.025	-0.574	-0.030

Table 11 shows significant differences in Behavioral Belief ($p = 0.001$) and Overall Behavior ($p = 0.009$). This means that those engaged in investments have stronger positive beliefs about investing and show higher investment-related behavior. Other factors—such as attitudes, social influences, and perceived financial control—do not differ significantly, suggesting these are generally similar between both groups.

Table 11. *Differences in investment intentions in terms of Engagement in Investment*

Factors	t-test for Equality of Means						
	t	df	p	M_{diff}	SE_{diff}	95% Confidence Interval of the Difference	
						Lower	Upper
Attitude (Behavioral Outcome)	-1.22	189	.221	-0.49	0.40	-1.284	0.299
Attitude (Behavioral Belief)	-3.32	189	.001	-1.35	0.40	-2.159	-0.552
Subjective Norm (Normative Belief)	-1.68	189	.094	-0.68	0.40	-1.491	0.117
Subjective Norm (Motivation to Comply)	-1.54	189	.124	-0.63	0.41	-1.444	0.175
Perceived Behavioral Control (Perceived Power / Financial Literacy)	-0.82	189	.412	-0.36	0.44	-1.248	0.514
Overall Behavior	**-2.65**	**189**	**.009**	**-0.70**	**0.26**	**-1.234**	**-0.181**

Relationship between attitude, subjective norms, and perceived behavioral control on investment intentions Aligning with Vuk et al. (2017) and Pizzetti et al. (2021), subjective norms play a crucial role in investment behaviors, particularly among Gen Z. This finding underscores the importance of perceived behavioral control, as detailed by Al-Faryan and Ansari (2023) and DeVries (2016), in influencing investment intentions.

3.3 Relationship between Attitude, Subjective Norms, and Perceived Behavioral Control on Investment Intentions

The correlation analysis in Table 12 shows that several factors moderately and positively relate to investment intention, with Perceived Behavioral Control ($r = 0.641$) and Overall Behavior ($r = 0.613$) showing the strongest associations. This indicates that higher financial confidence and active engagement in investment activities

significantly increase the likelihood of intending to invest. Other moderately correlated factors include Attitude (Behavioral Outcome) at 0.462, Motivation to Comply at 0.408, and Attitude (Behavioral Belief) at 0.368, highlighting the roles of positive investment views and social encouragement. In contrast, Normative Belief shows a negligible and non-significant correlation ($r = 0.090$, $p = 0.213$), suggesting that social pressure has minimal influence on investment intentions. These results reinforce the emphasis of Al-Faryan and Ansari (2023) and DeVries (2016) on the pivotal role of perceived behavioral control. Consistent with local findings by Gumasing and Niro (2023), the data suggest that internal factors—such as confidence, behavior, and attitudes—are more influential than external norms in shaping Filipino Gen Z investment intentions.

Table 12. *Correlation between Attitude, Subjective Norms, and Perceived Behavioral Control on Investment Intentions*

Factors		Intention to Invest	Degree
Attitude (Behavioral Outcome)	Pearson Correlation	.46	
	Sig. (2-tailed)	<.001	Moderate
	N	191	
Attitude (Behavioral Belief)	Pearson Correlation	.36	
	Sig. (2-tailed)	<.001	Moderate
	N	191	
Subjective Norm (Normative Belief)	Pearson Correlation	.09	
	Sig. (2-tailed)	.213	Negligible
	N	191	
Subjective Norm (Motivation to Comply)	Pearson Correlation	.40	
	Sig. (2-tailed)	<.001	Moderate
	N	191	
Perceived Behavioral Control (Perceived Power / Financial Literacy)	Pearson Correlation	.64	
	Sig. (2-tailed)	<.001	Moderate
	N	191	
Overall Behavior	Pearson Correlation	.61	
	Sig. (2-tailed)	<.001	Moderate
	N	191	

The results show that Perceived Behavioral Control (Financial Literacy) is the most significant predictor of investment intention, with a standardized beta of 0.502 and a p-value of 0.000. This indicates that individuals with greater financial confidence and knowledge are much more likely to intend to invest. This finding is consistent with Sobaih and Elshaer (2023) and Malkan et al. (2022), who emphasize the crucial role of financial literacy in influencing investment behavior, and supports the theoretical insights of Al-Faryan and Ansari (2023) and DeVries (2016) on the power of perceived behavioral control. Attitude (Behavioral Outcome) also emerged as a significant factor ($p = 0.010$), suggesting that positive views about investment outcomes encourage intention to invest. In contrast, Attitude (Behavioral Belief), Normative Belief, and Motivation to Comply were not statistically significant, implying that individual beliefs and social pressures have limited impact when internal confidence and practical outcome expectations are accounted for. These findings align with the local study by Gumasing and Niro (2023), which emphasized that Filipino Gen Z investors are influenced more by their financial knowledge, perceived risk, and practical benefits than by external social norms. Similar to Klana and Muttaqin (2025) and Utami et al. (2025), this study reinforces that internal drivers, such as financial literacy and positive investment attitudes, are key in shaping Gen Z's investment intentions, further validated by Filipino-specific and broader Southeast Asian contexts.

Table 13. *Predictors of Investment Intentions*

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	SE	Beta		
(Constant)	0.22	0.33		0.68	.496
Attitude (Behavioral Outcome)	0.21	0.08	0.18	2.61	.010
Attitude (Behavioral Belief)	0.01	0.07	0.01	0.20	.836
Subjective Norm (Normative Belief)	0.08	0.05	0.08	1.48	.139
Subjective Norm (Motivation to Comply)	0.13	0.06	0.12	1.95	.052
Perceived Behavioral Control (Perceived Power / Financial Literacy)	0.50	0.06	0.50	8.05	<.001

4.0 Conclusion

This study has elucidated the investment intentions of Generation Z in the Philippines through the Theory of Planned Behavior, underscoring the significant roles of financial literacy, subjective norms, and perceived behavioral control. The findings demonstrate that higher levels of financial literacy are positively associated with investment intentions, indicating that well-informed individuals are more confident in engaging with financial markets. However, while financial literacy emerged as a strong predictor, this influence should be interpreted cautiously, as other unexamined factors—such as emotional readiness, access to resources, or previous financial experiences—may also play crucial roles in shaping investment behavior. Additionally, the study reveals the dual impact of digital platforms: they enhance accessibility to investment tools while exposing young investors to misinformation and speculative trends. Subjective norms, particularly from peers and social media, were found to influence investment decisions, highlighting the social dynamics that shape financial behaviors among Gen Z. Despite these insights into motivational drivers, future research should also explore the obstacles or barriers—such as fear of loss, lack of mentorship, or institutional trust—that may prevent young Filipinos from translating intention into action. A balanced understanding of drivers and hindrances will provide a more comprehensive framework for supporting Gen Z in becoming confident and responsible investors.

5.0 Contributions of Authors

The sole author, Jilla Mae D. Susada, undertook all tasks in this study. These included conceptualizing and designing the study, collecting data, analyzing it, interpreting the results, and writing and revising the manuscript. Artificial intelligence tools were used to support language enhancement and idea organization. The author critically reviewed and edited all outputs generated with AI assistance to ensure academic integrity and originality.

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7.0 Conflict of Interests

There are no conflicts of interest to declare. The sole author has conducted the research independently, with no influence from third parties that could have affected the outcomes or interpretations presented in this study.

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Predicting Japanese Students' English Communication Apprehension through Learning Motivation and Willingness to Communicate

Madel M. Catre
University of the Immaculate Conception, Davao City, Philippines

Author Email: catremadel@gmail.com

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Abstract. Japanese students exhibit the highest levels of communication apprehension compared to other Asian countries, struggling with the worry and fear of using English. This quantitative descriptive-correlational study investigated how communication apprehension when speaking English is influenced by students' English learning motivation and willingness to communicate. Conducted in two public high schools in Ehime Prefecture involving 230 students, the research employed purposive-quota sampling and utilized three adapted questionnaires. The findings revealed that students exhibit moderate to high motivation to learn English, driven mainly by a desire to engage with the international community. They also demonstrated different willingness to communicate in the target language, which was which was affected mainly by the level of familiarity with other participants in the conversation. They show moderate communication apprehension when speaking in English, exhibiting high apprehension in public speaking settings. Further, a significant negative correlation was found between willingness to communicate and communication apprehension. This indicates increased willingness to communicate is associated with reduced English speaking apprehension. At the same time, English learning motivation alone does not significantly impact apprehension. The study concludes that fostering willingness to communicate is crucial for reducing communication apprehension, suggesting further research to explore additional variables impacting communication apprehension.

Keywords: Communication apprehension; English learning motivation; Willingness to communicate.

1.0 Introduction

The recent changes in the Japanese educational scheme of English education resulted in an ongoing movement of English learning and teaching geared towards more communicative-centered approaches (Ministry of Education, Culture, Sports, Science and Technology, 2014). This means that elementary, secondary, and higher education teachers currently implement more communication-oriented coursework involving increased classroom speaking activities. This is a massive leap from traditional classrooms utilizing rote memory and parroting activities, focused on test performances, to higher education (Masutani, 2021). Unfortunately, Japanese students struggle with an aversion to the unfamiliarity of English and other negative dispositions related to teaching it (Sato, 2020). This expected or current level of worry and fear of communication in the English language with others is considered communication apprehension (Hussain et al., 2021).

With reports showing the highest levels of communication apprehension among Japanese students compared to other countries in Asia (Wang et al., 2024), students continue to struggle with an aversion to the unfamiliarity of the English language and other negative dispositions related to teaching it (Sato, 2020). More than 50 percent of Japanese English language learners exhibit a lack of confidence and apprehension in voluntary oral presentations (Toyoda et al., 2021). Those with higher levels of apprehension would consider reticence at the slightest uncertainty in the correctness of their utterance, ultimately leading to isolation from actively participating peers and resorting to guessing unfamiliar linguistic forms (Alnuzaili & Uddin, 2020). In effect, little to no language use takes place in the classroom.

Numerous studies have affirmed the relationship between language learning motivations and communication apprehension. Wang and Guan (2020) revealed that communication apprehension is conversely related to English learning motivation, implying that learners who are highly motivated to learn English are less likely to be nervous in actual communicative situations. Additionally, quantitative data results from 173 Chinese English language students attested to the link between motivation and apprehension, suggesting future research that explores the contributory factors leading to the latter (Luo et al., 2020). Another study by Aqeel et al. (2021) also showed that motivation levels influenced 200 graduate students' communication apprehension in Pakistan, along with other variables such as the manner of feedback, utilization of language teaching strategies, and class peers.

Further, various studies revealed the linkages between communication apprehension and examined learners' willingness to communicate. A study among Chinese students shows that oral communication apprehension concerning correct second language expression, public speaking, and speaking proficiency stunted respondents' willingness to communicate (Liu, 2018). In Belgium, Zhou et al. (2020) explored the effect of communication apprehension on second language competence and willingness to communicate among 129 study-abroad Chinese students. Accordingly, communication apprehension regulated the effect between willingness to communicate and reading, writing, and second language proficiency. Specifically, communication apprehension negatively moderates willingness to communicate and second language competence.

However, these studies have rarely taken these variables together to examine communication apprehension in English-speaking individuals critically. Furthermore, as most studies utilized data from participants or respondents from higher education, there is still much research to be done for participants at the basic education level. As such, this study undertook these variables conjointly and gathered information among senior high school students. Specifically, it described their English language learning motivations, accounted for their willingness to communicate, and investigated how these variables relate to and predict communication apprehension when speaking English among Japanese students.

2.0 Methodology

2.1 Research Design

The study utilized the descriptive-correlational research design. Guthrie (2023) defines it as a non-experimental quantitative design in which the researcher applies correlational statistics to measure and describe the degree of association among variables or sets of scores. It examined the degree of association between English learning motivation, willingness to communicate, and communication apprehension among respondents. It also determined the significant influence of the independent variables, English learning motivation and willingness to communicate, on the dependent variable, communication apprehension, when speaking English using a multiple regression analysis.

2.2 Research Locale

The study was carried out in Niihama City, Ehime Prefecture, Japan. The research area included two public high schools under the Ehime Prefectural Board of Education. These academic institutions followed the same Course of Study approved by the Board of Education, used the same references by the Ministry of Education, Science, and Technology, and utilized the same communicative teaching strategies in the classroom, which focused on oral presentations and collaborative dialogue in English. These high schools were chosen because their English classrooms allowed their respondents to provide significant data for the study.

2.3 Research Participants
The study used purposeful-quota sampling to gather data from 230 respondents—163 students from School A and 67 from School B. Only General English Communication classes that utilized communicative activities such as oral presentations and collaborative dialogue were included in the study. Students were chosen regardless of their year level and course strands.

2.4 Research Instrument
The study adapted and modified three questionnaires to align with its objectives - the English Learning Motivation questionnaire adapted from Gonzales (2016), the Willingness to Communicate questionnaire adapted from McCroskey (1992), and the Communication Apprehension when Speaking English questionnaire adapted from McCroskey (1978). The instruments were chosen to assess students' motivations, predisposition to initiate communication in another language, and communication apprehension across various settings. After pilot testing, all questionnaires demonstrated high reliability (Cronbach's alpha > 0.95).

2.5 Data Gathering Procedure
The researcher followed a series of steps to collect the necessary data for the study. The data gathering procedure commenced with obtaining a Compliance Certificate for Research Ethics Protocol Review from the University of Immaculate Conception's Research Ethics Review Committee. Following that, clearance from the institution's Dean of the Graduate School was obtained to undertake the study. After receiving authorization, the researcher submitted letters to the school principals, requesting formal permission to conduct the study in the targeted senior high school within Ehime Prefecture. Once the approval was granted, the researcher administered the questionnaires following the policy of the research locales regarding their underage students' data privacy and protection. The data gathered was tabulated, analyzed, and interpreted as part of the research.

2.6 Ethical Considerations
To ensure ethical conduct, the researcher submitted the proposed study to the UIC Research Ethics Committee (UIC REC) for assessment and approval. The researcher clarified that participation in the survey was entirely voluntary, offering a general outline of the study's background and objectives. Supervising teachers, along with the researcher, ensured adherence to the prefectural school policy, which protected respondents from all forms of harm during the research and prohibited the provision of personal information outside official school documents, overseeing ethical data collection during the survey.

3.0 Results and Discussion
3.1 English Learning Motivation
Table 1 pertains to the level of English learning motivation among Japanese students. The overall mean score for the English learning motivation of Japanese high school students is 3.39, described as moderate and sometimes manifested. Among the six indicators of English learning motivation, the desire to become a global citizen has the highest category mean of 3.84. In contrast, the desire for self-satisfaction in learning has the lowest category mean of 2.88.

The findings suggest that Japanese high school students are moderately motivated to learn English, particularly inclined to global citizenship. Their high motivation to become a global citizen (M=3.84) indicates that students acknowledge the importance of the English language, which aligns with the efforts to improve English education in Japan. On the other hand, the low mean for self-satisfaction in learning (M=2.88) suggests Japanese students may be affected by other factors outside of personal enjoyment or hobbies. This information presents an opportunity for English teachers to integrate the language and introduce students to an audience through community and school-led activities, such as local tours or forums, to enhance their sense of self-satisfaction in learning and strengthen their motivation to become global citizens.

The results affirm those of Saragih and Subekti (2024), who note that English learning motivation is personal and unique to each student, shaped by their needs and personalities. The variability in the category means supports this notion, demonstrating that motivation is not uniform across all aspects of English learning. Similarly, Yung (2023) emphasizes that motivation in English learning often manifests differently among learners, consistent with our findings showing varying levels of motivation across different indicators.

Table 1. *Level of English Learning Motivation among Japanese Students*

Indicators	Mean	SD	Description
Desire for Career and Economic Enhancement			
1. I want to improve my chances of getting a good job.	3.40	1.02	High
2. I want to get a high paying job.	3.30	1.02	Moderate
3. English proficiency will have financial benefits for me.	3.62	1.01	High
4. …of training in my future job.	3.73	1.08	High
5. I have better job opportunities after graduation.	3.95	1.02	High
6. English gives me more opportunities after graduation.	3.81	1.04	High
7. English gives me an edge over other applicants for a job.	3.83	1.03	High
8. English is another way of enriching me for my future career.	3.86	1.01	High
Category Mean	**3.69**	**0.82**	**High**
Desire to Become a Global Citizen			
9. English allows me to understand other cultures.	3.87	1.05	High
10. English is one way of learning another culture.	3.92	0.99	High
11. English broadens my view of other cultures.	3.87	1.03	High
12. I can appreciate foreign people more if I know their language.	3.84	1.03	High
13. English will allow me to understand other cultures.	3.90	0.99	High
14. English is important for me to understand other cultures.	3.89	1.01	High
15. English gives me self-confidence to understand other cultures.	3.73	0.99	High
16. I want to be more educated about other cultures.	3.71	1.04	High
Category Mean	**3.84**	**0.86**	**High**
Desire to Communicate Affiliate with Foreigners			
17. I want to communicate with foreigners in their native language.	3.69	1.09	High
18. I want to speak to foreigners using their own language.	3.77	1.09	High
19. It is easier for me to relate with foreigners.	3.96	1.03	High
20. I am fascinated when I hear a foreigner speaking	3.77	1.16	High
21. I want to go to the country where it is spoken.	3.47	1.29	High
22. It is useful when I travel abroad.	3.86	1.16	High
Category Mean	**3.75**	**0.90**	**High**
Desire for Self-Satisfaction in Learning			
23. I enjoy learning English when my friend gives me some English books.	2.70	1.04	Moderate
24. I enjoy browsing websites that deal with English on the Internet.	2.74	1.10	Moderate
25. I like learning English because I have friends who have enjoyed studying it.	2.80	1.12	Moderate
26. I enjoy watching movies on TVs and DVD especially if they are in English.	2.87	1.18	Moderate
27. My classmates are having a good time learning with me.	3.14	1.05	Moderate
28. I enjoy learning English in order to pass an entrance examination.	3.03	1.07	Moderate
Category Mean	**2.88**	**0.88**	**Moderate**
Self-Efficacy			
29. I can relate well in my English class.	3.23	1.06	Moderate
30. I enjoy learning English because I feel I am good at it.	2.66	1.20	Moderate
31. I feel comfortable speaking in my English classes.	2.77	1.14	Moderate
32. I enjoy learning English even if it is difficult.	3.41	1.10	High
33. I am delighted when my teacher notices how I am progressing in my English class.	3.36	1.16	Moderate
34. I believe I have the ability in learning it.	2.96	1.23	Moderate
Category Mean	**3.07**	**0.90**	**Moderate**
Desire to be Integrated with Other Cultures			
35. I want to live in a foreign land.	2.65	1.39	Moderate
36. I want to be able to interact with foreigners well.	3.26	1.31	Moderate
37. I am also interested in foreign cultures.	3.57	1.20	High
38. English will prepare me to live in foreign country.	3.33	1.23	Moderate
39. I want to live with another culture.	2.72	1.39	Moderate
40. I want to be able to socialize with foreigners.	3.31	1.22	Moderate
Category Mean	**3.14**	**1.03**	**Moderate**
Overall Mean	**3.39**	**0.75**	**Moderate**

3.2 Willingness to Communicate

The information in Table 2 reveals the students' willingness to communicate in English. The overall mean score for willingness to communicate in English among Japanese high school students is 3.01, which is described as moderate and is interpreted as sometimes observed. Among the seven indicators, the willingness to communicate with friends obtained the highest mean score at 3.42, and with strangers, the lowest mean score at 2.50. This indicates that familiarity and comfort are crucial to students' readiness to converse in English.

Table 2. *Level of Willingness to Communicate among Japanese Students*

Indicators	Mean	SD	Description
Context-Group			
1. Talk in a small group of strangers.	2.70	1.17	Moderate
2. Talk in a small group of acquaintances.	2.96	1.21	Moderate
3. Talk in a small group of friends.	3.43	1.19	High
Category Mean	**3.03**	**0.97**	**Moderate**
Context-Meeting			
4. Talk in a large meeting of friends.	3.34	1.26	Moderate
5. Talk in a large meeting of acquaintances.	3.07	1.28	Moderate
6. Talk in a large meeting of strangers.	2.47	1.23	Low
Category Mean	**2.96**	**1.00**	**Moderate**
Context-Interpersonal Conversation			
7. Talk with an acquaintance while standing in line.	3.10	1.25	Moderate
8. Talk with a friend while standing in line.	3.38	1.25	Moderate
9. Talk with a stranger while standing in line.	2.27	1.17	Low
Category Mean	**2.92**	**0.99**	**Moderate**
Context-Public Speaking			
10. Present a talk to a group of friends.	2.54	1.18	Low
11. Present a talk to a group of acquaintances.	3.53	1.25	High
12. Present a talk to a group of strangers.	3.33	1.28	Moderate
Category Mean	**3.13**	**0.97**	**Moderate**
Receiver-Stranger			
13. Present a talk to a group of strangers.	2.54	1.18	Low
14. Talk in a small group of strangers.	2.70	1.17	Moderate
15. Talk with a stranger while standing in line.	2.27	1.17	Low
16. Talk in a large meeting of strangers.	2.47	1.23	Low
Category Mean	**2.50**	**1.05**	**Low**
Receiver-Acquaintance			
17. Talk with an acquaintance while standing in line.	3.10	1.25	Moderate
18. Talk in a large meeting of acquaintances.	3.07	1.28	Moderate
19. Talk in a small group of acquaintances.	2.96	1.20	Moderate
20. Present a talk to a group of acquaintances.	3.33	1.28	Moderate
Category Mean	**3.11**	**1.03**	**Moderate**
Receiver-Friends			
21. Talk in a large meeting with friends.	3.34	1.26	Moderate
22. Talk with a friend while standing in line.	3.38	1.25	Moderate
23. Present a talk to a group of friends.	3.53	1.25	High
24. Talk in a small group of friends.	3.43	1.19	High
Category Mean	**3.42**	**1.11**	**High**
Overall Mean	**3.01**	**0.91**	**Moderate**

The findings align with previous research on willingness to communicate by Lee et al. (2019), Kim et al. (2022), and Ito (2022), whose studies reveal that familiarity and trust are factors that contribute to willingness to communicate in various contexts. Similarly, Waluyo (2020) noted that students showed increased WTC in situations allowing for preparation and structured turn-taking, which explains the preference to talk with friends where both are predictable. As such, schools can consider conducting regular English conversation practices through their resource pool. By engaging with unfamiliar native or non-native speakers, students can gradually increase their willingness to communicate in English with anyone, helping them overcome the initial hesitation of speaking with unfamiliar participants.

3.3 Communication Apprehension when Speaking English

The information in Table 3 shows the students' willingness to communicate in English. The overall mean score for communication apprehension when speaking English among Japanese high school students is 3.36, which is described as moderate and interpreted as sometimes manifested. Among the four indicators, public speaking showed the highest mean score (M=3.73) and group discussion the lowest (M=3.08). This indicates that students experience higher apprehension when speaking to the public than when being part of a group discussion.

These findings are supported by Endahati (2023) and Abdul Majid et al. (2022), who noted that speaking in English causes the most anxiety among students when addressing larger audiences. This is consistent with the general trend of public speaking as a potent stressor in communication contexts. Rahman and Pinky (2024), whose results state that group discussion causes the lowest levels of communication apprehension among students, support a

pattern of students' ease of communication in smaller, more collaborative settings compared to formal, highly organized settings. This presents an opportunity for teachers to provide more opportunities for students to practice English communication through peer conversations, group discussions, and formal presentations to build greater language confidence.

Table 3. *Level of Communication Apprehension when Speaking English among Japanese Students*

Indicators	Mean	SD	Description
Interpersonal			
1. While conversing with a new acquaintance using English, I feel very nervous.	3.70	1.25	High
2. I am nervous to speak up in conversations with my teachers using the English language.	3.47	1.34	High
3. Ordinarily, I am agitated in conversations with my classmates using English.	2.96	1.29	Moderate
4. Ordinarily, I am very anxious in conversations with my friends using English.	3.15	1.30	Moderate
5. I feel agitated while conversing with a new acquaintance online using English.	3.43	1.35	High
6. I am afraid to speak up in conversations in class using the English language.	3.08	1.28	Moderate
Category Mean	**3.30**	**1.13**	**Moderate**
Group Discussion			
7. I dislike participating in group discussions using the English language.	2.86	1.23	Moderate
8. Generally, I am uncomfortable participating in group discussions using English.	2.70	1.19	Moderate
9. I am tense and nervous while participating in classroom group discussions using English.	3.23	1.27	Moderate
10. I dislike getting involved in group discussions using the English language.	2.86	1.27	Moderate
11. Engaging in a group discussion with new people using the English language makes me tense and nervous.	3.45	1.31	High
12. I am tense and anxious while participating in online group discussions using English.	3.36	1.28	Moderate
Category Mean	**3.08**	**1.06**	**Moderate**
Meeting			
13. Generally, I am nervous when I have to participate in a meeting using the English language.	3.45	1.22	High
14. Usually, I am uncomfortable when I have to participate in a meeting using the English language.	2.97	1.24	Moderate
15. I am agitated and anxious when called upon to express an opinion at a meeting using English.	3.68	1.19	High
16. I am afraid to express myself at meetings using the English language.	3.37	1.25	Moderate
17. Communicating at meetings using the English language usually makes me uncomfortable.	2.90	1.22	Moderate
18. I am agitated when answering questions at a meeting using the English language.	3.70	1.25	High
Category Mean	**3.35**	**1.01**	**Moderate**
Public Speaking			
19. I am afraid of giving a speech in English.	3.75	1.25	High
20. Certain parts of my body feel tense and rigid while speaking in a big crowd using the English language.	3.73	1.24	High
21. I feel tense while speaking in the classroom using the English language.	3.94	1.18	High
22. My thoughts become confused and jumbled when I am giving a speech using the English language.	3.77	1.23	High
23. I face the prospect of speaking with fear, using the English language.	3.65	1.29	High
24. While giving a speech using the English language, I get so nervous that I forget facts I know.	3.58	1.18	High
Category Mean	**3.73**	**1.10**	**High**
Overall Mean	**3.36**	**0.96**	**Moderate**

3.4 Relationship between English Learning Motivation and Willingness to Communicate

The correlation analysis between variables is presented in Table 4. The data shows that only one variable is significantly and negatively correlated with communication apprehension when speaking English among Japanese students. The willingness to communicate with a correlation coefficient (r = -0.314) demonstrates a moderate negative relationship with communication apprehension when speaking English and reaches statistical significance of a p-value less than 0.005. The negative r-value signifies that higher levels of the willingness to communicate correspond to lower levels of communication apprehension when speaking English among Japanese students. This suggests that changes in willingness to communicate are associated with variations in communication apprehension when speaking English. The result aligns with Gharibi (2023), demonstrating that willingness to communicate and communication apprehension in English are inversely related.

Table 4. *Correlation of Variables*

Variables Correlated	r	p	Interpretation
English Learning Motivation	-.08	.191	Not Significant
Willingness to Communicate	-.31	<.001	Significant

**Significant at 0.05*

On the other hand, no significant relationship was found between English learning motivation and communication apprehension when speaking English among Japanese students. Although the correlation

coefficient (r-value) of -0.086 suggests a weak, negative correlation, this association does not reach statistical significance with a *p*-value of more than 0.005 (p = 0.191). Therefore, it can be inferred that other factors beyond motivation may substantially influence communication apprehension among Japanese students learning English. These results contradict the findings of Welesilassie and Nikolov (2022), who asserted a positive relationship between English learning motivation and communication apprehension when speaking English. Similarly, they diverge from the conclusions drawn by Aqeel et al. (2021), whose study yielded similar results. In contrast, the findings echo the inverse relationship reported in the study by Samad et al. (2023).

3.5 Regression Analysis of Variables

The analysis on the influencers of communication apprehension when speaking English among Japanese students, as presented in Table 5, underscores the significant impact of both individual and combined predictors. A regression analysis on individual predictors shows that only willingness to communicate significantly affects communication apprehension when speaking English among Japanese students, with a standardized coefficient beta of -0.357 and a significant t-value of -4.882 ($p < 0.05$). This implies that the decrease in willingness to communicate is associated with an increase in the level of communication apprehension when speaking English among Japanese students by approximately 35.70%. Hence, willingness to communicate is considered as the best predictor of Japanese students' communication apprehension when speaking English. The finding supports previous research showing that willingness to communicate affects communication apprehension among students. Fathi et al. (2021) found that students' willingness to communicate had a significant impact on their speaking anxiety. Similarly, Liu (2018) observed that Chinese students' willingness to communicate was negatively affected by their anxiety about speaking, public speaking, and language proficiency. Highly anxious students displayed lower willingness to communicate, underscoring the crucial role of willingness to communicate in shaping communication apprehension among language learners.

Table 5. *Influencers of Communication Apprehension when Speaking English among Japanese Students*

Individual Predictors	Standard Coefficient Beta	t	p-value	Remarks
English Learning Motivation	0.07	0.87	.383	Not Significant
Willingness to Communicate	-0.35	-4.88	<.001	Significant
	Holistic Model			
Predictors Combined	**R^2**	**F**	**p-value**	**Remarks**
	0.10	12.9	<.001	Significant

**Significant at 0.05*

On the other hand, English learning motivation, with a standardized coefficient beta of 0.078 and a t-value of 0.874 (p=0.383), does not significantly affect communication apprehension when speaking English. This indicates that changes in English learning motivation do not correspond to significant changes in communication apprehension when speaking English among Japanese students. This contradicts the findings of Luo et al. (2020) and Samad et al. (2023), which show that motivation affects communication apprehension among students learning English. These differences suggest that cultural or contextual factors may influence how motivation impacts communication apprehension and indicate that relationships between these variables can vary across diverse groups.

Moreover, the holistic model shows that the combined predictors—English learning motivation and willingness to communicate—elucidate approximately 10.20% only of the variance in the communication apprehension when speaking English among Japanese students, as indicated by the model's R^2 value of 0.102. Although this is typically considered a small effect, the model exhibits statistical significance ($F = 12.9$, $p < 0.05$), affirming the predictive power of the combined predictors. Hence, while English learning motivation and willingness to communicate collectively contribute significantly to the communication apprehension when speaking English among Japanese students, there are other combined factors, equivalent to 89.80% that could significantly influence the communication apprehension when speaking English among Japanese students that are not covered in this study.

4.0 Conclusion

To gain a deeper understanding of communication apprehension among language students in the Japanese context, the study examined learning motivation and willingness to communicate as key variables. The findings

showed a significant negative correlation between students' willingness to communicate and their communication apprehension, which implies that the more willing Japanese students are to initiate communication in English, the less anxious they tend to be. On the other hand, no significant correlation was found between English learning motivation and communication apprehension. However, when combined, willingness to communicate and learning motivation account for 10.20 percent of the variance in students' communication apprehension when speaking English.

The findings affirm the importance of student participation in authentic, low-pressure communication with unfamiliar participants to boost students' willingness to speak English and reduce communication apprehension. As such, it emphasizes strengthening collaboration with Assistant Language Teachers, utilizing sister-school partnerships, and integrating English language learning into school activities or community initiatives to achieve more favorable language learning conditions. It also underscores applying rhetorical techniques and effective speech structures to help students organize their thoughts, reinforce preparation, and reduce anxiety in classroom settings. Providing more opportunities for students to practice English communication, through peer conversations, group discussions, and formal presentations, diminishes communication anxiety and develops communication confidence.

Though significant, the combined variables' modest predictive value demands further investigation that could delve into a broader range of linguistic, behavioral, or sociocultural factors, such as language cognitive load and processing, self-perceived communication competence, or the avoidance of self-promotion. Conducting studies with larger and more diverse participant groups would also contribute to a more inclusive and comprehensive understanding of communication confidence and competence among English language learners in Japan.

5.0 Contributions of Authors

The author is solely responsible for all aspects of this research paper, including the conception, design, data collection, writing, and revisions.

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Financial Management Practices and Business Performance of Micro and Small Enterprises in the Food Retail Industry

Leslie A. Deligero[1], Ma. Teresa B. Ballados*[2]
[1]Department of Education, Negros Occidental, Philippines
[2]Carlos Hilado Memorial State University, Bacolod City, Philippines

*Corresponding Author Email: teresa.ballados@chmsu.edu.ph

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Abstract. The research problem highlights the significant challenges confronting micro and small enterprises (MSEs), specifically within the food retailing sector, resulting from financial constraints, inflationary pressures, and increasing costs. This study investigates the extent of financial management practices, specifically costing, budgeting, and financing, and their effect on the business performance of 136 micro and small enterprises (MSEs) within the food retailing sector of Enrique B. Magalona as a second-class municipality in the province of Negros Occidental. Using a descriptive-correlational research design, data were collected through an adapted questionnaire administered to a stratified sample of business owners and managers. Statistical analyses were utilized to assess the relationships and differences in financial management and performance indicators, including mean, standard deviation, Mann-Whitney U test, and Spearman's rho correlation. The principal findings reveal that while MSEs demonstrate a good grasp of costing and budgeting practices, their overall business performance remains inconsistent. Significant variations in performance were noted across different business profiles, particularly concerning the number of years in operation and employee count. Notably, a weak correlation was observed between the extent of financial management practices and business performance, suggesting that MSEs may struggle with practical implementation. The study concludes that a robust focus on financial management is essential for enhancing profitability and operational efficiency. Recommendations include investing in training programs to improve the regular application of financial practices and developing tailored strategies for better cash flow management.

Keywords: Business performance; Descriptive-correlational research; Financial management practices; Food retail industry; Micro and small enterprises.

1.0 Introduction

In recent years, the importance of financial management practices has gained significant recognition for enhancing the economic viability of enterprises across the globe. Research has consistently shown that effective financial management systems are pivotal to the success of businesses in various sectors, including micro and small enterprises (MSEs) (Ikrama, 2019; Barbosa, 2021). Fatoki (2012) further emphasizes this point, highlighting that poor financial management competencies are among the primary drivers of MSEs' failures. This assertion is particularly salient in the food retail sector, where financial sustainability is essential for competitiveness.

At a national level, the challenges MSEs face in managing their finances are well-documented. In developing economies, inadequate financial management has been linked to decreased profitability and heightened

insolvency risks (Fatoki, 2012; Mena & Nalwaya, 2022). Evaluating the effectiveness of financial practices is thus crucial for building a resilient business foundation (Mahmudova & Katonane Kovacs, 2018).

The financial landscape for smaller businesses has become increasingly complex due to the rise of large retail chains such as supermarkets and hypermarkets. Additionally, the significant rise in policy interest rates across numerous nations and a tighter lending environment have adversely affected financing costs for small and medium-sized enterprises (SMEs). These enterprises typically rely on debt to support their operations and investments (OECD, 2024). Previous research has shed light on small enterprises' operational and financial challenges, particularly in the food retail sector, emphasizing the need for an enhanced focus on financial sustainability. Micro and small enterprises frequently have difficulty obtaining affordable funding. Lenders often view them as high-risk borrowers because of their smaller scale, insufficient collateral, and limited financial history, which can hinder their growth and development (Franco, 2023).

Locally, in the municipality of Enrique B. Magalona, province of Negros Occidental, MSEs have grappled with substantial difficulties compounded by the COVID-19 pandemic, which has adversely affected consumer income sources. This disruption has created financial constraints that hinder many businesses' ability to recover to pre-pandemic levels (Herman & Zsido, 2023). The current inflationary environment has also notably impacted SMEs, restricting their ability to transfer increased input costs to customers without jeopardizing their competitive edge. Research indicates that a rapid and uneven rise in prices can negatively affect certain businesses and disrupt the overall structure of the business sector (Belanová, 2023).

The intersection of financial management practices and business performance is a crucial area of inquiry. Existing literature highlights a robust correlation between effective financial management and improved business performance, especially within Micro and Small Enterprises (MSEs). Otoo (2024) identified that working capital significantly influences organizational performance, while capital budgeting management is equally essential. Systematic financial planning is vital for MSEs striving for profitability and sustainability, as Sooriyakumaran (2024) and Musah et al. (2018) emphasize. This growing acknowledgment reinforces the pivotal role that financial management practices play in driving performance enhancements within these enterprises.

However, there is a notable gap in research specifically addressing the nuances of this relationship within the context of the food retail sector in the municipality of Enrique B. Magalona. This study aims to address this gap by exploring the dynamics between financial management practices and the business performance of MSEs in the local food retail industry. By systematically identifying this relationship, the research intends to equip micro and small entrepreneurs with valuable insights for adopting effective financial management practices and fostering long-term success. Ultimately, understanding how these practices influence business performance is critical not only for the enterprises involved but also for the broader economic recovery and stability of the food supply chain in the region.

2.0 Methodology

2.1 Research Design

This study employed a descriptive-correlational research design, utilizing a quantitative approach to comprehensively examine the financial management practices and business performance of micro and small enterprises within the food retailing sector in the municipality of Enrique B. Magalona. The descriptive research design focused on detailing and contrasting various aspects of financial management practices against these enterprises' corresponding business performance metrics. The study aimed to provide an insightful overview of how these practices manifest in real-world business operations by gathering and analyzing data. Additionally, the correlational research design was used to investigate the existence and nature of relationships between the two key variables: financial management practices and business performance. This aspect of the study is crucial as it seeks to understand how effective financial management may influence overall business outcomes. The results could reveal significant correlations that might inform future strategies for improving financial practices and operational success in micro and small enterprises within the food retailing industry.

2.2 Research Locale

The locale of this study is Enrique B. Magalona, a municipality in Negros Occidental renowned for its dynamic food retailing sector. This vibrant community is characterized by a rich tapestry of micro and small enterprises (MSEs), crucial to the local economy as they supply residents with essential food products and services. The focus on Enrique B. Magalona as the study's setting is particularly pertinent, given the municipality's unique socio-economic dynamics and the rapidly evolving food industry landscape. These factors mirror broader trends in consumer behavior and market demand, making it an ideal case for examining the operational characteristics and challenges MSEs face. This study highlights a significant limitation due to the restrictions imposed on data access from the Office of Business Licensing in the municipality of Enrique B. Magalona. Instead of direct data from the Office of Business Licensing, the study utilized the Department of Trade and Industry (DTI) information. In 2023, the Department of Trade and Industry documented 220 micro and small enterprises operating in the area. This study categorizes these businesses based on their operational longevity and workforce size, providing valuable insights into the entrepreneurial environment of Enrique B. Magalona. Notably, 136 MSEs were considered study subjects, and 83 (61.03%) have been in operation for five years or less, reflecting a substantial influx of new businesses in the local market. Conversely, 53 MSEs (38.97%) have been operational for over five years, representing the established enterprises that successfully managed to navigate the competitive landscape. Regarding workforce size, a considerable majority of the MSEs are small-scale operations. Specifically, 106 MSEs (77.94%) operate with a single employee, illustrating a common trend in the region where many entrepreneurs manage their businesses independently. In contrast, 30 MSEs (22.06%) employ multiple individuals, highlighting a distinct division in the operational scales of these enterprises.

2.3 Research Participants

The study participants were owners and managers of micro and small food retail businesses in the municipality of Enrique B. Magalona. These individuals were selected for several compelling reasons. Firstly, micro and small businesses play a crucial role in the local economy, often serving as vital employment and community engagement sources. By focusing on this demographic, the study aimed to gather insights directly from those deeply entrenched in the operational challenges and financial realities of running such enterprises. Secondly, the owners and managers possess firsthand experience and knowledge about their business practices and financial management. Their unique perspectives are invaluable for understanding how financial management strategies impact business performance. This direct involvement allows for a more nuanced exploration of the intricate relationship between effective financial practices and the overall success of food retail operations. The selection of owners and managers from micro and small food retail businesses in E.B. Magalona was deliberate, aiming to ensure that the research captures relevant, insightful, and actionable data on the intersection of financial management practices and business performance in this sector.

2.4 Research Instrument

This study employed adapted survey questionnaires to gather data relevant to financial management practices and business performance among micro and small enterprises (MSEs). The questionnaire for assessing financial management practices was derived from the work of Barbosa (2021), while the section focused on business performance was adapted from the research by Ahmad and Jamil (2020). Specific items within the questionnaires were carefully modified to align with the specific objectives of this study. The structured questionnaire is divided into three distinct parts. The first section is designed to capture the demographic profiles of the MSEs, providing crucial context for understanding the sample. The second section focuses on measuring financial management practices, which are essential for identifying effective strategies and areas for improvement among MSEs. Lastly, the third part of the questionnaire assesses the business performance of these enterprises, allowing for a comprehensive evaluation of their operational outcomes. Responses were collected using a Likert scale, facilitating nuanced insights into participants' perceptions and practices.

A rigorous validation process was conducted to ensure the validity of the questionnaire. Utilizing the Lawshe Content Validity Ratio (CVR), the questionnaire achieved a CVR score of 0.84, indicating strong agreement among the ten validators with expertise in financial management and research. According to established guidelines, items scoring 0.62 and above were retained, affirming the instrument's content validity. This high CVR score reflects confidence in the questionnaire's ability to measure the intended constructs accurately.

The instrument's reliability is equally important, ensuring consistency in participants' responses across different items. A pilot test was conducted with 30 business owners or managers from MSEs within the food retail industry, strategically chosen outside the primary study locale. The reliability of the questionnaire was assessed using Cronbach's Alpha, with a target reliability index ranging from .70 to 1. The results yielded a Cronbach's Alpha of .781 for the financial management practices section and an impressive .983 for the business performance section. These values suggest that both sections of the instrument are highly reliable, indicating that the responses collected are consistent and trustworthy.

2.5 Data Gathering Procedure

A formal request was sent to the heads of relevant food retail businesses to initiate the research, seeking permission to survey within their establishments. This step was essential for obtaining the necessary approvals and fostering a collaborative relationship with the study's business owners, managers, and key stakeholders. Upon receiving the appropriate permissions, the researchers crafted an Informed Consent Form tailored to business owners and managers. This document conveyed the study's purpose, focusing on how financial management practices influence business performance and emphasizing the voluntary nature of participation. It outlined confidentiality measures that would protect sensitive business information and a transparent discussion of potential risks and benefits. To promote trust and encourage participation, ample time was given for participants to review the consent form and ask questions, ensuring they felt comfortable making an informed decision.

The survey questionnaires were distributed personally, reinforcing the study's commitment to engagement and respect for participants' time. The researcher visited the selected businesses, handed out questionnaires directly to owners and managers, and provided comprehensive instructions for completion. Moreover, a pre-arranged timeline for collecting completed questionnaires was established, allowing participants to fill them out at their convenience. After the collection phase, the researchers implemented a systematic approach to compile and analyze the data. Each completed questionnaire was carefully reviewed to ensure completeness and accuracy before being organized for analysis. The study utilized advanced statistical software to process the data, enabling the researchers to derive meaningful and actionable insights. This rigorous methodology enhanced the quality of the data gathered and strengthened the study's overall findings, ultimately contributing to a deeper understanding of the relationship between financial management practices and business performance in the food retail sector.

2.6 Data Analysis

Initially, data collection focused on critical variables: costing, budgeting, and financing. Mean and standard deviation were employed as primary statistical measures to analyze these variables effectively. This approach enabled us to assess the extent of financial management practices both overall and when segmented by various business profiles. The use of mean provided a central tendency of the data, while standard deviation offered insights into the variability and distribution of the financial management practices within the observed enterprises. To evaluate these businesses' performance, we analyzed financial and non-financial performance measures. Again, mean and standard deviation were utilized to capture an aggregate picture and nuanced differences across business profiles. To investigate potential differences in financial management practices and business performance across various business profiles, we applied the Mann-Whitney U test based on the result of the Kolmogorov–Smirnov test of $< .05$. This non-parametric test was appropriate for our dataset, given that it enables comparison of two independent groups without the assumption of a normal distribution. This analysis accounted for variables such as years in operation and number of employees.

To delve deeper into the interplay between financial management practices and business performance, we utilized Spearman's rank correlation coefficient based on the result of the Kolmogorov–Smirnov test of $< .05$. This analysis helped determine the strength and direction of the relationship between the extent of financial management practices and overall business performance. By employing this method, we could identify whether effective financial management correlates with superior performance outcomes. Finally, we used simple linear regression analysis to assess the predictive capacity of financial management practices on business performance.

2.7 Ethical Considerations

In conducting this study, several key ethical considerations were meticulously observed, reflecting a deep commitment to the principles of ethical research and the safeguarding of participant welfare. Central to these considerations was the adherence to the principle of voluntary participation. Participants were invited to join the study and thoroughly informed about its purpose and scope, ensuring that their engagement was entirely voluntary. The informed consent process was comprehensive, comprising an Informed Consent Form that detailed the study's objectives, expectations regarding participant involvement, the intended use of findings, and their unequivocal right to withdraw at any time without consequences. This transparent approach was pivotal in fostering trust and respect, empowering participants to make informed decisions regarding their participation in the research.

Moreover, confidentiality and anonymity were paramount, particularly given the sensitive nature of discussions within the food retail industry, often involving proprietary or competitive information. Stringent measures were implemented during data collection and analysis to protect the participants' identities. No identifiable information was retained, and responses were anonymized to ensure participants felt safe to contribute openly without fearing personal repercussions. The data management protocols reinforced this confidentiality, with all collected materials treated as sensitive and securely stored. Access to this information was strictly limited to the researchers involved, further assuring participants of their privacy. In addition, a robust post-research protocol was established, emphasizing a commitment to ethical responsibility. After the study's conclusion, all completed questionnaires and answer sheets were systematically destroyed, ensuring no identifiable data lingered. This measure reflects ethical diligence and honors participants' trust in the researchers and the research process.

3.0 Results and Discussion

3.1 Extent of Financial Management Practices of MSEs

Table 1 provides a comprehensive analysis of financial management practices, particularly focusing on budgeting within micro and small enterprises (MSEs). The findings reveal a positive perception of budgeting practices, with an overall mean score of 3.42 (SD=0.63). This indicates that budgeting is primarily implemented among MSEs, suggesting a promising trend for their financial health and sustainability.

Table 1. *Extent of Financial Management Practices in terms of Budgeting*

Items	Mean	Interpretation	SD
Overall	**3.42**	**Great**	**0.63**
1. Setting up of a fund for future expenses	3.53	Very Great	0.79
2. Review budget regularly	3.52	Very Great	0.91
3. Prepare or use budget plan	3.44	Great	0.90
4. Monitor the implementation of the budget plan by comparing the budget to actual performance	3.17	Great	0.93

Note: 3.50-4.00 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 (Very Low)

One notable aspect is the high mean score of 3.53 (SD=0.79) for "Setting up a fund for future expenses." This reflects proactive financial planning, illustrating MSEs' dedication to long-term stability and readiness to tackle future financial obligations. This aligns with the findings of Fortuna (2021), who noted that small and medium enterprises (SMEs) tend to favor budgeting practices as they are associated with strategic development and effective resource allocation. This support from the literature underscores the importance of forward-thinking financial practices in enhancing the stability of these businesses.

However, the relatively lower mean score of 3.17 (SD=0.93) for "Monitor the implementation of the budget plan by comparing the budget to actual performance" indicates a critical area for growth. While the result still reflects considerable engagement with monitoring practices, the variability in execution among different participants raises concerns. It suggests an opportunity for MSEs to enhance their financial management processes by identifying and addressing the specific challenges that inhibit consistent monitoring and performance evaluation. This finding resonates with the research conducted by Onduso (2022), which emphasized the significance of monitoring and evaluation in budget implementation for improving financial performance, particularly in manufacturing firms.

Furthermore, research by Brijlal et al. (2014) on South African micro, small, and medium enterprises (MSMEs) revealed that 69% of enterprises engage in budgeting processes and 63% actively compare actual payments with budgeted amounts. This data supports the notion that MSEs recognize the value of budgeting, although it also highlights variations in practice that necessitate further investigation. While the findings from Table 1 indicate that MSEs generally adopt commendable budgeting practices, there remains room for improvement, particularly in monitoring and evaluation. The existing literature broadly supports these findings, emphasizing the role of effective budgeting in promoting financial performance and strategic growth among enterprises. By addressing the identified gaps in monitoring, MSEs can potentially enhance their financial sustainability and competitive positioning in the market.

Table 2 outlines the extent of financial management practices concerning costing. The overall extent of these practices was rated as "great" (M=3.40, SD=0.66), indicating that they are implemented in most instances. The item with the highest mean score was "Adopt product costing method according to the nature and processes used by the business," which received a mean of 3.57 and a standard deviation of 0.62. This is interpreted as a "very great extent," meaning it is practiced consistently. In contrast, the item "Perform cost-targeted activities regularly to prevent unexpected increases in cost and expenses" had the lowest mean score, interpreted as "practiced to a great extent" (M=3.20, SD=0.92), indicating it is implemented in most instances. The overall mean score reflects a generally positive attitude toward costing, suggesting that many micro and small enterprises (MSEs) engage in these practices frequently.

Table 2. *Extent of Financial Management Practices in terms of Costing*

Items	Mean	Interpretation	SD
Overall	**3.40**	**Great**	**0.66**
1. Adopt product costing method according to the nature and processes used by the business.	3.57	Very Great	0.62
2. Perform cost-targeted activities regularly to prevent unexpected increases in cost and expenses	3.20	Great	0.92

Note: 3.50-4.00 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 (Very Low)

Furthermore, the findings indicate that MSEs prioritize adapting their product costing methods to align with their business nature and processes. However, while cost-targeted activities are practiced most of the time, they are not prioritized by MSEs to prevent unexpected increases in costs and expenses. Many MSEs rely on whatever their business operations incur, which is particularly common among those just starting and lacking knowledge about cost management. This strongly recognizes the need for customized costing practices that align with their financial strategies and operational activities. The variation in responses regarding cost-targeted activities indicates significant room for improvement in the consistency of these practices across the sector.

According to Kartalis et al. (2019), product and service costing are essential for developing pricing policies and controlling costs. These practices are valuable tools for assessing a business's current and future operations. Product costs have the most significant influence during the early stages of development, gradually diminishing as the product matures. Consequently, cost estimation and industrialization are particularly critical during these initial phases. Additionally, cost information plays a vital role in decision-making, aiding in setting product prices, determining the product mix, and supporting planning and managerial control (Hundal, 1997; as cited in Solon et al., 2021).

Moreover, these methods are crucial for generating information and guiding decision-making. Enterprises must identify the costing method that best suits their needs (Rocha et al., 2019). Solon et al. (2021) further explain that these costing methods are complementary, as they help ascertain the price the market is willing to pay for a product or service. If a product's price exceeds its costs, the market is covering process inefficiencies. Conversely, if the price falls below the absorption cost, it suggests a need to reevaluate the business processes. According to Holý et al. (2017), retail chains strive to minimize costs in every possible way. Costs and expenses differ in that costs are directly related to the manufacturing process, while expenses are more associated with administrative costs (Solon et al., 2021)

Table 3 presents an analysis of the financial management practices of micro and small enterprises (MSEs) in the context of financing. Among the financing practices assessed, the item related to utilizing earnings for business expansion scored the highest mean (M=3.26, SD=1.06), indicating that MSEs frequently engage in this practice. Conversely, the item about borrowing money from financial institutions while considering minimal interest and favorable repayment terms received the lowest mean (M=2.31, SD=1.14), suggesting that this practice is less commonly adopted.

Table 3. *Extent of Financial Management Practices in terms of Financing*

Items	Mean	Interpretation	SD
Overall	**2.80**	**Great**	**0.95**
1. Utilize earnings of the business to expand operations	3.26	Great	1.06
2. Pay the principal and interest of loans on time	2.83	Great	1.37
3. Borrow money from financial institutions with consideration for minimal interest and favorable terms of payment	2.31	Low	1.14

Note: 3.50-4.00 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 (Very Low)

The overall mean score for financial management practices related to financing was 2.8 (SD=0.95), interpreted as "to a great extent." This finding indicates that while MSEs actively utilize their income to expand operations, a significant gap exists in their understanding and implementation of favorable borrowing practices. The variability in responses, reflecting different perceptions among respondents, suggests that while many MSEs know the importance of financing, they may lack the knowledge or resources to navigate the complexities of borrowing effectively. Furthermore, the data highlight a troubling trend: MSEs disproportionately rely on informal funding sources and frequently overlook financial institutions offering lower interest rates and better repayment terms. This reliance on informal borrowing can lead to financial shortages impacting day-to-day operations, as MSE owners turn to various funding sources to bridge these gaps. Such dependence underscores MSEs' need to cultivate financial literacy and enhance their understanding of effective financing strategies.

The literature primarily supports the study's findings regarding the financial management practices of micro and small enterprises (MSEs). The study's observation that MSEs frequently use earnings for business expansion aligns with previous research indicating that these enterprises are proactive in utilizing internal funds to grow. However, the study also highlights a significant gap in MSEs' understanding and implementation of favorable borrowing practices, consistent with existing literature that points to barriers such as financial illiteracy, poor access to formal financing, and inadequate banking relationships. Several sources cited in the study, such as Anoos et al. (2020), confirm the challenges MSEs face in accessing capital, including reliance on personal savings and the corresponding instability this may cause. Additionally, findings from Kilonzo and Ouma (2015) regarding the negative impact of inadequate access to loans on small enterprise sustainability resonate with the study's results, showing that MSEs are hampered by financial shortages when resorting to informal funding sources. Furthermore, the high default rates and slow repayment cycles discussed by Wahab and Abdesamed (2012) and Nawai and Shariff (2010) echo the study's concerns regarding loan management among MSEs. Overall, the study's findings about the practices MSEs engage in and the barriers they encounter correlate well with the existing literature, reinforcing the need for improved financial literacy and better access to formal financing options for these enterprises (cited in Kitomo et al., 2020).

3.2 Level of Business Performance of MSEs

Table 4 analyzes the level of business performance in terms of financial performance among micro and small enterprises (MSEs) from 2021 to 2023. The data indicate an overall mean score of M = 1.95 (SD = 0.76), which is interpreted as a decrease and suggests instability in business performance. Among the key indicators, cost secured the highest mean score (M = 2.02, SD = 0.96), while sales recorded the lowest mean score (M = 1.86, SD = 0.94), both categorized as erratic. This inconsistency highlights a troubling trend in financial performance, revealing that while costs may be manageable, sales fluctuations significantly undermine overall profitability.

Table 4. *Level of Business Performance in terms of Financial Performance*

Items	Mean	Interpretation	SD
Overall	**1.95**	**Erratic**	**0.76**
1. Cost in 2021-2023	2.02	Erratic	0.96
2. Profit in 2021-2023	1.97	Erratic	0.93
3. Cash flow position in 2021-2023	1.95	Erratic	0.98
4. Sales in 2021-2023	1.86	Erratic	0.94

Note: 2.50-3.00 (Increase); 1.5-2.49 (Erratic); 1.00-1.49 (Decrease)

The findings suggest that MSEs are grappling with minimizing costs while simultaneously maximizing sales. The erratic nature of these financial indicators points to the possibility of fluctuating operational efficiencies and unstable market demand. These challenges can lead to inconsistent profit and cash flow positions, indicating that MSEs may struggle to sustain their financial health throughout varying market conditions. Historical data from 2021 to 2023 demonstrates increased and decreased profitability periods, underscoring the struggle to maintain a stable financial position. The variability in cash flows may further impact MSEs' ability to meet financial obligations, suggesting an urgent need for strategic planning to stabilize performance.

The literature corroborates some of these findings. According to Ahmad and Jamil (2020), effective financial performance in micro-enterprises is closely linked to sales volume, with higher sales driving greater profits. This perspective aligns with the observed trend in the current study, where fluctuations in sales directly affect overall financial viability. Furthermore, the literature indicates that stable profit and growth are indicators of sound business performance (Majenga & Mashenene, 2014; Nyangoma, 2012, cited in Ahmad and Jamil, 2020). The current study's findings relate to this notion; however, the erratic nature of sales and cash flow in the observed MSEs contradicts the expectation of enduring performance stability outlined in the literature.

Conversely, the literature also points out that good cash flow is essential for long-term sustainability and profitability, which is in line with Ahmad and Jamil's (2020) observation. This aspect raises a critical question about the ability of these MSEs to generate reliable cash flow, which the current study indicates is inconsistent over the study period. The findings suggest that MSEs may not effectively leverage their assets to ensure sustained revenue generation. Additionally, the studies of Tundui (2012, cited in Ahmad & Jamil, 2020) and other authors reinforce the idea that stable growth hinges on effective sales performance. While these scholarly works advocate for the direct correlation between sales volume and profitability, the erratic sales observed in this study suggest that the investigated MSEs may struggle to implement strategies that enhance sales performance, contradicting the ideal scenarios derived from existing literature.

Table 5 illustrates the findings concerning the level of business performance across non-financial performance indicators for the years 2021 to 2023. The reported data displays a fluctuating pattern across all indicators, culminating in an overall mean score of (M = 1.80, SD = 0.73). This score is interpreted as erratic, indicating considerable inconsistency in non-financial performance metrics during the observed period. Among the various indicators, the number of new customers acquired exhibited the highest mean score (M = 2.05, SD = 0.97). However, this is still characterized as erratic, signaling variable performance with periods of both increase and decrease in new customer acquisition.

Table 5. *Level of Business Performance in terms of Non-Financial Performance*

Items	Mean	Interpretation	SD
Overall	**1.80**	**Erratic**	**0.73**
1. Number of new customers received by the business in 2021-2023	2.05	Erratic	0.97
2. Number of regular customers received by the business in 2021-2023	2.02	Erratic	0.96
3. Number of products added in 2021-2023	1.98	Erratic	0.96
4. Number of employees in 2021-2023	1.70	Erratic	0.89
5. Number of branches added in 2021-2023	1.23	Decrease	0.62

Note: 2.50-3.00 (Increase); 1.5-2.49 (Erratic); 1.00-1.49 (Decrease)

Conversely, the number of branches added recorded the lowest mean score (M = 1.23, SD = 0.62), which reflects a negative performance trend. These findings suggest that the business faced significant challenges in expanding

its reach through new branches, possibly due to external constraints such as market conditions or internal factors like resource allocation and strategic focus.

Further analysis reveals that the operational indicators for micro and small enterprises (MSEs) displayed erratic movements between 2021 and 2023. While the high mean score in customer acquisition hints at potential opportunities, the inconsistent behavior raises concerns regarding the effectiveness of strategies aimed at customer retention. The mean score for regular customer retention (M = 2.02, SD = 0.96), also categorized as erratic, indicating fluctuations in purchase frequency and loyalty among existing customers. Additionally, the mean score for new products introduced (M = 1.98, SD = 0.96), which points to limited product offerings or potential resource constraints, further highlighting the inconsistency in performance. The data suggest that MSEs experienced a slowdown in their non-financial performance indicators during certain periods, influenced by external challenges such as the pandemic, alongside internal inefficiencies and ineffective business strategies. This necessitates a thorough investigation to validate the contributors to this erratic performance and to develop targeted corrective measures.

The literature underscores the importance of customer loyalty and employee satisfaction as critical components of a company's profitability. For instance, Ittner and Larcker (2003 cited in Ahmad & Jamil, 2020) emphasize that heightened customer and employee loyalty is indicative of satisfaction with the enterprise's offerings, which contributes to better overall performance. Similarly, Kimatu and Bichanga (2014 cited in Ahmad & Jamil, 2020) posit that growth in employee numbers, market reach, and product development serve as crucial metrics for measuring enterprise performance. According to Sayibu Ibrahim Nnindini et al. (2024), customer satisfaction hinges on effectively addressing customer needs through well-timed and suitable goods and services, further reinforcing the connection between customer satisfaction and business sustainability. Moreover, the observable patterns in the collected data align with the literature, indicating that high levels of customer and employee loyalty, as well as ongoing product development, are essential for MSEs to achieve consistent growth. The studies cited illustrate a comprehensive framework for evaluating non-financial performance, supporting the findings of this study. Notably, Kimatu and Bichanga (2014 cited in Ahmad & Jamil, 2020) also propose that actively discovering new markets and innovating product offerings can significantly enhance an enterprise's performance, a notion echoed in the current study's results.

3.3 Differences in the Extent of Financial Management Practices

Table 6 provides a detailed analysis of financial management practices among micro and small enterprises (MSEs), focusing on two critical factors: years in operation and number of employees. The results reveal no significant differences in the financial management practices comprising costing budgeting and financing across these two variables.

Table 6. *Difference in the Extent of Financial Management Practices when grouped by Business Profiles*

Area	Grouping Variables	N	Mean	Summary of Ranks	Mann-Whitney Test			
					U-ratio	W	Z	*p*
Costing practices								
Number of years in operation	5 years and below	83	64.44	5348.50	1862.50	5348.50	-1.587	.115
	more than 5 years	53	74.86	3967.50				
Number of employees	1 employee	106	70.83	7508.50	1342.50	5348.50	-1.363	.173
	more than 1 employee	30	60.25	1807.50				
Budgeting practices								
Number of years in operation	5 years and below	83	66.09	5485.50	1999.50		-.913	.361
	more than 5 years	53	72.27	3830.50				
Number of employees	1 employee	106	68.95	7308.50	1542.50	2007.50	-.255	.799
	more than 1 employee	30	66.92	2007.50				
Financing practices								
Number of years in operation	5 years and below	83	68.16	5657.50	2171.50	5657.50	-.127	.899
	more than 5 years	53	69.03	3658.50				
Number of employees	1 employee	106	69.40	7356.00	1495.00	1960.00	-.505	.613
	more than 1 employee	30	65.33	1960.00				

In the analysis based on years in operation, the findings indicate that the U statistics for costing (U=1862.50, p=.115), budgeting (U=1999.50, p=.361), and financing (U=2171.5, p=.899) all yield p-values exceeding the

conventional significance threshold of 0.05. This leads to the acceptance of the null hypothesis, which posits that years in operation do not significantly affect financial management practices. This outcome suggests a potential uniformity in how financial management is approached across enterprises, regardless of how long they have been in business. It raises questions about whether external factors, such as market conditions or access to resources, may exert a more substantial influence on financial strategies than operational history alone.

A parallel analysis based on the number of employees also yielded similar results. For costing reported U=1342.5 with p=.173; for budgeting, the U statistic was recorded as 1542.5 with a p-value of .799; and financing showed U=1495 with p=.613. None of these p-values fell below the .05 threshold, further substantiating the null hypothesis that financial management practices do not vary significantly according to the number of employees. This consistency across different scales suggests that MSEs experience similar challenges and adopt comparable approaches to financial management, regardless of their size or years of operation.

Supporting this analysis, the study by Dolorso (2023) indicates that many respondents have operated their businesses for two years or less, suggesting a predominance of new micro-businesses. This slipstream of new entrants implies that these enterprises may not possess sufficient knowledge or experience in financial management practices, potentially leading to higher rates of business failure. This assertion finds support in the findings of Anoos et al. (2020), which note that many businesses operate within a 1 to 3-year timeframe, and Berner et al. (2008) who observe that many micro-businesses stagnate in their growth trajectory toward becoming small and medium enterprises.

Furthermore, Dolorso's (2023) analysis reveals that the majority of respondents employ only one or two individuals within their enterprises, with few employing between six to nine workers. This finding implies that in such small operations, most responsibilities are centralized, lacking segregation of duties. The potential consequences of this are significant; the absence of a structured approach to financial control may increase the risk of mismanagement. Supporting literature from Berry et al. (2011 cited Dolorso, 2023) underscores this issue, indicating that many small businesses remain owner-managed by individuals who also oversee all operational duties. As noted by Anoos et al. (2020), the small workforce further exacerbates the challenge of implementing adequate segregation of duties, which can contribute to ineffective financial oversight.

The examined literature both supports and elaborates on the findings of the current study, highlighting systemic issues that micro and small enterprises face in financial management. The consistent lack of significant differences based on years in operation and employee count emphasizes a broader need to address the fundamental challenges posed by limited experience and resources within the sector. Moving forward, it is essential for MSEs to seek enhanced financial management practices that account for external influences and organizational growth dynamics.

Table 7 presents the results from the Mann-Whitney U test, which was conducted to identify any significant differences in two indicators of Business Performance (financial and non-financial) when categorized according to business profile aspects such as the number of years in operation and the number of employees. The analysis indicates that the performance level of micro and small enterprises (MSEs) does not differ significantly based on their years in operation. Specifically, the test yielded results for financial performance ($U = 2151.500$, $p = .827$) and non-financial performance ($U = 1754.000$, $p = .138$), both of which suggest that the longevity of an enterprise does not positively or negatively affect its performance metrics. This finding is consistent with some existing literature that argues tenure alone does not guarantee business success.

In contrast, the results reveal a noteworthy difference in business performance based on the number of employees. Financial ($U = 1080.000$, $p = .006$) and non-financial performance ($U = 1096.000$, $p = .016$) demonstrated significant statistical differences at $p \leq 0.05$, indicating that the number of employees does play a crucial role in influencing overall business performance. This suggests that variations in business scale, organizational structure, and resource allocation, which often accompany different employee counts, have a marked impact on MSE performance. While the age of a business does not appear to significantly influence performance, the workforce size is a critical factor worth considering.

Table 7. *Difference in the Level of Business Performance when grouped by Business Profiles*

Area	Grouping Variables	N	Mean	Summary of Ranks	Mann-Whitney Test			
					U-ratio	W	Z	*p*
Financial								
Number of years in operation	5 years and below	83	67.92	5637.50	2151.50	5637.50	-.218	.827
	more than 5 years	53	69.41	3678.50				
Number of employees	1 employee	106	63.69	6751.00	1080.00*	6751.00	-2.730	.006
	more than 1 employee	30	85.50	2565.00				
Non-Financial								
Number of years in operation	5 years and below	81	62.65	5175.00	1754.00	5075.00	-1.483	.138
	more than 5 years	51	72.61	3703.00				
Number of employees	1 employee	102	62.25	6349.00	1096.00*	6349.00	-2.400	.016
	more than 1 employee	30	80.97	2429.00				

*Significant at $p \leq .05$

Supporting this findings, prior research highlights that financial management is vital for enhancing the wealth of entrepreneurs (McMabon, 2001, as cited in Waweru & Ngugi, 2014). It has been established that performance metrics are integral to understanding both the successes and challenges faced by small enterprises. Jen (2003) notes that business performance indicators are essential in assessing credit risk, and Davidson and Dutia (1991) emphasize that low performance can lead to issues such as under-capitalization. This interconnectedness indicates that robust financial management practices can mitigate risks associated with poor performance.

Moreover, studies by Abuzayed (2012), Bañós-Caballero et al. (2012), Jindrichovska (2013), Kapitsinis (2019), and Kaya and Alpkan (2012) as cited in Zada et al. (2021) all agree that effective financial management practices are pivotal to a business's success, while ineffective ones can lead to failure. This body of literature strongly aligns with the study's findings, underscoring the necessity for small firms to focus on financial management to enhance performance. Additionally, the characteristics of mature firms bear relevance here. Although older firms may enjoy higher profitability, they often exhibit reduced opportunities for expansion and a preference for internal financing. This tendency supports our findings that while the number of years in operation does not significantly impact performance, it is essential for financial management practices to evolve in conjunction with the size of the workforce.

3.4 Relationship between Financial Management Practices and Business Performance

Table 8 presents the results of the Spearman's rho analysis, exploring the relationship between financial management practices and business performance in the food retailing sector. The findings reveal a statistically significant weak negative correlation (r = -0.289) between these two variables, indicating that as financial management practices improve, business performance may slightly decline. This inverse relationship suggests that while enhancing financial management practices is generally considered beneficial, it does not guarantee an improvement in business performance. The correlation coefficient's strength being low (p = 0.001) highlights the need to consider additional factors that might influence business outcomes.

Table 8. *Relationship between Financial Management Practices and Business Performance*

Variables	r	p
Financial Management Practices and Business Performance	-.28**	.001

**Significant at $p \leq .01$

This finding challenges the prevailing assumption that effective financial management directly translates to better business performance. Existing literature strongly supports the notion that sound financial management practices are crucial for business success. Numerous studies have demonstrated that the efficacy of a business is highly dependent on the financial management strategies it employs, linking failure to ineffective practices (Abuzayed, 2012; Baños-Caballero et al., 2012; Jindrichovska, 2013; Kapitsinis, 2019; Kaya and Alpkan, 2012, as cited in Zada et al., 2021). Given this context, it becomes imperative to explore the complexities and interdependencies present in financial management and overall business strategies.

Additionally, scholarly work has emphasized the importance of robust financial management for strategic planning and decision-making. High-quality information derived from effective financial management is essential for monitoring performance and understanding emerging trends (Olawale & Garwe, 2010, as cited in

Zada et al., 2021). The findings from Mohamed and Ali (2013) support the necessity of participatory planning, suggesting that such practices can lead to rapid implementation and positively impact organizational performance. Likewise, Kimunguyi et al. (2015) argue that effective budgeting is positively correlated with financial performance, advocating for the formulation and adherence to sound budgeting policies. Supporting this notion, Fortuna (2021) highlights that effective budgeting practices contribute to profitability across sectors, including retail. Pimpong and Laryea (2016) further elaborate on this idea, indicating a statistically significant moderate positive relationship between budget coordination and firm performance. Collectively, these studies reinforce the importance of comprehensive budgeting and financial oversight as vital components of successful business management.

3.5 Financial Management Practices as Predictors of Business Performance

Table 9 presents a linear regression analysis that examines the relationship between financial management practices and business performance. The intercept of the regression model indicates that when the level of financial management practices is at zero, business performance is predicted to be 2.631. The regression coefficient of -0.234 suggests that for every one-unit increase in financial management practices, business performance decreases by 0.234 units. Furthermore, the Beta value of -0.219 underscores the relative strength of this relationship.

Table 9. *Linear Regression Results of Financial Management Practices as Predictors of Business Performance*

Predictor	B	SE B	β	t	p
(Constant)	2.63	0.29		8.99	.010
Financial Management Practices	-0.23	0.09	-0.21	-2.59	

Note: **B =** unstandardized regression coefficient; **SE B** = standard error of B;
β = standardized regression coefficient; **CI** = confidence interval;
t = t-test statistics; ***p*** = p-value

These findings imply that a lack of financial management practices measured at 0.234—corresponds with a baseline business performance of 2.631. Conversely, as financial management practices increase, business performance is expected to decline, indicating an inverse relationship. This is pivotal, as it suggests that certain financial management practices may not contribute positively to enhancing business performance. Consequently, the study identifies a small but negative influence of financial management practices on overall business performance within the context of micro and small enterprises (MSEs) in the food retail industry. Contrastingly, the findings of Njaga (2023) indicate that financial planning practices have a positive and significant effect on firms' performance, highlighting that improved internal control practices can lead to better business outcomes. This view is corroborated by Kabue (2020), who also asserts that strong internal controls positively influence performance. Further supporting this perspective, Eton et al. (2022) emphasize the necessity for small businesses to maintain robust financial management practices to see improvements in profitability.

The studies cited herein present a divergent view compared to the results of the current analysis. They suggest that effective financial management practices are predictors of heightened business performance, whereas this study identifies an inverse relationship between these variables for MSEs in the food retailing industry of E. B. Magalona. While the literature underscores the importance of financial management practices as contributors to business success, the findings of this study reveal a unique context in which these practices may actually correlate with diminished performance. This suggests a potential disconnect that warrants further investigation into the specific financial management strategies employed within this sector and their actual impacts on performance outcomes

4.0 Conclusion

The study concludes that micro and small enterprises (MSEs) have a foundational understanding of financial management practices, particularly in costing and budgeting. However, despite this solid grounding, many MSEs struggle with inconsistent financial performance, signaling a crucial need for robust financial strategies and training. The findings suggest that simply implementing financial protocols is not enough; MSEs must consistently apply and monitor these practices to improve profitability and cash flow management effectively. Additionally, the analysis identifies specific challenges faced by MSEs between 2021 and 2023, particularly in areas such as customer retention and product development. The existing literature supports these findings, indicating

that tackling these issues could significantly enhance business performance and foster sustainable growth. Addressing gaps in financial literacy and borrowing practices is essential for MSE owners to leverage financing options more effectively, which would positively impact their overall financial viability.

Furthermore, the erratic trends observed in financial performance highlight the necessity for strategic planning and disciplined financial oversight. MSEs that effectively manage costs and sales are more likely to attain better financial outcomes, pointing to the importance of financial discipline for sustainable growth. The implications of these findings are clear: MSEs need to prioritize the development of comprehensive financial management strategies that not only emphasize accurate costing and budgeting but also enhance their capacity for effective cash flow management. By addressing these challenges through targeted training and consistent financial monitoring, MSEs can improve their operational efficiency, stabilize their financial performance, and ultimately achieve long-term success in an increasingly competitive marketplace

Further investigation is needed to understand how financial management interacts with other operational strategies affecting business performance, particularly in the food retailing sector. This holistic approach could be key to unraveling the complexities of performance dynamics in MSEs, ultimately leading to sustainable growth. Future research could explore qualitative methodologies, such as interviews or case studies, to gain deeper insights into the barriers faced by MSEs in implementing financial management practices. Additionally, comparative studies across different sectors may provide a broader understanding of best practices in financial management.

5.0 Contributions of Authors

The first author conceptualized the research topic. Both authors collaborated on data design and analysis, while the second author reviewed the manuscript.

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7.0 Conflict of Interests

The authors declare that they have no conflict of interest.

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Gleaning Fisheries as Context for Culturally Relevant Contents for Science Teaching

Michael G. Garlan
Iloilo Science and Technology University, La Paz, Iloilo City, Iloilo

Author Email: michael.garlan@isatu.edu.ph

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Abstract. This exploratory-sequential study investigates the integration of indigenous knowledge from a Philippine gleaning fishery into science education to contextualize curriculum content and enhance socio-cultural relevance and environmental consciousness. Thematic analysis revealed five key domains of indigenous science: fisheries management, religion, health, conservation biology, and earth science, each offering connections to socio-scientific and environmental issues. A prototype lesson plan was developed based on these themes and underwent pilot testing with 60 participants (30 teachers and 30 students) from a coastal community engaged in gleaning activities. Results showed a moderate acceptance among students (M = 2.99, SD = 0.486) and a high level of acceptance among teachers (M = 3.95, SD = 0.486), as measured using a 4-point Likert scale. The findings underscore the pedagogical value of indigenous knowledge in fostering scientific thinking, environmental stewardship, and culturally responsive teaching. Embedding cultural practices into science instruction empowers educators to create inclusive, meaningful, and contextually grounded learning environments.

Keywords: Contextualization; Culturally relevant teaching; Gleaning fisheries; Indigenous science; Lesson plan; Science pedagogy.

1.0 Introduction

The science curriculum in the Philippines places a strong focus on community involvement and localized teaching, aiming to build on students' existing knowledge and cultural experiences (Buenvenida, 2015). Culturally relevant pedagogy (CRP) plays a significant role in increasing student interest by weaving cultural beliefs, traditions, and lived experiences into science instruction, which helps learners grasp scientific ideas more effectively and see their relevance in everyday life (Handa, 2008; Hammond, 2001; Moll, 1992). Aligned with this approach, the Enhanced Basic Education Curriculum requires schools to adapt learning materials and methods to reflect the cultural and social realities of their local communities, a mandate supported by Section 14, Article XIV of the 1987 Philippine Constitution and reinforced by Republic Act No. 10533 or the Enhanced Basic Education Act of 2013 (Pearl, 2015). Through the K–12 reform, science education aims to improve both scientific understanding and practical skills by relating content to the lived experiences of Filipino students. Nevertheless, effectively applying CRP remains a challenge, particularly when designing teaching strategies that suit diverse cultural settings. Science educators are therefore encouraged to identify and integrate culturally embedded knowledge from their students' environments to enrich classroom instruction. This includes drawing on the scientific aspects found in everyday household practices and community traditions. Research highlights the effectiveness of CRP in the Philippine context; for example, culturally responsive teaching tools such as documentaries and personal reflections have been used to support the educational needs of indigenous communities like the Iraya Mangyan, fostering a more inclusive and culturally sensitive learning environment (Bawagan, 2010). Similarly, Brown and Cooper (2011) argue for

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integrating students' cultural values and experiences into science instruction to support the holistic goals of the K–12 curriculum.

In response to the marginalization of indigenous perspectives, Pejaner and Mistades (2020) highlighted the cultural disconnect experienced by the Obo Monuvu tribe and advocated for curriculum revision to address indigenous realities. Inocian et al. (2020) proposed the Inasal Teaching Model (ITM), which draws from Cebuano cultural identities to design culturally grounded instruction. Meanwhile, Snively and Corsiglia (2000) emphasized the educational significance of traditional ecological knowledge (TEK), calling for its integration into science curricula to recognize multiple ways of knowing. Pawilen (2023) further demonstrated the value of localized and community-based curricula in early science education, advocating for integrating indigenous knowledge, cultural scripts, and local resources to foster children's interest in science.

This study responds to the pressing need for a culturally relevant and context-specific approach to science education in the Philippines. Recognizing the limitations of conventional teaching methods in addressing learners' diverse cultural contexts, this research aims to bridge the gap between indigenous knowledge and mainstream science curricula. It explores the scientific dimensions of gleaning fisheries—an enduring livelihood practice in coastal communities—and investigates how these practices can inform science instruction through a culturally grounded lens. Employing a thematic analysis, the study systematically extracted scientific themes embedded in gleaning practices to develop a lesson plan exemplar rooted in indigenous science. This lesson plan was designed to align with the indigenous knowledge systems and the scientific competencies outlined in the national curriculum. The resulting instructional framework offers a model for integrating traditional ecological knowledge into science education, highlighting the educational value of indigenous wisdom while maintaining consistency with formal science standards.

This study addresses the broader call for inclusive science education by contributing a culturally responsive instructional model. It affirms the importance of recognizing indigenous knowledge as a legitimate and valuable source of scientific understanding. It aims to serve as a reference for educators and policymakers seeking to develop science curricula reflecting learners' cultural diversity in the Philippines and the broader Asian region.

Indigenous Science and Cultural Identity

Indigenous science is necessary for developing Filipino learners' scientific knowledge, attitudes, and process skills while preserving their cultural identity. Indigenous knowledge taught and practiced by community folks includes predicting weather conditions, traditional herbal medicine, preserving and selecting good seeds for planting, and native fruit winemaking. Indigenous science is practiced by different groups of people and early civilizations (Sibisi, 2004). According to Pawilen (2021), indigenous science includes complex arrays of knowledge, expertise, practices, and representations that inform human societies in their interactions with the natural milieu: agriculture, medicine, naming and explaining natural phenomena, and strategies for coping with ever-dynamic environments. Ogawa (1995) also emphasized that indigenous science is experienced and collectively lived in by the people of a given culture. Indigenous science also develops essential values relevant to scientific attitudes, such as motivating attitudes, cooperating attitudes, practical attitudes, and reflective attitudes (Johnson, 1992). Sibisi (2004) underscored that indigenous science provides the basic foundations of astronomy, pharmacology, food technology, and metallurgy derived from traditional knowledge and practices.

Culturally Relevant Education and Pedagogy

Culturally relevant education is discussed here, emphasizing teaching strategies aligned with cultural knowledge, culture-based curricula, and community participation in education. Culturally relevant pedagogy is presented as a new way of teaching that embraces students' customs, traditions, and home worlds. Culture is recognized as an essential part of people's lives, consisting of behavioral patterns, symbols, and institutions, including schools. Demmert and Towner (2003) stated that culturally relevant education includes teaching strategies parallel to cultural knowledge, including culture-based curricula, and involves community participation in educating children. Hammond (2001) and Moll et al. (1992) emphasized that culturally relevant pedagogy is a new way of seeing the world in a way that teachers can teach their lessons while embracing their students' customs, traditions, and home worlds. Banks (2001) believes that culture is an essential part of people's lives, consisting of behavioral patterns, symbols, and institutions, which includes a school as an institution and the students in the school.

Funds of Knowledge and Context-Based Science Curriculum

Funds of knowledge are identified as valuable resources for academic instruction in science. The knowledge and skills gained from these cultural interactions are known as funds of knowledge (Moll et al., 1992), and this knowledge could form a basis for curricular units in science. Genzuk (1999) considered funds of knowledge as an underdeveloped resource for academic instruction that teachers can provide with cultural congruence. Studies of Hispanic students and teachers showed that funds of knowledge are diverse in children because they actively participate in diverse community activities (Moll et al., 1992). Funds of knowledge can be used in teaching to engage teachers in critical pedagogy based on students' resources (Gonzales et al., 1992). When teachers are connected to the sources of students' funds of knowledge, classroom instruction tends to be less transformative and participatory (Moll et al., 1992).

Gleaning Fisheries as Context to Identify Science Contents

The study aimed to glean indigenous science in Guimaras Island in the Philippines, and used the knowledge to identify science contents for context-based and culturally relevant science curriculum framework. *Pagpanginhas* is a native Filipino term that translates to gleaning fisheries. It is one of the many cultural practices in the Philippines and is considered one of the locality's primary livelihood sources. It is carried out in the intertidal zone when the low tide is at its maximum, and the marine species collected include mollusks, echinoderms, and other invertebrates of commercial importance. The often-overlooked practice of intertidal gleaning, a type of small-scale fisheries (SSF), significantly contributes to bolstering food security and augmenting income within fishing communities (Cullen-Unsworth et al., 2014; Grantham et al., 2021; Villarta et al., 2021; Estrada et al., 2021; Stiepani et al., 2022; Treviño, 2022). This form of small-scale fisheries encompasses diverse collection activities, including gathering algae and various invertebrates such as mollusks, echinoderms, or crustaceans. (Andréfouët et al., 2013; Tilley et al., 2021; Stiepani et al., 2022; Anderson et al., 2023). Collectors or gleaners, whether opportunistic or focused on particular species, traverse the shoreline, intertidal zone, or submerge themselves during low tide to gather resources (Grantham et al., 2021; Tilley et al., 2021a; Bantayan, 2022; del Norte-Campos et al., 2023). In contrast to freely swimming fish, the species gathered in intertidal gleaning are visible and easily collected by hand. This accessibility makes it a feasible practice for individuals lacking the skills or equipment required for conventional fishing (del Norte-Campos et al., 2005; Furlong et al., 2020).

The diverse collection activities in intertidal gleaning involve various species of algae and invertebrates. Studying the gathered species provides insights into the biodiversity of intertidal zones and the ecological relationships between different marine organisms. The ability of collectors or gleaners to gather resources during low tide highlights the adaptations of marine organisms to intertidal environments. Understanding how marine organisms adapt to fluctuations in water levels and exposure to air provides valuable information about their physiological and behavioral adaptations. Intertidal gleaning involves individuals traversing the shoreline to collect resources. Examining the interactions and interdependencies among different species and individuals engaged in intertidal gleaning contributes to understanding community ecology within coastal ecosystems. The practice of intertidal gleaning for food and income raises questions about the sustainability of this small-scale fishery. Studying the impact of intertidal gleaning on targeted species and the overall ecosystem helps assess the sustainability of this practice and informs strategies for responsible resource management. Intertidal gleaning involves the collection of various marine organisms, including mollusks, echinoderms, and crustaceans. Researchers can study the taxonomy, life cycles, and ecological roles of the collected organisms, contributing to the broader field of marine biology. The accessibility of intertidal gleaning makes it feasible for individuals lacking conventional fishing skills or equipment. Understanding the social and cultural aspects of intertidal gleaning, including the knowledge and practices of gleaners, contributes to the broader field of social sciences within the context of fisheries management.

These literatures reflect the interconnectedness of indigenous knowledge, culturally relevant education, and the integration of funds of knowledge into science curricula, emphasizing the importance of preserving cultural identity while fostering scientific understanding.

2.0 Methodology

This study investigates one of the five significant cultural practices in a Guimaras Island, Philippines coastal community, specifically focusing on the indigenous knowledge embedded in gleaning fisheries. The research adopts an exploratory-sequential mixed methods approach, a robust methodology that integrates qualitative and quantitative techniques. This approach allows for the comprehensive exploration of indigenous knowledge and

its subsequent translation into a culturally relevant science curriculum to enhance the local educational experience. The research framework is grounded in the epistemology of constructivism, emphasizing the co-creation of knowledge within social contexts. Symbolic interactionism is the theoretical lens that provides insight into the dynamic interplay between cultural behaviors and their symbolic meanings in the community.

The study is structured into two phases: the first entails collecting qualitative data from key informants. In contrast, the second phase involves developing and evaluating a culturally contextualized lesson plan aligned with the Philippine K-12 science curriculum. The key methodological steps are outlined below:

Exploration of Indigenous Science from Gleaning Fisheries

The primary objective of this research was to explore indigenous science within the context of gleaning fisheries, using Spradley's (1979) Developmental Research Sequence (DRS) for thematic analysis. The DRS framework is a well-established qualitative research method that involves systematic data collection, categorization, and analysis. This methodology was complemented by a negotiated agreement approach for validation, incorporating consensual coding techniques as Garrison et al. (2006) demonstrated. In addition, a thorough literature review was conducted, utilizing reputable platforms such as ScienceDirect and peer-reviewed articles, to ensure a comprehensive foundation for integrating indigenous science with formal education.

Selecting a domain. The study focused on extracting indigenous knowledge from gleaning fisheries, recognizing its significance as a source of traditional wisdom and environmental knowledge. The identified knowledge was a foundation for developing a culturally relevant curriculum framework. This framework aimed to bridge the gap between local practices and mainstream education, providing students with a more contextualized and culturally sensitive educational experience.

Selecting an informant. Purposive sampling was employed to select key informants—adults aged 35 and above and their children—who were actively engaged in gleaning fisheries (locally known as *pagpanginhas*). These individuals were selected based on their direct involvement in the practice, ensuring the information gathered was authentic and deeply rooted in the community's lived experience. Furthermore, 30 science teachers and 30 students were included in evaluating the lesson plan exemplar, providing additional insights into integrating indigenous knowledge into the science curriculum.

Choosing a locale. Barangay Dolores, located in Nueva Valencia, Guimaras, was selected as the study site due to its predominantly coastal population deeply engaged in gleaning fisheries. This locale was chosen because of its rich tradition of gleaning as a primary livelihood and its relevance to the study's focus on indigenous knowledge systems.

Learning the language. Hiligaynon, the regional dialect spoken in Western Visayas, was identified as the language of the community. The researcher invested significant time and effort to understand local terminology related to gleaning fisheries, such as *ugsad* (full moon), which provided a deeper understanding of the community's cultural and environmental context. This linguistic preparation was essential for fostering effective communication and ensuring cultural sensitivity in data collection.

Informant's perspective. The researcher employed participant observation to gain a comprehensive understanding of the community's worldview. This approach allowed for immersive engagement in the daily activities of the gleaning fisheries community, facilitating a deeper insight into their practices, beliefs, and cultural significance. This ethnographic method provided a nuanced understanding of how knowledge is situated within social and cultural contexts.

Asking descriptive questions. Descriptive questions were formulated to elicit detailed participant information about their experiences with gleaning fisheries. These questions were designed to uncover the contextual, cultural, and environmental elements that shaped the community's approach to gleaning and how these could be translated into science education.

Sampling. The study utilized purposive sampling to select a representative sample of participants involved in gleaning fisheries. Key informants included adult community members (aged 35 and above) and their children,

ensuring that both generations' perspectives were captured. The study sample comprised 60 participants, split evenly between teachers (n=30) and students (n=30), providing valuable feedback on the lesson plan exemplar.

Thematic, Taxonomic, and Componential Analysis

Domain analysis. The thematic analysis identified a central domain—indigenous science in gleaning fisheries—underpinning the curriculum framework. The thematic analysis revealed key elements of local wisdom, traditional practices, and community values, which are represented in a visual domain model. This model comprehensively represented the interconnectedness of cultural practices and scientific knowledge, forming a coherent foundation for the culturally relevant curriculum.

Taxonomic analysis. Taxonomic analysis explored the relationships between different socio-scientific themes, including fisheries, religious practices, taxonomy, conservation biology, and astronomy. This analysis mapped indigenous knowledge to scientific principles, uncovering meaningful connections that could inform science education. The research also explored how these themes align with existing curriculum standards and proposed ways to integrate them into formal education.

Componential analysis. This step focused on analyzing the relationships between components within each thematic category, identifying variations, similarities, and contrasts. The analysis aimed to uncover the underlying structures of indigenous knowledge related to gleaning fisheries and assess its alignment with the science competencies prescribed by the K-12 curriculum.

Cultural theme analysis. Cultural theme analysis synthesized the findings from the previous analyses to identify overarching cultural patterns that emerged from the community's understanding of gleaning fisheries. These cultural themes were critical in framing the lesson plan and ensuring cultural relevance.

Writing ethnography. The final step involved writing an ethnographic account that effectively communicated the cultural meanings inherent in the indigenous knowledge of gleaning fisheries. This process included both linguistic translation and a rich portrayal of the symbolic and contextual significance of the practices observed. The ethnography bridges cultural gaps, ensuring the community's knowledge is accurately represented and communicated to diverse audiences, including educators, students, and policymakers.

Integration of Indigenous Knowledge into the K-12 Science Curriculum

The study thoroughly reviewed the Philippine K-12 science curriculum, identifying opportunities for integrating local wisdom, sustainability values, and environmental awareness derived from indigenous science. The curriculum analysis provided a framework for understanding how indigenous knowledge can be seamlessly incorporated into science education, fostering a more inclusive, relevant, and meaningful educational experience for students in coastal communities.

3.0 Results and Discussion

The study explored indigenous scientific principles and knowledge in gleaning fisheries, analyzing extensive data. Key insights were used to develop a context-specific lesson plan exemplar, aligning with educational standards and cultural contexts and ensuring seamless integration of indigenous knowledge. Table 1 on gleaning fisheries was used to identify relevant indigenous knowledge consistent with the mainstream science curriculum. The identified topics were then used as bases for developing contextualized, culturally-relevant lesson plan exemplars. The themes extracted from the practice of gleaning fisheries served as a rich source of science concepts that seamlessly aligned with the standard competencies outlined in the Philippines' science curriculum. By deriving scientific content from the cultural practice of intertidal gleaning, the lesson plan became inherently contextualized and, as a result, culturally relevant. This integration ensures that science teaching becomes academically rigorous but also meaningful and specific to the local context. The contextualized lesson plan offers students a unique opportunity to engage with scientific concepts in a way that directly resonates with their cultural experiences, fostering a deeper understanding and appreciation for the subject matter. Overall, the approach enhances the effectiveness of science education and contributes to the preservation and promotion of local cultural practices.

Table 1. *The Five Themes Related to Socio-Scientific and Environmental Issues, Including Fisheries, Religion, Taxonomy, Conservation Biology, and Astronomy, and the Indigenous Knowledge Parallel to Scientific Knowledge and the Suggested Science Curriculum*

Cultural Practice	Ethnography
Gleaning fisheries	Within the gleaning fisheries community, seasoned and veteran fishing folks carefully gather various commercially prized shellfish species, including *sihi, baka-baka, sigay, sikad-sikad, tirik*, and *sobra-sobra*. However, they also avoid certain mystifying zones, known as *mari-it*, which are considered marine sanctuaries. The gleaning fishing folks carefully select mollusks and other marine species with vibrant hues and unconventional features and release premature shellfish species to ensure the continuity of their kind. The harvesting process is governed by a temporal flow, with certain months becoming sacred hiatuses and lunar phases as celestial orchestrators. The dance aligns with the ebb and flow of the tide, with *ugsad* (full moon) and *hunas* (low tide) ushering in preferred daylight hours for the gleaning of marine treasures. The *almanaque*, a local calendar chronicling the moon's phases and celestial events, serves as a revered guide, ensuring gleaning fishing folks' endeavors harmonize with the natural cadence of the ecosystem. This rhythmic pulse of the gleaning fishing community fosters a profound respect for the natural habitat and its mysteries, woven into their daily lives and echoed in their gleaning traditions.

Themes	Indigenous Knowledge	Scientific Knowledge	Relevant Science contents	Curriculum level
Fisheries	The fishing community engages in the collection of commercially significant local shell species, including *sihi* (nerite), *sigay* (tiger cowries), *sikad-sikad* (conch), *baka-baka* (*Lambis lambis*), *tirik* (*T. gratilla*), and *sobra-sobra* (*Aulica* sp.).	Nueva Valencia, Guimaras Island, boasts approximately 18 distinct local shell species (Municipality of Nueva Valencia, Province of Guimaras Archive). These species interact with each other in a dynamic ecological pattern within their own environment.	Biology: Taxonomic classification of invertebrates, specifically within Phylum Mollusca, encompassing classes Bivalvia and Gastropoda; exploration of biodiversity and species richness; food chain; energy transfer	Higher education, senior high school
Religion	Fishermen strategically avoid certain areas, deeming them as *mari-it* (enchanted) and believed to be protected by unseen beings. There is a prevailing belief that trespassing into these areas may incur a spell, motivating the community to leave these zones untouched and undisturbed.	Protected areas provide undisturbed habitats for juvenile marine species, allowing them to grow and explore the ecosystem. Several scientific studies support the assertion that protected areas provide undisturbed habitats for juvenile marine species. For instance, a study conducted by Jones et al. (2018) in marine reserves demonstrated enhanced growth rates and survival rates for juvenile fish compared to non-protected areas. Similarly, research by Halpern et al. (2019) highlighted the positive impact of marine protected areas on the diversity and abundance of juvenile marine species, indicating the significance of these zones for their development. These examples underscore the empirical basis for the statement, substantiating the importance of protected areas in fostering the growth and exploration of juvenile marine species.	Biology: Exploration of Ecosystem Dynamics and Interactions	Senior high school, upper secondary
Health and Medicine	Fishermen refrain from collecting shells exhibiting vivid colors and	Cryptic coloration observed in certain animals, including crabs, sea snails, or conch,	Chemistry: Exploration of conotoxins, neurotoxins, proteolytic	Higher education

	unconventional appearances, such as crabs with algae-covered hairs on their carapace. Additionally, certain species of conch are deliberately avoided for consumption.	may indicate the presence of venom. Within the approximately 500 species of cone snails, each venom comprises 50 to 200 distinct biologically active peptides (Layer & McIntosh, 2006). Additionally, crabs with algae growth on their carapace often signal a potentially unpleasant taste.	enzymes, protease inhibitors, and allergens.	
Conservation Biology	Fishermen selectively harvest fully matured shellfish, releasing small or juvenile animals back into the marine ecosystem to allow for growth. Species carrying eggs are also returned to ensure reproductive sustainability. Additionally, they refrain from collecting species lacking commercial value or those unsuitable for culinary purposes. Furthermore, shellfish collection is avoided during certain months, aligning with responsible harvesting practices.	Scientific studies, such as those conducted by Green et al. (2019) and Smith et al. (2020), affirm that leaving small and juvenile shellfish species uncollected fosters their continuous growth and reproduction. This practice contributes to the potential increase in shellfish populations in the future. Moreover, by refraining from collecting juvenile species and those with eggs, as exemplified in the research of Anderson et al. (2018), the sustainability of shellfish populations is effectively ensured. Such responsible resource use aligns with the concept of intergenerational equity, ensuring that present needs are met without compromising the ability of future generations to meet their own needs.	Environmental Sustainability: Exploring Ecological Dynamics	Higher education, senior high school
Earth Science	Fishermen rely on lunar phases as a key determinant for optimal shellfish collection times. The preferred collection periods coincide with daytime, *ugsad* (full moon), and *hunas* (low tide). Additionally, they consult a local calendar, known as *almanaque*, which delineates the moon's phases and lists astronomical events throughout the year.	The moon significantly influences Earth's tides. During the alignment of the Sun, Moon, and Earth, the solar tide combines with the lunar tide, resulting in an additional low tide. This phenomenon occurs due to the gravitational interaction between the Moon and Earth, causing the tides to rise and fall (Marine Environment Curriculum Study, 1974). The relationship between lunar phases and tidal patterns corroborates the understanding of the gravitational forces at play in shaping Earth's tides.	Physics: Exploring the Influence of Celestial Bodies on Tides, Gravitational Forces, Tidal Patterns, and Planetary Motion.	Senior high school, junior high school, upper elementary

3.1 Development of Science Lesson Exemplar

Gleaning fisheries is the traditional and commercial collection of marine species such as mollusks and echinoderms carried out usually, but not restricted to, intertidal zones and seagrass meadows when the low tide is at its maximum, and the weather is favorable to the shell collectors. Teachers may identify lessons congruent to gleaning fisheries, such as marine biodiversity, food chain, and energy transfer across trophic levels. The lesson plan exemplar developed in this study is contextualized to the needs of the learners who live in the coastal

community, and the activities involved materials that are readily available and familiar to the learners. Thus, their science lesson is connected to the realities in their community. The exemplary lesson plan prototype followed the 7 Es Learning Cycle format (Figure 1) recommended by the Department of Education (DepEd) and the instructional design model suggested by the National Science Teachers Association (NSTA). It has seven (7) phases: Elicit, Engage, Explore, Explain, Elaborate, Extend, and Evaluate, collectively forming a strategic and dynamic sequence that optimizes the teaching and learning process.

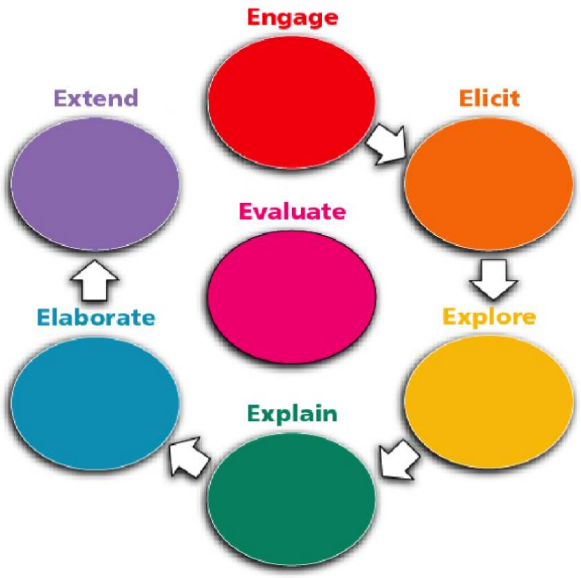

Figure 1. *The 7 Es Learning Cycle Model*

Table 2 presents the 7 Es lesson plan format contextualized to gleaning fisheries. The lesson plan starts with an elicitation phase in this format, activating prior knowledge and curiosity. It then moves to the engagement phase, involving interactive activities and multimedia resources. The exploration phase encourages hands-on learning and deeper understanding. The explain phase introduces formal instruction, demystifying complex concepts. The elaborate phase encourages students to apply knowledge in more complex ways. The extended phase challenges students to apply new knowledge in diverse contexts. The final phase evaluates and assesses students' mastery of lesson objectives, ensuring continuous improvement and informed future instructional decisions.

The prototype lesson plan (Figure 2) underwent a pilot testing phase involving 60 participants categorized as teachers and students. The pilot testing occurred within a school situated in a coastal community actively engaged in gleaning fisheries. The results in Table 3 revealed that the exemplary, contextualized lesson plan got an overall acceptance rating of 2.99 (*M*) with a standard deviation of 0.486 among students (*n*=30). Furthermore, the evaluation from teachers (*n*=30) indicated a notably higher level of acceptance, with a mean rating of 3.95 (*M*) and a standard deviation of 0.486.

Table 2. *The Learning Cycle Format and Teaching-Learning Activities*

Learning Cycle	Activities
Elicit	The teacher initiated a process of understanding the students' existing knowledge by engaging them in a discussion about their perceptions and ideas regarding ecosystems. This involved posing questions to the learners, prompting them to articulate their understanding of the concept. One specific context explored during this knowledge exploration was the "*hunasan*" or intertidal zone, recognized as an ecosystem. Within this dynamic environment, the practice of gleaning fisheries, undertaken by both fishing community members and their children, was identified as a significant component. The intertidal zone, or "*hunasan*," emerged as an illustrative example of an ecosystem where the intricate relationship between the environment and the activities of fishing communities unfolded. This approach to teaching not only acknowledged the relevance of students' prior knowledge but also seamlessly connected theoretical concepts, like ecosystems, to real-world practices, fostering a more holistic and meaningful understanding among the learners.

Engage	The teacher directed the attention of the learners with a deliberate focus on their cognitive engagement, employing visual aids to enhance the educational experience. In this instance, the teacher presented illustrative materials showcasing a diverse array of species found in the intertidal zone. These visuals encompassed various organisms, including seagrass, native echinoderms, crustaceans, and mollusks, creating a vivid and comprehensive representation of the biodiversity thriving within the intertidal environment. By strategically using illustrations, the teacher aimed to deepen the students' understanding of the ecological intricacies of the intertidal zone, providing a visual context for the theoretical concepts discussed. This visual approach not only captured the learners' interest but also facilitated a more immersive and interactive learning experience, fostering a connection between theoretical knowledge and the tangible, diverse life forms inhabiting the intertidal ecosystem.
Explore	The teacher sought to establish a shared and experiential foundation for the learners by introducing a participatory activity known as "*Pasa Lukaba*" (Pass-the-Shell). This interactive game was carefully designed to create a common experience among the students, fostering a sense of unity and engagement within the classroom. The teacher methodically presented the mechanics of the game, explaining the rules and dynamics to ensure a clear understanding among the learners. The game, "*Pasa Lukaba*," served as an immersive and collaborative learning activity, providing a hands-on experience that transcended traditional teaching methods. By actively involving the students in this shared activity, the teacher aimed to not only enhance their understanding of the subject matter but also promote a sense of camaraderie and collective participation in the learning process.
Explain	The teacher proceeded to delve into the conceptual underpinnings of the introduced game, elucidating the underlying principles that connected it to a fundamental ecological concept. The game, "*Pasa Lukaba*," was strategically designed to symbolize the intricate dynamics of energy transfer within a food chain. In this context, the shells themselves served as symbolic representations of energy, embodying the flow of vital resources through various organisms in an ecosystem. Through this illustrative game, the teacher aimed to elucidate the interconnected relationships among different species and their dependence on one another for sustenance. The passing of shells from one participant to another mirrored the sequential transfer of energy within a food chain, emphasizing the vital role each organism plays in maintaining the overall balance of the ecosystem. This hands-on approach not only made the concept more tangible but also provided a memorable and engaging learning experience for the students, reinforcing their understanding of the intricate processes governing energy flow in ecological systems.
Elaborate	Following the theoretical understanding gained from the lesson, the learners actively applied their newly acquired knowledge by engaging in a practical exercise. Tasked with constructing their own food chain, the students drew upon the concept of energy transfer within ecosystems, particularly focusing on the species commonly found in the intertidal zone where they actively participate in *pagpanginhas,* or intertidal gleaning. In this hands-on activity, each student carefully selected and arranged the various species, including seagrass, native echinoderms, crustaceans, and mollusks, to form a cohesive and interconnected food chain. By doing so, the learners not only demonstrated their comprehension of the theoretical concepts but also showcased their ability to apply this knowledge in a context directly relevant to their local environment and cultural practices. This practical exercise not only reinforced the concept of energy flow within ecosystems but also empowered the students to actively engage with and contribute to the ecological understanding of the intertidal zone they regularly interact with during *pagpanginhas*.
Evaluate	The teacher employed an evaluative approach to gauge the depth of the learners' understanding by administering a straightforward multiple-choice test. This assessment aimed to measure the comprehension of the recently covered material, providing the teacher with valuable insights into the students' grasp of the key concepts related to ecosystems, intertidal zones, and energy transfer through food chains. The multiple-choice format offered a structured means of testing knowledge, requiring learners to select the most appropriate response from a set of provided options. This method allowed the teacher to efficiently assess the students' recall of factual information, their ability to apply concepts, and their overall assimilation of the subject matter covered during the lesson. The assessment not only served as a tool for measuring individual progress but also informed the teacher's instructional decisions, enabling them to tailor future lessons to address specific areas of difficulty or reinforce particular concepts.
Extend	The learners' grasp of the conceptual framework was further enriched as they applied the acquired knowledge to a novel context. This extension of the concept beyond its initial presentation allowed students to explore its versatility and relevance in diverse situations. By introducing the concept into a new context, the teacher aimed to reinforce the understanding of its fundamental principles and demonstrate its applicability in various real-world scenarios. This approach not only encouraged a more profound comprehension of the concept but also fostered critical thinking and the ability to transfer knowledge to different situations. Engaging with the concept in a fresh context prompted learners to consider its broader implications, solidifying their grasp of its nuances and encouraging a more holistic understanding. This method of experiential learning enhanced the students' ability to adapt and apply the acquired knowledge, contributing to a more comprehensive and enduring comprehension of the conceptual framework.

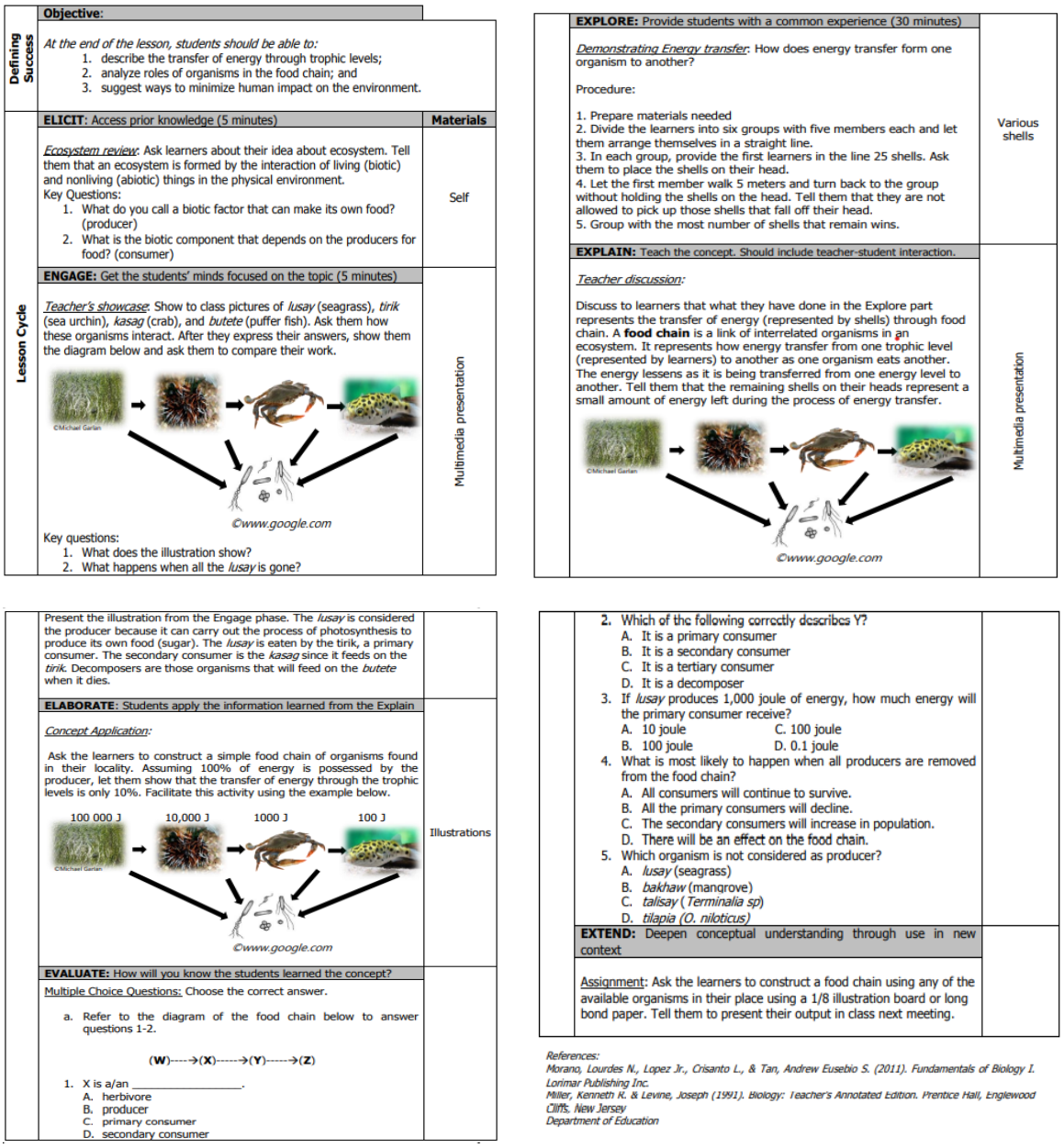

Figure 2. *Sample Contextualized Lesson Plan Exemplar*

Table 3. *Students' and Teachers' Evaluation of Context-based Lesson Plan Exemplar*

	n	Mean	SD	Interpretation
Students	30	2.99	0.486	Acceptable
Teachers	30	3.95	0.486	Very acceptable

Note: 1.00-1.50, Not Acceptable; 2.51-3.50, Acceptable; 1.51-2.50, Merely Acceptable; 3.51-4.50, Very Acceptable

In culturally responsive pedagogy, akin to culturally relevant teaching, the approach capitalizes on the cultural knowledge, experiences, and performance styles intrinsic to ethnically diverse students. This pedagogical methodology aims to augment the quality of learning experiences by integrating and leveraging the diverse cultural attributes of the student population. It aims to improve academic success while affirming students' backgrounds and identities and connecting to individual students' home lives and experiences (Mensah, 2021 in NSTA). Culturally relevant pedagogy serves as a valuable tool for empowering students to glean knowledge and foster habits within the context of their own cultural background and comprehend the broader world beyond the

confines of the school environment (Handa, 2008). This approach employs a comprehensive reliance on everyday experiences to perceive the world. In doing so, a teacher demonstrates respect for students and wholeheartedly embraces their customs, traditions, and individual home worlds (Hammond, 2001; Moll, 1992). Aikenhead (1996) emphasizes the importance of incorporating indigenous knowledge, local practices, and cultural values into science instruction to make it more accessible and engaging while fostering a deeper understanding of scientific concepts within their cultural heritage.

3.2 Development of Culturally Relevant Curriculum Framework

The framework presented in Figure 3 has been developed to serve as a guide in developing a culturally relevant lesson plan deeply rooted in the principles of indigenous science associated with gleaning fisheries. This visual representation shows the interconnected elements essential for creating an educational learning resource that aligns seamlessly with this small-scale fishing industry's cultural context and traditional knowledge systems.

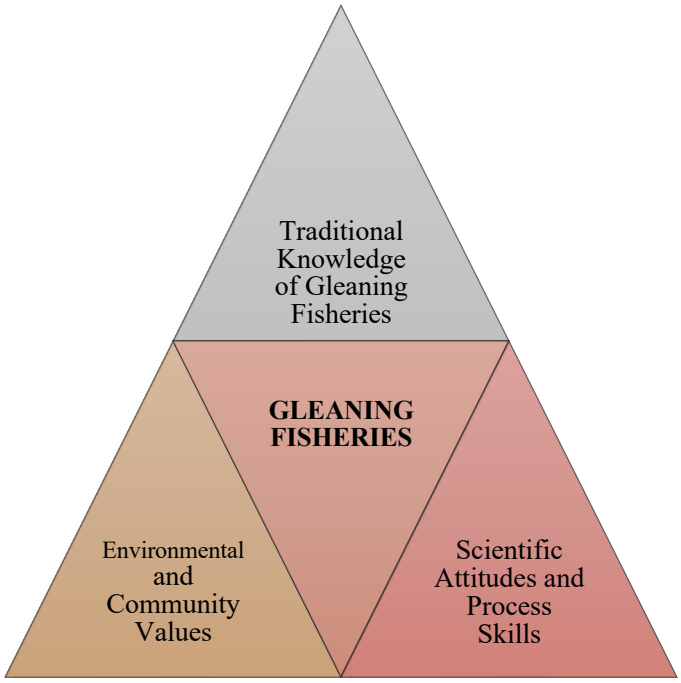

Figure 3. *Indigenous Science Framework Developed in this Study*

At the core of this concept map is the inclusive theme of indigenous science found in the gleaning fisheries, symbolizing the focal point around which scientific knowledge revolves. Branching out from this central theme are vital concepts representing diverse facets crucial to the cultural relevance of the science contents. These nodes include local wisdom, traditional practices, and community values, embodying the unique cultural tapestry that shapes the indigenous knowledge landscape. It also represents a framework for pedagogical implication, acknowledging the need for a teaching approach that resonates with the community's socio-cultural context. Integration with the existing curriculum can be implied, highlighting the importance of aligning the teaching strategies with established educational frameworks while infusing it with the richness of indigenous perspectives and environmental attitudes.

Moreover, the framework emphasizes engagement strategies that promote scientific attitude and skills, fostering a dynamic learning process. Practical applications of indigenous science are also delineated, showcasing how theoretical concepts seamlessly translate into real-world scenarios relevant to the community's daily life. This framework serves as a visual model, illustrating the intricate interplay of elements essential for developing a culturally relevant curriculum grounded in indigenous science. It encapsulates a holistic approach that not only respects and integrates local knowledge but also endeavors to create an educational experience that resonates authentically with the community's lived realities and cultural heritage.

3.3 Traditional Knowledge of Gleaning Fisheries

Within the community, a vibrant tapestry of traditional knowledge intricately weaves together cultural practices, with a particular focus on methods such as gleaning fisheries, ethnobiology, and folk astronomy. As Simons et al. (2016) articulated, traditional knowledge encapsulates a universal understanding among indigenous people, encompassing various facets of life such as history, habits, religion, morality, politics, art, and the intergenerational transmission of wisdom. In the specific context of gleaning fisheries, the traditional knowledge held by the community serves as a cornerstone for sustaining their way of life. The fishing folks of the identified coastal community exhibit a profound mastery of their gleaning fisheries tradition, drawing upon celestial objects to intricately gauge tidal patterns. Their expertise extends beyond simple collection; it encompasses a subtle understanding of species identification, hunting techniques, and the art of imparting this knowledge to subsequent generations.

Moreover, the community shares a rich repository of superstitious beliefs, notably those surrounding "*tag-lugar*," unseen beings believed to inhabit towering trees and enchanting places (*mari-it*). Rather than mere folklore, these beliefs play a vital role in environmental conservation, acting as a deterrent against exploitative practices within the area. This intricate web of traditional knowledge serves as a sustaining force, ensuring the preservation of the environment and preventing undue exploitation. The transmission of this multiperspective knowledge is a testament to the community's commitment to preserving the traditional gleaning fishery. These teachings form an invaluable legacy passed down through generations, fostering a deep connection between the past, present, and future. In essence, the community's embrace and demonstration of traditional knowledge contribute to the sustenance of their livelihoods and embody a profound understanding of the interconnectedness between cultural practices, environmental stewardship, and the preservation of their unique ways of life.

3.4 Environmental and Community Values

Indigenous science, deeply rooted in environmental and community values, reflects a deep connection between the community and the coastal ecosystem, which is their livelihood. The gleaning fishing folk community members, acting as stewards of natural resources, are responsible for safeguarding and nurturing this vital ecosystem. Drawing inspiration from the insights of Straton and Pearson (2008), ecosystem services emerge as a key concept, denoting the natural commodities and provisions critical for sustaining the welfare of those who depend on them. Ecosystem services, including water, climate regulation, and disease control, are intricately linked to the environment's essential components, including soil, water, air, plants, and animals. As highlighted by Barry Commoner's seminal concept from 1971, "Everything is connected to everything else," the coastal community perceives and respects the profound interconnectedness of its ecosystem. This interconnectedness emphasizes that the community's well-being is intricately tied to the health and vitality of their natural surroundings.

In their role as stewards, the gleaning fishing folks of the coastal community prioritize the sustainable management of resources, demonstrating a conscientious approach to prevent exploitation. Recognizing the repercussions of resource depletion on ecosystem services, they actively engage in practices that ensure the regeneration and preservation of these valuable components. This deliberate effort aligns with their commitment to not only meet present needs but also to responsibly re-establish these resources for the benefit of future generations. In essence, the gleaning culture practiced by the fishing folk community embodies a holistic understanding of the environment, emphasizing the mutualistic relationship between human communities and the ecosystems where they live. This moral nature of responsible stewardship underscores a commitment to maintaining the delicate balance between resource utilization and conservation, ensuring the sustained well-being of the community and its coastal ecosystem.

3.5 Nature Dynamics and Science Process Skills

Indigenous science, profoundly ingrained in the cultural fabric of communities, represents a repository of skills and insights honed and transmitted from generation to generation. These scientific skills encompass a range of observational, analytical, and problem-solving abilities, allowing communities to comprehend and navigate their physical environment effectively. These scientific skills manifest prominently within the coastal community as residents leverage their profound expertise in observing intricate tide patterns, deciphering winds, and gauging the total growth of various marine species.

The science of observation, handed down through familial and communal traditions, allows community members to discern subtle nuances in their ecosystem, often imperceptible to untrained eyes. Additionally, the ability to

measure and interpret these observations enhances their scientific understanding, aligning indigenous knowledge with empirical data. This harmonization of traditional wisdom with scientific insights empowers the coastal community to develop context-specific adaptations and mitigations that foster the resilience of their socioecological systems. The coastal community's observation and measurement practices are crucial in addressing climate change challenges. Indigenous knowledge helps evaluate climate change impacts and aligns with climate models. By integrating indigenous and contemporary climate science, communities can contribute to informed decision-making and adaptive strategies. This collaborative approach strengthens resilience and enriches broader scientific understanding by incorporating localized perspectives and insights. In summary, utilizing skills passed down through generations in the coastal community exemplifies the dynamic synergy between indigenous science and empirical data. This amalgamation enhances the community's ability to navigate and sustain their environment and positions them as valuable contributors to the broader discourse on climate change and social-ecological resilience.

Figure 4. *Some Species of Mollusk Gleaned By Fishing Folks*

Within the gleaning fisheries community in the Philippines, the indigenous science practiced by fishing folks integrates traditional knowledge about marine species (Fig. 4), celestial observations, and superstitious beliefs to establish a harmonious relationship with nature. This holistic approach is grounded in respecting nature and maintaining a delicate balance in their lives. The community's gleaning fisheries practices offer a compelling example where the avoidance of collecting undersized and juvenile species aligns with their foresighted use of natural resources, considering the impacts on future generations.

The present study revealed that the fishing folks (Fig. 5) engaged in gleaning fisheries have learned the correlation between celestial bodies and natural phenomena, validating their use of celestial observations to understand and navigate nature. Additionally, it highlights the role of superstitious knowledge in preserving coastal environments, shedding light on the intricate interplay between cultural beliefs and environmental conservation.

Figure 5. *Typical Day for Gleaning by Fisher Folks in the Intertidal Zone*

Integrating indigenous science into science education exemplifies interdisciplinary, encompassing chemistry, biology, and physics alongside cultural, ecological, and economic dimensions. This interdisciplinary approach is

evident in exploring environmental issues from diverse perspectives, fostering a holistic understanding. The fishing folk's philosophy, emphasizing the preservation of nature and the pursuit of a balanced and prosperous existence, offers valuable insights for accommodating environmental ethics in the science curriculum. Students engaged in cultural practices may bring different funds of knowledge accumulated through their lived experiences into the classroom, and these experiences can be utilized to teach meaningful science. Students who are children of gleaning fishing folks and gleaners themselves bring a wealth of knowledge to the classroom, shaped by their personal encounters, cultural backgrounds, and individual perspectives. By recognizing this wealth, science educators can impart meaningful scientific education. Each student's journey outside the classroom contributes to a distinct tapestry of knowledge, ranging from cultural practices like gleaning fisheries to personal observations. By integrating these diverse funds of knowledge, educators can bridge the gap between the tangible realities of students' lives and abstract scientific concepts. This holistic approach makes science education more relevant and transforms the learning process into a dynamic, interactive exploration of the world. Students become co-creators of their scientific learning experience, fostering a more inclusive and engaging educational environment. Educators can unlock a wealth of perspectives by tapping into students' diverse knowledge, encouraging critical thinking and a deeper understanding of scientific principles. In doing so, the classroom becomes a dynamic space where the fusion of personal experiences and scientific exploration cultivates a profound and lasting appreciation for the wonders of the natural world. Aikenhead (1996) emphasized the importance of incorporating students' cultural backgrounds, beliefs, and everyday experiences into science education and argued that science learning should not be detached from students' cultural contexts but should instead be integrated with their lived experiences.

In culturally relevant teaching, Aikenhead (1996) underscores the significance of recognizing and incorporating indigenous knowledge, local practices, and cultural values into science instruction. He contends that such an approach not only makes science more accessible and engaging for students but also fosters an appreciation and understanding of scientific concepts within the framework of their cultural heritage. His work advocates a shift from a one-size-fits-all approach to science education. It encourages educators to tailor their teaching methods to resonate with the diverse cultural backgrounds of their students. By doing so, he believes that educators can enhance the relevance of science education, improve student engagement, and promote a more inclusive and equitable learning environment.

4.0 Conclusion

The research emphasizes the significance of indigenous science in Philippine gleaning fisheries as context for science teaching. Integrating indigenous science into classroom instruction can create a transformative learning experience, bridging the gap between formal education and learners' cultural contexts. This approach allows educators to understand learners' perspectives, thinking processes, and unique cultural insights, making the learning journey more meaningful and effective. It also contributes to preserving and celebrating indigenous knowledge and practices, making the teaching-learning process more meaningful, relevant, and inclusive.

5.0 Contributions of Authors

The author confirms the contribution to the paper as follows: *Corresponding author*: study conception, design, data collection, analysis, interpretation or results, draft of the manuscript, and presentation.

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7.0 Conflict of Interests

The author declares no conflict of interest.

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Interleaved Practice in Remediating Basic Arithmetic Proficiency in Grade One

Junessa T. Bonite
Grade School Department, Sacred Heart School- Ateneo de Cebu, Cebu, Philippines

Author Email: ness.bonite@shs-adc.edu.ph

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Abstract. Mastery of basic arithmetic in grade one is a crucial stage in developing complex mathematical operations. During this stage, learners begin to acquire concepts that are necessary for the foundation of numeracy. Hence, the learners' difficulty in attaining the basic skills of addition and subtraction must be improved; thus, this action research was conducted to minimize learning gaps. This study utilized a one-shot pretest-post-test quasi- experimental quantitative design to examine the effectiveness of interleaved practice as a remedial intervention strategy for enhancing proficiency in addition and subtraction operations among grade one pupils. Specifically, this determined 1) the level of performance of grade one learners in the basic operations of addition and subtraction using: a. traditional blocked practice and b. interleaved practice, 2) a significant difference in the mean scores between the learners under traditional blocked practice and those under interleaved practice, and 3) a significant mean gain between the pretest and posttest scores of learners between traditional blocked practice and interleaved practice. The grade one low-performing learners were selected through their second-trimester grade in Mathematics and the keen observations and feedback of Mathematics teachers during their class activities with the limited sample sizes of 15 for interleaved practice and 15 for traditional blocked practice. The researcher utilized Wilcoxon's Signed Rank Test and Man- Whitney U-test. Results have shown a significant improvement in the performance of the grade one pupil using both interleaved and traditional blocked strategies. Moreover, both interleaved and traditional blocked practices show an approximate equivalency of performance in terms of improving the skills of the learners. Thus, interleaved practice is an effective strategy to substitute the traditional blocked practice in remediating arithmetic skills in grade school. Still, further studies are recommended to test the long-term effect of the interleaved practice in remediating basic arithmetic operations.

Keywords: Interleaved practice; Traditional blocked practice; Arithmetic proficiency; Remediation

1.0 Introduction

The acquisition of fundamental arithmetic skills, particularly in grade one, is a pivotal milestone in a child's mathematical journey. At this crucial stage, students begin to grasp the foundational concepts that will shape their mathematical proficiency in the later years. During this time, children begin to form foundational understandings of number concepts, operations, and mathematical relationships that will influence their future mathematical proficiency (Nunes, Bryant, & Barros, 2012). Among these foundational skills, mastery of basic operations such as addition and subtraction stands as a cornerstone of mathematical understanding. Mastery of these basic arithmetic operations is essential for building a solid mathematical foundation. These skills serve as building blocks for more complex mathematical concepts, including multiplication, division, fractions, and algebra (Ginsburg, 2009).

It is common for students to encounter challenges in grasping these fundamental operations. Some students may struggle with basic arithmetic concepts due to various factors such as learning differences, limited exposure to mathematical concepts, or insufficient instructional support (Skelton et al. 2016). Addressing

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these factors through targeted interventions and supportive teaching practices is crucial for promoting mathematical understanding and reducing anxiety toward mathematics among primary school children. Traditional teaching methods often rely on repetitive practice and drill exercises to reinforce arithmetic skills. While these methods may benefit some students, they may not adequately address the diverse learning needs of all students, particularly those requiring remedial intervention or support (Dunn, et.al, 1995). Thus, exploring alternative instructional approaches that can better accommodate individual differences and promote equitable learning outcomes for all students is a must.

As educators strive to meet the individual needs of their students, innovative teaching strategies are continuously being explored to enhance learning outcomes. One such innovative approach is the interleaving strategy, which diverges from traditional blocked practice by mixing different types of problems within the same practice session. Unlike blocked practice, where students repeatedly solve the same type of problem consecutively, interleaving exposes students to a variety of problem types in a randomized order. Research in cognitive psychology has shown that interleaving promotes deeper learning, enhances retention, and improves the transfer of learned skills compared to blocked practice. The study by Rohrer and Taylor (2007) provides empirical evidence from classroom settings supporting the effectiveness of interleaved practice in promoting understanding, enhancing recognition, and application of learned skills compared to blocked practice. These findings align with research in cognitive psychology, which suggests that interleaving encourages more robust learning processes and facilitates greater generalization of knowledge across different contexts.

Interleaving improves mathematics learning not only by improving discrimination between different kinds of problems, but also by strengthening the association between each kind of problem and its corresponding strategy (Rohrer, Dedrick, & Burgess, 2014). Another study that explores the application of interleaved practice (contextual interference) in motor skill learning demonstrated its benefits in improving the acquisition and retention of complex motor skills. Results replicated previous findings of contextual interference research by showing significant outcomes of block interaction between acquisition trials, retention, and transfer. The random group performed better on both retention and transfer than the blocked group (Goode & Magill, 1986).

In the investigation done among tertiary students, whether continuously alternating between topics during practice or interleaved practice, results have shown the improvement of memory and the ability to solve problems in undergraduate physics. It was concluded that in a domain that entails considerable amounts of problem-solving, replacing conventionally arranged with interleaved homework can (despite perceptions to the contrary) foster longer-lasting and more generalizable learning (Samani, & Pan, 2021). In the review paper Optimizing Learning in College, perspectives on Psychological Science discusses various learning strategies, including interleaving, and their practical applications in educational settings (Putnam, Sungkhasettee, & Roediger, 2016). These mean that the interleaving strategy is now one of the strategies considered to help students retain what was learned which needed more exploration.

Furthermore, interleaving is grounded in cognitive psychology theories such as interference theory and desirable difficulties, which proposes that interspersing varied but related learning tasks leads to increased cognitive engagement and deeper encoding of information. While the benefits of interleaving have been observed across various educational domains, its application in teaching fundamental arithmetic to young learners remains an area warranting exploration. Hence, this action research aims to explore the effectiveness of employing the interleaving strategy as a remedial intervention to enhance arithmetic proficiency among grade one students in the context of addition and subtraction. By integrating interleaving into remedial interventions, this study further seeks to provide educators with evidence-based strategies to support students who struggle with addition and subtraction.

Through an examination of the effects of interleaving on arithmetic proficiency, this research endeavors to contribute valuable insights into effective teaching methodologies for early mathematics education. By empowering educators with evidence-based practices, this study further aimed to foster a supportive learning environment where all students can develop a strong foundation in arithmetic skills, setting them on a path toward mathematical success in their academic journey.

2.0 Methodology

2.1 Research Design

The research study utilized a one-shot pretest-posttest quasi-experimental quantitative design to investigate the effectiveness of interleaved practice as a remedial intervention strategy for enhancing arithmetic proficiency in grade one pupils. To determine the significant difference in the performance between those exposed to the traditional blocked practice, teacher-made pre-post-tests and worksheets on the basic operations were designed.

2.2 Research Participants

All participants were grade one pupil from all sections in a private basic education Institution in Mandaue City, Cebu, Philippines. Selected participants were identified through the learner's second-trimester grade in mathematics and from the feedback of the mathematics teachers. Only the low-performing pupils who did not meet the standard grade were selected. Participants were chosen through purposive sampling technique. Thirty pupils were selected, and each were randomly assigned between two groups. Half of the pupils were assigned to the control group and the other half for experimental group to ensure an unbiased comparison between instructional methods. The control group of fifteen assigned learners were taught using the traditional blocked practice, while the experimental group of fifteen assigned learners used the interleaved practice. The low-performing grade one pupils received remediation for twenty (20) sessions. The control group received thirty (30) minute practice per session focusing solely on addition or subtraction operations using the traditional blocked practice method. The experimental group received thirty (30) minute practice per session involving mixed addition and subtraction problems utilizing the interleaved practice method through worksheets and exit slip activities. The worksheets and exit slips were checked by three credible validators to ensure the validity of the instruments.

2.3 Data Gathering Procedure

Upon the approval of the study and issuance of its ethical clearance from the Institutional Research Committee of Sacred Heart School- Ateneo de Cebu, consent was sought from the Grade School administration and parents of the selected grade one participants. With the granted consent, the selected grade one learners were assigned to control and experimental groups. Then, learners were oriented toward the study, its procedure, advantages, and disadvantages. After the preliminary was done and approval was received, the selected learners took the researcher-made pretest. The pretest was the same for both the control and experimental groups. Then, the learners underwent twenty (20) sessions of remediation using the assigned strategy in their group. At the end of the whole remediation session, the selected pupils took the researcher-made posttest. The pretest and posttest were the same for both groups.

2.4 Data Analysis

The pretest and posttest scores of the grade one pupils were initially analyzed by determining the mean scores. This was done to determine the pupils' performance before and after receiving the remediation in each respective group. For the difference between pretest and posttest of each group, Wilcoxon's signed rank test was used. Then, Mann- Whitney U Test was employed to determine the significant difference between the posttest mean score of the pupils remediated through traditional blocked practice and those that were remediated through interleaved practice. This analysis was selected since the values do not conform to a normal distribution. Rank biserial correlation test was also utilized to identify the effect size for both groups.

2.5 Ethical Considerations

A clearance to conduct research was requested from the grade school principals, the Institutional Research Committee, and the data protection officer before the commencement of the study. A reply slip from a written consent form sent to the parents explaining the nature and objectives of the study, the data needed from the pupils, and the process of conducting it was sought. Participation in this study was invitational and voluntary. The pupils were given an orientation on the processes of the study and the liberty to decide to be part of the study and to withdraw their participation anytime if they decided to do so. Furthermore, to ensure confidentiality and to reduce research bias, a list per section was linked in codes, and questionnaire and answer sheets were kept with utmost confidentiality and were free from any information that would identify

the research participants. The identity of the participants was concealed in all reports- written and verbal. All the information obtained about the participants was handled and kept in confidence. Measures were taken to ensure the confidentiality of participant data, including anonymizing data during analysis and storing of all research-related documents. Furthermore, all raw data were deleted upon the culmination of this research by the Data Privacy Act of 2012.

2.6 Limitations and Delimitations

The study acknowledges potential limitations, such as sample size constraints, variations in implementation fidelity, and external factors influencing outcomes. Delimitations may include focusing exclusively on grade one pupils, specific arithmetic skills (addition and subtraction), and instructional interventions (traditional blocked practice and interleaved practice). By employing a rigorous research methodology, the study aims to provide robust evidence on the effectiveness of instructional interventions for enhancing arithmetic proficiency in grade one pupils, thereby informing educational practice and policy.

3.0 Results and Discussion

This section presents and discusses the results, and the findings based on the data gathered. Table 1 shows the Wilcoxon Signed Rank Test result between the pretest and posttest scores of interleaved practice. Table 2 shows the Wilcoxon Signed Rank Test result between the pretest and posttest scores of Traditional blocked practice. Table 3 shows the result Mann- Whitney U Test results to determine the significant difference between the posttest mean score of the pupils remediated through traditional blocked practice and those that were remediated through interleaved practice.

Table 1. *Difference between the Pretest and Posttest Scores of Interleaved Practice*

Test type	Mean	t	p-value	Interpretation
Pretest	5.87	-3.40	<.0001	With Significant Difference
Posttest	14.40			

Note: *Significant if p<0.05; Effect size= -0.88 (strong negative difference)*

The results indicated a statistically significant difference between the pretest and posttest scores of pupils exposed to interleaved practice, as reflected by a Z value of -3.4078 and a p-value of less than 0.00064. Since the p-value is well below the 0.05 threshold, the null hypothesis of no difference was rejected. The mean scores increased from 5.87 during the pretest to 14.4 in the posttest, demonstrating a substantial improvement. Additionally, the effect size of -0.88 suggests a strong and meaningful difference, reinforcing that interleaved practice contributed to a significant enhancement in performance. These findings align with broader research on interleaved practice. The study by Rohrer et al. (2020) highlights the benefits of interleaved practice in fostering deeper learning and adaptability by forcing students to select appropriate strategies for each problem rather than relying on repetitive patterns. Additionally, interleaving naturally incorporates the spacing and retrieval effects, both of which are known to enhance long-term retention and problem-solving skills.

Furthermore, a meta-analysis conducted by Brunmair and Richter's (2019) quantified the overall effectiveness of interleaved practice across various domains. Their analysis revealed a small positive effect for mathematical tasks, suggesting that interleaving is beneficial for procedural knowledge but may vary depending on implementation and task design. On the other hand, Van der Haar et al. (2023) revealed that interleaved practice increased short-term retention scores by 0.29 standard deviations but showed no significant improvement in cumulative assessments over the academic year. The study suggests that interleaved practice may have mixed impacts depending on the test type and retention interval. These studies collectively highlight the effectiveness of interleaved practice in enhancing procedural knowledge, fostering flexible strategy use, and promoting long-term retention across various age groups and mathematical domains. The present study contributes to this body of research by providing evidence that interleaved practice can be successfully applied in early elementary education to remediate and enhance basic arithmetic skills. This convergence of findings emphasized the potential of interleaved practice as a versatile and impactful instructional strategy that educators can leverage to improve mathematical literacy and adaptability in young learners. Similarly, the time-tested traditional blocked method has shown dependable results as shown in the table below.

Table 2. *Difference between the Pretest and Posttest Scores of Traditional Blocked Practice*

Test type	Mean	t	p-value	Interpretation
Pretest	6.40	-3.407	<.001	With Significant Difference
Posttest	13.40			

Note: *Significant if p<0.05; Effect size= -0.86 (strong negative difference)*

As shown in Table 2, the findings revealed a statistically significant difference between the pretest and posttest scores of students who engaged in traditional blocked practice, as shown by a Z value of -3.4078 and a p-value of less than 0.00064. Since the p-value is below the 0.05 threshold, the null hypothesis was rejected. The mean scores improved from 6.4 in the pretest to 13.4 in the posttest, indicating a substantial gain in performance. The effect size of -0.86 further supports that this difference was strong and meaningful, suggesting that traditional blocked practice had a significant positive impact on students' performance.

In the study, "why do people overestimate the effectiveness of blocked learning?", it was found out that people overestimate the effectiveness of blocked learning due to the immediate memory boost caused by blocked learning and not due to their previously acquired habit to study in blocks. The study pointed out how evaluations for effectiveness are not always accurate. (Krasnoff, 2023) Blocked practice has traditionally been effective for **initial** skill acquisition**,** especially in early stages of learning like basic arithmetic (addition and subtraction) (Rohrer, 2012; Taylor & Rohrer, 2010). It allows focused repetition which can boost confidence and reinforce mastery of procedures, especially for younger learners.

However, while blocked practice resulted in significant immediate gains, some studies caution that its benefits may not sustain over time. Blocked practice tends to encourage rote memorization rather than flexible problem-solving, which might limit students' ability to transfer their skills to much complex problems (Rohrer & Taylor, 2007). Thus, while effective in the short term for basic computational skills, blocked practice might be less beneficial for promoting deeper mathematical understanding compared to more varied practice strategies like interleaving.

In grade one, concepts are taught in traditional blocked practice. This is done to allow sufficient time for mastery since this is the entry level were concepts are still introduced. The result of the test has highlighted the effectiveness of the Traditional Blocked Practice. However, problems such low retention from the next level continues to resurface. Thus, the need of another strategy for intervention.

Table 3. *Difference between Posttest Scores of Interleaved and Traditional Blocked Practices*

Strategy Type	Posttest Mean Score	U-value	p-value	Interpretation
Interleaved Practice	14.40	98	.281	No Significant difference
Traditional blocked practice	13.40			

As shown in Table 3, the results revealed that U value of 98 indicates that the difference between pretest and posttest scores after implementing interleaved practice is not statistically significant. This suggests that interleaved practice has comparable measurable improvement in students' basic arithmetic performance with the traditional blocked practice. Both practices are effective in improving the skills of the learners. Although the results showed no statistical significance, previous research conducted around the world support the idea that somehow interleaved practice yields better results compared to traditional blocked practice. Herrington (2021) found that interleaved practice resulted in better delayed assessment scores compared to blocked practice, with 75% accuracy for interleaved assignments versus 61.7% for blocked ones. Further evidence supporting the efficacy of interleaved practice comes from a study on subtraction strategies among German third graders, which demonstrated that interleaved instruction fostered greater adaptive use of shortcut strategies compared to blocked practice. Nemeth et al. (2019) found that interleaved practice in elementary school

mathematics fosters flexible and adaptive use of subtraction strategies. Specifically, their results suggest that interleaving, when paired with prompts to compare and discriminate between tasks, enhances learners' ability to choose appropriate strategies based on task characteristics.

Braithwaite and Hall (2024) found that while explicit instruction in fraction arithmetic is effective, there is no evidence that explaining the rationales behind mathematical procedures or interleaving practice enhances the effects of such instruction on procedural knowledge. This suggests that explicit teaching methods alone are sufficient for improving procedural understanding, and additional strategies like rationale explanations or interleaved practice may not provide further benefits in this context.

However, despite the absence of statistically significant difference between the two interventions, research articles could not help but highlight the effects of interleaved practice in comparison to the traditional blocked practice. Schorn and Knowlton's (2021) found that interleaved practice benefits implicit sequence learning and transfer. Participants who practiced sequences in an interleaved manner showed better retention and transfer compared to those who practiced in a blocked manner. Even when participants were unaware of the sequences, interleaved practice enhanced their ability to recall and apply the learned patterns.

Agarwal and Agostinelli (2020) contrast interleaved practice with blocked practice, where students practice one concept at a time, while interleaving, which involves mixing up different types of problems, enhances long-term learning by requiring students to discriminate between problems and select appropriate strategies. They argued that while blocked practice may lead to higher initial performance, interleaved practice results in better retention and understanding over time.

In this paper, the researcher proposes that interleaved practice will be used in remediating arithmetic proficiency among grade one learners. This involves mixing different types of arithmetic problems (e.g., addition and subtraction) within practice sessions. Interleaved practice enhances problem- solving fluency, retention, and adaptability by requiring students to select appropriate strategies for each problem (Rohrer et al., 2020; Nemeth et al., 2019). By incorporating interleaved practice into daily routines, teachers can foster a robust understanding of arithmetic concepts and prepare students for more complex problem-solving scenarios. This approach is supported by research demonstrating its effectiveness in improving long-term learning outcomes across various educational contexts (Agarwal & Agostinelli, 2020). This adaptability is crucial for grade one learners who are still developing their ability to apply learned strategies across different types of arithmetic problems.

4.0 Conclusion

Based on the results, the pupils who were exposed to interleaved practice displayed significant improvements in their performance levels after the intervention. It has comparable statistical effectiveness with the traditional blocked practice as evidenced by the insignificant difference in the post-test and gain scores. Thus, the interleaved practice is as effective when it comes to remediating a pupil's basic arithmetic proficiency in addition and subtraction. It can be concluded that the use of interleaved practice showed a measurable contribution towards arithmetic proficiency on addition and subtraction and is a good alternative strategy to be implemented next school year together with the traditional blocked practice.

As a recommendation, it is suggested to continue implementing the interleaved practice over a longer period to allow more time for its effects to become evident. Also, ensure that the practice methods are applied consistently across all participants to reduce variability. For future research, it is recommended that researchers utilize assessment tools that are sensitive enough to detect changes in students' performance. Exploring other strategies that would help improve intervention programs in Mathematics is also recommended.

5.0 Contributions of Author

The author solely conducted all aspects of this research, including the conceptualization, data collection, analysis, writing, and finalization of the manuscript.

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7.0 Conflict of Interests

There is no known conflict of interest encountered in this study.

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Chatbot as Academic Companion: Exploring Education Students' Narratives in Using Artificial Intelligence in Learning

Grover Stephen T. Masula*, Rebecca T. Barrios, Elmer D. Hilario
Northwestern Visayan Colleges, Kalibo, Aklan, Philippines

*Corresponding Author Email: masulagroverstephen@gmail.com

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Abstract. This qualitative narrative study aims to explore education students' experiences, challenges, and opportunities using artificial intelligence (AI) chatbots at a college of education in Kalibo, Aklan. This study applied a narrative inquiry as the research design to delineate the experiences, challenges, and opportunities of six participants with experience of at least three years of AI chatbots. The researchers used semi-structured interviews to elicit detailed and in-depth narratives. The data analysis to generate themes in this study was the Collaizi method. The study revealed that education students' experiences in using chatbots revolve around their being established digital natives, exploring chatbots' question-and-answer interface, and utilizing it when the deadline is near. The challenges encountered by the students using chatbots were the stress from hallucinations and fact-checking, their inexperience with the technology, and the internet connectivity problem. The opportunities for students to use chatbots were efficiency in academic work, awareness of technology dependency, a guide for language improvement, and a chatbot as a savior in times of procrastination. These findings suggested that digitally literate education students utilized chatbots when dealing with short-term necessities and convenience. Challenges resonated with the call to expand students' ethical awareness of using chatbots. Thus, chatbots revealed the budding potential as an academic companion but also a call for dialogue among academes, which should and should not be allowed.

Keywords: Artificial intelligence; Challenges; Chatbot; Opportunities; Students' narratives.

1.0 Introduction

Chatbots, artificial intelligence on the internet that is designed for textual or spoken conversations, have increasingly gained popularity over time and are being utilized for all purposes. However, chatbots in educational environments are quite limited. (Yang & Evans, 2019). Eventually, chatbots have been used in education increasingly rapidly (Fauzi et al., 2023; US Department of Education, 2023). Along the educational level, tertiary education mainly uses chatbot applications (AIPRM, 2024). The adoption of AI chatbots in the tertiary or higher education institutions (HEIs) is changing the nature of education by providing chances for improved student engagement and effectiveness in administration (Chukwuere, 2024). Chatbots powered by artificial intelligence (AI) can fundamentally alter how students interact with and absorb knowledge.

Recent studies on artificial intelligence have explored the opportunities of chatbots in education, specifically for student learning. One significant benefit for students is AI chatbots' capacity to provide an interactive interface for personalized learning (Baha et al., 2023; Ventura, 2017; Labadze et al., 2023; Oranga, 2023). Students applied chatbots, which provide instructions for their learning, resulting in quick access to learning materials, immediate

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feedback, and a rising level of engagement and interest (AIRPRM, 2024; Celik et al., 2022; Cheong-Trillo, 2023). Moreover, feedback in the context of education allows students and teachers to interact with the teaching-learning process in the classroom environment, whether physical or distant (Cavalcanti et al., 2021; Dwivedi et al., 2023). Other benefits of chatbots in education are communication and artificial intelligence. The gradual conversation with the chatbot shows the effectiveness of its use and language correction (Kaharuddin, 2021; Sedblauer et al., 2024). Finally, chatbots fostered learning free of anxiety and facilitated communication (Baha et al., 2023; Antony & Ramnath, 2023). Artificial Intelligence, particularly chatbots, significantly enhances educational learning experiences for students and teachers alike.

On the contrary, several challenges were found, including inaccurate responses, plagiarism, academic dishonesty, and cheating. Students encountered questionable replies from the chatbot when asked ineffective questions. In return, the chatbot responds with AI hallucinations or provides incomplete or inaccurate answers (Farrokhnia et al., 2023; Jurado et al., 2023; Shoufan, 2023; Weise, K., & Metz, C., 2023). Ethical implications were discussed in the studies, which showed that there is a need for guidelines in the use of artificial intelligence, let alone chatbots (Kooli, 2023). When sent to the chatbot, students' original works were claimed by AI as its own (Shidiq, 2023). The danger in sending original content to a chatbot is when it is seen as similar to AI-generated content, as detected by the plagiarism checker. Furthermore, there are concerns about the student use of AI chatbots in a most convenient way leading to plagiarism, academic dishonesty, and cheating (Farazouli et al., 2023; Gökçearslan et al., 2024; King, 2023).

AI chatbots have evolved to reach education with their benefits and drawbacks. The previous studies emphasized the opportunities for using AI chatbots in their academic pursuit, particularly in personalized learning. The feedback system was also highlighted as it allowed student engagement, interaction between student and teacher, and flexibility in learning modality. The frequent use of chatbots most likely relates to the students' language learning. Challenges were focused on the flaws of the chatbots and the students. Chatbots supplied inaccurate responses while students were tempted to cheat. With this matter, researchers must take action to elucidate how education students in higher education experience using AI chatbots, as they may similarly traverse as the studies reveal.

This study explores the narratives of education students on using chatbots in the College of Education Department of the Northwestern Visayan Colleges in Kalibo, Aklan, Philippines. Particularly, it delves into their experiences, challenges, and opportunities using artificial intelligence. The research applies a qualitative approach to delineate how chatbots accompany education students and the interactions among education students and other groups in common. The results contribute mainly to the academic institutions' upholding legal, social, and ethical responsibilities in using technology, specifically artificial intelligence. Given the discussions above, the study's findings aid in the development of ethical policies on artificial intelligence to avoid plagiarism and strengthen academic integrity.

2.0 Methodology

2.1 Research Design

The research design used by the researcher in this study is a narrative inquiry. This approach studies the participant's experience of a particular occurrence. Narratives are as much a technique as a phenomenon (Connelly & Clandinin, 1990). This study investigates the lived experiences of education students using AI chatbots, learns more about their thought processes, and broadens a researcher's understanding of AI chatbots. The nature of this study design is descriptive; the researcher narrates education students' experiences. The education students explained how the AI chatbot was introduced to them, and how it was used in their recent applications. They also sought through their challenges and opportunities the use of AI chatbots as an academic companion. The researcher carefully examined the education students' experiences through observation and conducting interviews to gather data. Observation notes and interview transcripts are examples of the data utilized in narrative inquiry, which Clandinin and Connelly (2000) refer to as field texts. These narratives interconnect other constructs, revealing a wider vantage point of how AI chatbots are established as a pathway to the future of education.

2.2 Research Locale

The study was conducted at Northwestern Visayan Colleges (NVC), specifically the College of Education Department in Rustico Salazar Quimpo (RSQ) Building, Capitol Site, Estancia, Kalibo, Aklan. The College of Education Department is a PACUCOA-accredited higher educational institution, a three-story facility that houses highly qualified and globally competitive students through fully equipped professors and faculty. The Education Department offers four programs: Bachelor of Secondary Education (BSED) with four majors: Social Studies, English, Mathematics, and Filipino. Bachelor of Physical Education (BPED), Bachelor of Culture and Arts Education (BCAED), and Bachelor of Elementary Education (BEEd).

2.3 Research Participants

The study participants were two (2) third-year college students and four (4) fourth-year students from Northwestern Visayan Colleges with BSED degrees. The participants of the study were chosen using the following inclusion criteria: (1) The participant must have at least three years of experience using chatbots in their learning, (2) age and sex will be considered in choosing the participants, (3) place where they use chatbots in learning will be considered in selecting the participants, (4) type of chatbots is considered in choosing the participants, and (5) year level of the participants and program. The names of the six participants were not disclosed and their identities were hidden for the privacy of the participants.

Table 1. *Inclusion Criteria in the Selection of Participants*

Participant	Age	Sex	No. of Years Using AI	Program	A place where a Chatbot is Used	Type of Chatbot
P1	22	Male	4	BSEd	School	CiCi Ai
P2	20	Female	3	BSEd	School	Chatgpt, Chai
P3	22	Male	3	BSEd	School	Chatgpt and Perplexity AI, Cici Ai
P4	22	Female	3	BSEd	Home	Chatgpt, CiCi Ai
P5	21	Female	4	BSEd	Home	Chatgpt and Quilbot, Chatbot
P6	23	Male	3	BSEd	Home and School	ChatGPT, Clova

The researcher used purposeful sampling, which is employed in qualitative research, to choose a specific population or unit of study. Participants were chosen "on purpose," as opposed to at random. This method is frequently called judgmental sampling or selective sampling.

2.4 Research Instrument

The researcher used an interview guide as a research instrument to collect data after identifying the qualified participants. The objective of interviews was to get more detailed information on a person's attributes, experiences, behavior, preferences, attitudes, and knowledge from a limited number of respondents. Interview questions are typically open-ended to allow for the collection of detailed information. Interviews are most useful for qualitative research, such as narrative inquiry studies, because they aid in explaining, understanding, and exploring research subjects' opinions, behavior, experiences, phenomena, etc. For them to clearly express their experiences using chatbots in learning, the prepared questions were asked through printed questionnaires that have been translated into both English and Akeanon. They also answered the questions in the language they were most comfortable with. The researcher distributed printed questionnaires with interview questions to collect data. Additionally, upon the completion of data collection, participant responses were compiled, handled, and analyzed.

2.5 Data Gathering Procedure

The researcher provided a permission letter to the dean of the College of Education at Northwestern Visayan Colleges. After approval, copies of the interview questions were distributed to the respondent to gather the relevant data. The interview questions were given face-to-face. To offer participants an environment where he or she can respond to questions on their experiences and difficulties incorporating chatbots into their learning process, while keeping in mind student convenience, the researcher used individual discussion, which is economical and convenient for the participants and researcher. After they had completed responding within the allotted time, the instrument was collected by gathering the questions from the participants.

2.6 Data Analysis Procedure

Participants' data were organized, analyzed, and interpreted to collect, process, and assess. After being read and broken down into parts, the data was classified and labeled, the extraneous material was eliminated, and the data was organized into themes that accurately and fully captured the participants' lived experiences. The data analysis employed the Colaizzi technique. One examines the early informants' statements of their experiences to gain a general understanding of the situation. After that, important assertions are found. The important claims serve as the basis for meaning formulation. Meanings are constructed to establish themes. A thorough explanation takes topics into account. The basic structure of the phenomenon is developed. Finally, the informants evaluated the analysis results to check whether it aligned with their initial experiences and validated their results. A population of the participants' experiences is utilized to inform the conceptualization of reasonable care by adapting the Colaizzi method.

2.7 Ethical Considerations

In this study, the researcher ensured that the target participants were well informed about the relevant information to acquire their consent to participate. The researcher also allows the participants to withdraw, stop, or leave at any point in the study, ensuring that the participants are not forced to participate in the study. Moreover, the personal details of the participants should be kept anonymous and private throughout and after the study is conducted. In addition, the researcher assured that the participants would not be harmed physically and psychologically during and after conducting the study, and thus does not and will not require the participants to participate in any physical or psychological activities. Lastly, the researcher conducted counseling and follow-up meetings with the participants after the study was conducted to ensure no lasting effects of participating on the participants.

3.0 Results and Discussion

3.1 The Experiences of Students in Using Artificial Intelligence Chatbots in Learning

The participants of this study were asked to tell their overall experience of using artificial intelligence chatbots in learning.

Established Digital Natives

Most participants learned about AI chatbots through online platforms and advertisements. It popped into their timeline on Facebook and the For You Page (FYP) in TikTok, which opened the door for them to utilize an AI chatbot. Becca and Con shared that they saw it online. On the other hand, most participants got information and were introduced to AI chatbots from friends who are familiar with technology and utilize chatbots. These students presented the chatbot to them as a resource that can ease tasks or offer support, particularly for academic assignments, as stated in the study of Labadze et al. (2023), which reveals the assistance given by AI chatbots, specifically in the areas of homework and studies. This indicates that AI chatbots were brought to these participants' attention through online exposure and personal ties with friends who are pioneers in using the technology.

"I became aware of it because it is very famous not only on Facebook or other digital platforms but even among my classmates who also use it, which is why I got motivated to use it as well." (P2)

Con: I learned about AI chatbots from social media, school discussions, and online platforms where they usually pop up on my timeline. They became popular tools, and I wondered how they could simplify tasks or provide assistance, especially to me as a student. (P3)

Other participants stated that their friend, who is a digital native and a user of chatbots, introduced them to artificial intelligence chatbots.

"I learned it from my cousin who uses chatbot-like change when doing her school work. She introduced it to me, knowing that I am struggling with my school work also." (P5)

"My friend introduced me to this when we had a task in our online class. She said it would be easy to conceptualize an answer using a chatbot that can generate an answer quickly within a short period." (P1)

"I just learned about this chatbot from a friend of mine who is an IT professional who also uses something like this in their field, so I am also curious to try it out." (P6)

Question and Answer Interface

As chatbots create human-like conversations (George, 2023), most participants highlight their experiences using AI chatbots. They reflect on how these chatbots work. The participants' stories demonstrate AI chatbots' notable development and capabilities as a tool that operates through a question-and-answer interface. This finding is related to a study by Šedlbauer et al. (2024) that demonstrates how chatbots alter the process of creating questions, making them more effective and time-saving than a Google search. Their responses demonstrate the effectiveness, conversational potential, and potential of advanced AI chatbot algorithms that make this instrument efficient and accessible to everyone. They also acknowledge the limitations in response quality and stress the significance of user commands and input, which influence the chatbot's efficacy and accuracy. It highlights the significant role of precise prompts for AI to have an accurate "understanding" of the question's objective (Šedlbauer et al., 2024).

Two of the participants showed how they input the question, and then the AI generates a response to the user's command.

In CiCi, an application on a mobile phone, you just input a question into the AI, and after a minute, it will generate an answer. You can also ask for the image, as long as you have a strong internet connection, it will generate what you ask." (P1)

"Based on my learning, ChatGPT is a chatbot where you can ask any question and it will provide an immediate and specific answer. You just have to type your question and it will generate the answers." (P2)

Another participant described their engagement with chatbots as similar to directing a robot that exhibits an understanding of the advanced algorithms that power chatbots and a database that analyses the question given; the same with other participants, it works as where the user submits a question or information and swiftly receives a response that resembles human conversational patterns.

"From what I have learned from using AI for quite some time, chatbots use advanced algorithms and databases to analyze questions, which is very promising, predict answers, and provide helpful responses, almost like acting or mimicking human conversation patterns. Based on my learning, a chatbot works like commanding a robot. You input the question or data, and then in just a split second, it generates the answer I need." (P3)

In addition to its role in producing information in response to the participant's questions. Some also admit that AI's use of language might occasionally be over-the-top.

"You just have to type and it will automatically generate an answer quickly. However, sometimes they can be over-the-top in providing definitions or responses, so it also needs to be refined." (P2)

Another participant pointed out that an AI chatbot works best if you are using specific information to be able to answer the question you input on the site online.

"By inputting specific information into the site, it generates the answer that you are looking for." (P6)

When the Deadline is Near

As a result of the collective responses of the participants, the approaching deadlines and academic workloads motivated the participants to use AI chatbots as a learning tool and support in making their work fast and easy, and meeting the deadlines of the academic activities. Baha et al. (2023) stated that integrating AI technologies enables students to meet academic goals, save time, and lessen anxiety caused by heavy academic responsibilities. It also reveals the convenience and efficiency of these chatbots that provide crucial support, particularly during heightened stress.

Participants shared their difficulties completing their school work on time and sought help from chatbots, which they used as learning support. It reveals the ability of chatbots to help students in their academic work.

"Sometimes because of the struggles I encountered in academics especially if the task they gave to us was quite difficult I searched on Google for some explanation and examples but because of the too much data and information that Google gave, I tend to use chatbots who work as a human that gave specific answers to my queries. Because it is fast and accessible, I accomplished my school work early." (P4)

I have many workloads, which is my motivation, and using AI helps me make my work easier. When I use chatbots, they correct my English grammar and make my work clearer and more creative. That is why I became a user of chatbot AI. (P5)

"Due to a lack of time to work on projects and meet deadlines, I am using a chatbot to make my work more efficient so I will not be overwhelmed and can also finish other schoolwork." (P6)

3.2 Challenges of Students in Using Artificial Intelligence Chatbots in Learning

Stress from Suspected Hallucination and Fact-Checking

The responses obtained from the participants showed the prevalent concerns about the accuracy and correctness of the AI-generated data and responses, which cause them stress and anxiety, particularly in circumstances where they need to meet the deadline, critics explain the instances of hallucination of AI chatbots as it generates incorrect response (Weise, K., & Metz, C. (2023). While showing the excellent help and potential of the AI chatbot as learning support, the concern about the accuracy of the answers of this tool cannot be ignored, so the user is still required to double-check and find other sources that will support the answers generated by the AI.

"Yes, sometimes you are doubting the accuracy of the information generated by AI chatbots like ChatGPT, and if you do not have time to double-check the credibility of the answers, you might be overthinking and stressing out about it." (P1)

"Using chatbots isn't difficult because they're user-friendly, but sometimes they misunderstand my question or give general answers to my question that require me to rephrase my question again for clarity." (P3)

Two of the participants added that there were conflicts that they encountered, specifically in the mental aspect and emotional aspects, because it required them to double-check the generated answers of the chatbot, which made it mentally draining. After all, they had more things to do and felt frustrated when he rushed to meet the deadline, but the chatbot did not provide the exact information he needed.

"Sometimes, I overthink whether the chatbot's answers are accurate, making me doubt and double-check ideas over and over again, which can be mentally draining, especially if I am doing a load of work that adds to my stress in dealing with my academic task. Con: In the emotional aspect, I think it is when the chatbot does not provide the answer I need, I feel frustrated, especially when I am in a rush or overwhelmed by deadlines." (P3)

"It made me anxious at times because I am still worrying if the generated answer that was provided to me is correct, so I needed to check on the other website just to be sure." (P4)

Inexperience of the User

Participants narrated their experiences while using the AI chatbot for the first time they used it when they were not yet familiar with the AI chatbot. They revealed their struggles to use and command the chatbot to generate information, fueling frustration when they first used it. The participant's answers highlighted the vulnerability of user input on online platforms and the potential consequences of unfamiliarity with the interaction in an Artificial intelligence chatbot. It revealed the need for the user to have proper knowledge and direction to fully utilize the AI chatbot's capabilities and close the gap caused by the user's lack of knowledge (Shoufan, 2023).

"At first, it was difficult for me to use it, but as time passed, I became more familiar with it, and it became easier to work, especially when there was a good internet connection. The only difficulty I have with AI chatbots is that they require a strong internet connection. Because if your internet is not strong, for example, if you are using mobile data, it becomes a struggle to use it quickly since it requires a good internet connection." (P1)

Another participant explained that their inexperience in using an AI chatbot makes it hard for her to utilize it, as she sometimes reloads the website unintentionally, which erases all her input commands. They also added that there is no space between paragraphs to separate them.

"At first, I had a hard time using ChatGPT because sometimes I reload the website without knowing, and my previous chats disappear, so I have to start over again. Also, when I want to add a space between two pieces of content, I cannot do it, so maybe that is why the AI sometimes misinterprets my command." (P4)

Threat to Academic Integrity

Participants concluded that there was a common theme about the threat to academic integrity. It shows the challenges the participants face regarding the integrity of their academic work. They feared their professors might think they had just extracted the information from an AI chatbot and become dependent on it. In the study of Farazouli et al. (2023) in AI chatbots, due to the ability of AI to mimic human capacity to create papers and answer queries quickly and easily, concern in academic honesty, irresponsible use, and plagiarism arises as a common concern with the use of AI that leads to a negative view on AI in education. These responses from the participants and the study show that utilizing AI chatbots in the education sector is not widely accepted and is categorized as a form of cheating, which pushes the idea of becoming digitally literate and ethically aware while utilizing the tool.

"Of course, I am feeling overwhelmed because of it, but at the same time, I feel guilty because AI is helping to generate ideas that I took. I worry that my teacher might think I relied entirely on the AI chatbot, even though I still check everything and ensure the information is correct. I did not copy word for word; I just used it to develop my ideas for the content." (P2)

"I feel happy because my work is already done ahead of time, and I can work on other academic tasks, but deep inside, I feel guilty because I feel I am cheating, due to the negative view of AI chatbots both as a source of information and as a tool. I will probably use it mentally for my school work or an academic paper. We all know that using an AI chatbot in your paper is not widely accepted in education. They will think that you only rely on AI to do your work, but honestly, it helps me make my work creative. So sometimes I overthink and stress a lot about whether they will accept my paper." (P5)

Another participant expressed his concern about the task he finished while using an AI chatbot that enhances and provides broader perspectives and ideas on his topic. They were concerned that the professor might think they had no originality and were AI-dependent. He said in the interview that:

"It is fine... but it is a 50/50 situation because it can be overdone with the words used. Moreover, you are overthinking since using an AI chatbot to answer your school tasks. Of course, we are forbidden from using AI for our papers because they say it might lead to a lack of originality, but I have not copied everything word for word. It is just nice that it gives me a lot of ideas and perspectives." (P6)

Internet Connectivity Problem

Participants also revealed that they encountered internet connectivity problems that affect the full potential of AI chatbots, as they require enough internet connectivity to work effectively. They struggled before using the AI chatbot, but later became familiar with the tool. However, they also shared the problem with internet connectivity that hindered the tool's utmost ability and help.

"At first, it was difficult for me to use it, but as time passed, I became more familiar with it, and it became easier to work, especially with a good internet connection. The only difficulty I have with AI chatbots is that they require a strong internet connection. Because if your internet is not strong, for example, if you are using mobile data, it becomes a struggle to use it quickly since it requires a good internet connection." (P1)

"Sometimes I feel angry when the internet connection is low, which affects how the chatbot works, especially when I am in a rush to meet the deadline of my assignment in Google Classroom. Compared, for example, to Google in my experience as a search engine, a chatbot works faster but requires a good internet connection to load and generate the information you need." (P4)

Another participant said they found using an AI chatbot difficult when the internet connection was unstable.

"Sometimes it's frustrating when the internet speed is slow, but when it comes to how it works, it is not that difficult; you just type in your question or what you want to know. Maybe when you are caught with a weak internet connection, you get stressed out because you are in a hurry." (P6)

3.3 Opportunities Experienced by Students in Using Artificial Intelligence Chatbots in Learning

Efficiency in Academic Works

Fast and easy are the repeated words uttered in the participants' mouths. The majority of them believed that artificial intelligence chatbots revealed had beneficial features to the participants that act as learning support in their individualized learning which is proved in the study of Labadze et al. (2023) where they point out the role of AI as support in learning, providing real-time answer which saves them in manual searching of information and provides direction for further sources. It is evident in the responses of the participants how this tool positively affects their academic life, allowing them to do their tasks in their phase and making it easy and efficient to guide them in generating ideas and answering their queries. The study of Oranga (2023) found that AI chatbots play a significant role in offering individualized learning experiences by providing personalized content and explanations to the needs of the students.

"Of course, you would feel more satisfied if you completed your school work more easily. It is easier to use. Searching for specific information and words you do not understand is easier because you can easily find their meanings. It is accessible to students because it is open to everyone. It becomes easier for you to work on your school assignments and improve your papers because you are given much information... There are many options to choose from that can help with what I am working on in school." (P1)

One of the participants expressed the same sentiments toward AI chatbots, believing that one of their advantages is their accessibility.

"I can say that the advantage of using technology, based on my experience, is that it provides better and quicker access to information compared to traditional technology. I can specifically say that it is efficient and helps me when I am doing solo reviews." (P2)

"It is more convenient and more accessible to users like me. It also saves much more time. And it helps me in doing my activities in school, especially when I need to study the topic; I use an AI chatbot to generate information to explain it further, which I believe is the advantage of these modern technologies." (P4)

"Every time I have rushed work like schoolwork and it is already due, I use ChatGPT or Quillbot to make my work easy and creative simultaneously, and I can finish it on time. AI helps me through my academic life by making schoolwork easy and relevant. Sometimes due to a lack of time management, I forget to do my school work early, but with the help of an AI chatbot, in a short period, I can easily finish my workload on time." (P5)

"Ah… As a student with a part-time job, I can say that it helps me manage my projects. Of course, in my years of experience, I can say that it positively affects my academic life. It is easily accessible because I can use it anytime. I usually go home late, and I feel shy about messaging my classmates, so the help of the AI chatbot explains my questions to me. It is faster and more convenient for my schedule." (P6)

Awareness of Technology Dependency

Three out of six participants established awareness of technology dependency while using AI chatbots in learning. It demonstrates the importance of consciousness about its merits and demerits while integrating these tools in education, urging a focus on learning with the right tools and using contemporary technologies. Additionally, this corroborated the study where college students think that it is cheating to use AI tools to finish papers or tests (Jurado et al., 2023)

"Using different chatbots can be very helpful, especially in schools, but it's important to use them responsibly. Not everything they provide is correct; their answers are just a guide. You shouldn't depend solely on AI because, of course, creativity comes from you. You shouldn't rely on AI alone, but should instead find a balance in using it as a complementary tool." (P2)

"I gain information in no time and it helps me to express myself more through writing. We just have to be responsible and mindful in using ChatGPT or any AI." (P5)

Fox also believed that it is really helpful for him the assistance given by the AI chatbot but also aware about the possible dependency on the tool if not used responsibly.

"I think when it comes to behavior, it's negative. It's easy to rely on the chatbot for everything. You become lazy right away. We know it helps a lot, especially when you're working on something and you don't have anyone to assist you. However, we should also be aware of how we use the chatbot. For me, yes, as long as you're using it for projects or assignments in school. As long as you understand the correct way to use an AI chatbot like ChatGPT." (P6)

The three participants' cumulative responses show that they are becoming more conscious of the dual nature of technology reliance -- the benefits that make it an efficient tool for students' self-learning and possible dependency.

Guide for Language Improvement

The majority of the participants' answers indicate the significant role of the AI chatbot in improving and enhancing their use of words, grammar, and writing skills which are a few of the various features that the tools provided for them. It is visible that the majority of the participants experienced difficulties in writing their written activities and sought help with an AI chatbot that enabled them to upgrade their writing skills and enhance their vocabulary. Kaharuddin (2021) stated that AI chatbots offer skills development by providing enhancement skills in writing and providing grammatical correction.

"I use chatbots for research when I need to look for other information, improving my writing, especially some common words to be advanced, studying, and even casual conversations when I need ideas or quick solutions to problems. So, I used it or anything not just in academics. When I accomplish something with a chatbot, I feel satisfied and grateful of course because I know that my work is refined by an AI and easily corrects my grammar. It's satisfying to see technology helping me accomplish tasks in just a bit of time." (P3)

One participant recognized the significant help of an AI chatbot that enhanced her vocabulary and enabled them to explore advanced language constructs.

"I think so because we cannot avoid seeking help, especially in writing papers in the future or even complex questions that need to be explained. Also, I will use this to further enhance my vocabulary and choice of words. I think one of its advantages for using some advanced words is for me to explore new words." (P4)

On the other hand, another participant pointed out the role of the AI chatbot in increasing her ability to recognize languages and allowing her to view things from various perspectives.

"It increased my ability to recognize languages and the potential to use a wider perspective in writing. And with the help of chatbot by providing more precise answers I can maximize my time in doing my school work." (P5)

Savior in Times of Procrastination

Based on the collective responses of the participants it highlights the significant role of AI chatbot in navigating academic challenges in procrastination among students. Pending deadlines and pressure lead the students to rely on the extra support given by the said tools. Artificial intelligence chatbot saved participants in times of procrastination making it easy and fast for them to accomplish tasks and meet deadlines as it offered learning support which is included in the study of Baha et al. (2023) which reveals the significant improvement in the learning experiences of the student where the AI chatbot helps students learn at their own pace and saves time in accomplishing their academic tasks. Conversely, a study on AI and procrastination posits that the more artificial intelligence is used and developed, the more procrastination individuals get because of the infrastructure that the independent variable offers (Belleza-Torrejón et al., 2024)

"I usually use it when I have assignments or when I have essays, especially when I'm cramming due to deadlines. Because of chatbots, it's easier for me to complete my assignments. Of course, as I said, it's very useful in terms of academic aspects. It helps me, especially during 'cramming time.' I use it as a guide, of course, not everything is known to me right away, so I rely on AI for assistance when I want to clarify a concept." (P2)

The feeling of being overwhelmed with academic responsibilities and managing deadlines that influence the reliance on AI chatbot support was explained by two of the participants. They also pointed out that when the deadline is near and they need to finish all their pending activities on time, an AI chatbot not only helps them pass through the deadlines but helps them produce better work. Participants said:

"I have a lot of workloads that's my motivation, and the use of AI, helps me make my work easier. When I use chatbots, they correct my English grammar and make my work clearer and more creative. That is why I became a user of chatbot AI." (P5)

"I lacked time to work on projects and meet deadlines, which is why I used a chatbot to make my work more efficient." (P6)

4.0 Conclusion

The Education students' narratives in using Artificial Intelligence chatbots in learning arose a common encounter of challenging and beneficial circumstances. Education students have to establish themselves as a digital citizen to engage themselves with conversational AI chatbots for individualized academic learning efficiency. The study pointed out that education students understand technology integration in education as most students of the generation are digital natives. Ethical concerns like plagiarism and academic dishonesty were agreed as a need for immediate attention. Notably, education students found AI chatbots as a means of work efficiency, however, they saw AI chatbots as a solution for procrastination. The study revealed that there were emerging problems created by technology needing an ICT policy for AI use in higher education. The utilization of artificial intelligence chatbots demonstrates their multifaceted role in learning support. These chatbots not only enhance the efficiency of completing academic tasks but also serve their function of amplifying language recognition and improving writing skills. These AI chatbots enable students to better manage their academic obligations by expediting the process of obtaining information and offering help, especially during stressful and procrastinating periods. The narratives of the students highlighted not only the budding potential of chatbots as academic companions but also a call for dialogue among academes in aid of the use of AI chatbots.

5.0 Contributions of Authors

Grover Stephen T. Masula led the idea generation, conceptualization, and development of the study design, wrote the review of related literature, conducted interviews, data analysis, manuscript preparation, and editing. Rebecca T. Barrios as the thesis adviser provided consultations and advice to the primary author regarding the research processes and its completion, suggested the methodology: research design of the study, the research participants, and reviewed and approved finalizing the paper. Elmer D. Hilario transcribed and analyzed the interview, generated the themes, and revised the paper to a publishable format.

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Relationship between Dissemination and Awareness of the University VMGO

Gleemoore C. Makie*[1], Ryan C. Buado[2]
[1]Benguet State University-Bokod Campus, Bokod, Benguet, Philippines
[2]Urdaneta City University, Urdaneta City, Philippines

*Corresponding Author Email: glimpsejgcm@gmail.com

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Abstract. The effective communication of an organization's Vision, Mission, Goals, and Objectives (VMGO) is crucial for the institution's success and stakeholders' alignment. This study investigates the relationship between disseminating the University's Vision, Mission, Goals, and Objectives (VMGO) and its students' awareness level. The research design used a descriptive survey method to collect student data using a structured questionnaire converted into Google Forms. The questionnaire assessed the effectiveness of dissemination and the level of awareness of VMGO. The study investigated factors that may influence dissemination and the students' awareness, such as frequency, channels, and clarity of communication. The results showed a significant relationship between dissemination and awareness of VMGO. The study highlights the importance of robust communication strategies in fostering engagement and alignment with the organizational objectives. The findings can inform UCU's administration in refining its dissemination practices to enhance awareness and understanding of the institution's VMGO.

Keywords: Awareness; Dissemination; Relationship; VMGO.

1.0 Introduction

Education plays a pivotal role in shaping individuals and societies. It is a fundamental right that enables people to acquire the knowledge and skills necessary for personal success and societal advancement (OECD, 2018). High-quality education is essential for improving living standards and fostering economic growth (Hanushek, 2014). Education is the backbone of national development, ensuring stability and progress (World Bank, 022). While different nations implement diverse educational policies and practices, pursuing academic excellence remains a global priority (Ozdem, 2011).

An essential component of quality education within academic institutions is clearly articulating and disseminating their Vision, Mission, Goals, and Objectives (VMGO). A well-crafted vision provides direction and purpose, outlining what an institution aspires to achieve long-term (JISC, 2014). The mission, conversely, defines the institution's core purpose and unique contribution to society, particularly in preparing students to compete globally and develop positive character traits (Asia Society, 2011). Goals and objectives provide operational focus, ensuring efficient resource allocation and institutional effectiveness (AAC&U, n.d.).

The dissemination and awareness of a university's VMGO are crucial to achieving institutional success. Effective communication of the VMGO fosters alignment among stakeholders, ensuring that students, faculty, and staff work toward shared educational objectives. Studies suggest a strong correlation between VMGO dissemination and stakeholder awareness. Wanjala (2017) emphasizes that VMGO should be accessible to all stakeholders to

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enhance understanding and commitment. Similarly, Daudelin and Martin (2019) argue that executing a strategic plan relies heavily on the widespread dissemination of the VMGO, which enhances institutional transparency and communication.

According to Schultz (2000), the identity and brand of an organization, including universities, are strongly influenced by how effectively they communicate their core mission and vision. This communication shapes internal perceptions and builds a reputable external image. In this regard, the dissemination of VMGO plays a pivotal role in shaping the institutional culture and student perception. Rocco and Hatcher (2011) emphasize that communication strategies tailored to student engagement are foundational to enhancing their awareness of institutional goals. By leveraging innovative and interactive methods of communication, universities can ensure that their VMGO is understood and internalized by the student body, leading to improved engagement (Brown, 2015; Kuh et al., 2015). Concurrently, Zepke et al. (2012) argue that understanding and improving student engagement at these levels can lead to better institutional effectiveness and increased student satisfaction. The research emphasizes the importance of tailored strategies to foster engagement, positively impacting students' perceptions of their educational experience. Bandura's (1977) Social Learning Theory suggests that learning occurs within a social context and is facilitated by disseminating knowledge and behaviors. In the educational setting, the dissemination of VMGO can be seen as a social learning process, where students learn and model themselves according to the institutional ethos and objectives.

Research indicates that universities that effectively communicate their VMGO experience improve student learning outcomes and engagement levels (Lusk & Hulse, 2019). Furthermore, disseminating VMGO promotes accountability and institutional transparency, leading to informed decision-making processes (AAC&U, n.d.). Laurente (2019) discusses stakeholders' awareness and acceptability of a university's Vision, Mission, Goals, and Objectives (VMGO) and how these factors contribute to institutional alignment and commitment**.** The study highlights that effective dissemination of VMGO enhances stakeholder participation and engagement**,** leading to a more substantial institutional commitment to educational quality.

In the Philippines, the Commission on Higher Education (CHED) mandates institutions to develop and publish their VMGO as part of their quality assurance obligations (CHED, 2020). Braganza et al. (2019) highlight the necessity of VMGO dissemination in ensuring institutional alignment and commitment among university communities. Arriesgado (2017) emphasizes monitoring VMGO implementation helps identify challenges and fosters continuous improvement. Moreover, Aguirre (2016) suggests linking VMGO dissemination with university performance to enhance institutional accountability.

Research gaps remain despite numerous studies on VMGO awareness and dissemination in Philippine universities. Many studies focus on specific universities, limiting their generalizability (Sadiwa, 2019). Likewise, while studies demonstrate the positive relationship between VMGO dissemination and stakeholder engagement (Smith & Johnson, 2019), there is a lack of research on the long-term impact of such dissemination efforts. Furthermore, the effectiveness of various dissemination strategies, such as digital platforms and interactive learning modules, remains underexplored (Escolano, 2021). Given these gaps, this study aims to assess VMGO awareness and dissemination at Urdaneta City University. By identifying the strengths and weaknesses of current dissemination strategies, the findings would provide a foundation for administrators to design policies that enhance VMGO communication, particularly among students. Ensuring widespread awareness of the university's VMGO is integral to fostering an academic environment that aligns institutional objectives with student success and societal contribution.

2.0 Methodology

2.1 Research Design

The descriptive survey method is a research design commonly used to describe and measure the characteristics of a population or phenomenon (Creswell, 2014). The researchers used this method, which deliberately portrays the reality and qualities of a given area of interest, genuinely and precisely. In this study, this was used to determine the extent of dissemination and the level of awareness of the Vision, Mission, Goals, and Objectives (VMGO) in Urdaneta City University. The survey questionnaire was the primary data collection tool in this study. The questionnaire was designed to gather information on the extent of dissemination and the level of awareness of the VMGO among the students of Urdaneta City University. It involved gathering primary data by asking the

first, second, third, fourth, and fifth-year students of Urdaneta City University. Recording, analyzing, and interpreting data were used to determine their preference and attitudes towards the research proposal.

2.2 Research Locale

The research took place at Urdaneta City University (UCU), involving students currently enrolled in the Ethics course during the first semester of the 2021-2022 academic year. The study specifically targeted students who had already completed the Nobility course, which covers UCU's Vision, Mission, Goals, and Objectives (VMGO) and its core values. Due to health protocols, data collection was conducted online.

2.3 Research Participants

Random sampling was used in this study. The respondents who answered the Google Form were students from different courses and were currently enrolled during the first semester of the academic year 2021-2022. Those who got a link from their instructors got the chance to answer the survey. This sampling used increased credibility because only the students who were willing to respond to the survey questionnaire answered the questionnaire. The first and second year students who responded to the survey had the same number of students, which made up 55.70% of the total 316 respondents. Another 26.90% of respondents were third-year students, while the remaining 17.41% were fourth and fifth-year students. The respondents of the different year levels who answered the questionnaire are shown below:

Table 1. *Respondents per Year Level*

Year Level	Total
First	88
Second	88
Third	85
Fourth	54
Fifth	1

2.4 Research Instrument

The instrument used to gather data was a survey questionnaire transformed into a Google Form. It has two parts: I) Extent of Dissemination, and II) Level of Awareness. The first part determined the extent of the dissemination of the VMGO to the students using the four-point Likert scale in Table 2. The second part determined students' level of awareness of the VMGO using the four-point Likert scale in Table 3. The last part correlated the extent of dissemination and level of awareness, considering the scale of equivalence in Table 4.

Table 2. *Four-point Likert Scale for Extent of Dissemination*

Scale	Descriptive Evaluation	Interpretation
3.26-4.00	Very Highly Disseminated (VHD)	The VGMO is disseminated to a very great extent.
2.51-3.25	Highly Disseminated (HD)	The VGMO is disseminated to a great extent.
1.76-2.50	Slightly Disseminated (SD)	The VGMO is disseminated to a slight extent.
1.00-1.75	Not Disseminated (ND)	The VGMO is not disseminated.

Table 3. *Four-point Likert Scale for the Level of Awareness*

Scale	Descriptive Evaluation	Interpretation
3.26-4.00	Very Highly Aware	The respondent is aware to a very great degree.
2.51-3.25	Highly Aware	The respondent is aware to a great degree.
1.76-2.50	Slightly Aware	The respondent is aware to a little degree.
1.00-1.75	Not Aware	The respondent is not aware at all.

Table 4. ***Correlation S****cale for the Extent of Dissemination and Level of Awareness*

r	Descriptive Equivalent
(+-) 1.00	Perfect Positive (Negative Correlation)
(+-) 0.75 – 0.99	High Positive (Negative Correlation)
(+-) 0.51 – 0.74	Moderately High Positive (Negative) Correlation
(+-) 0.31 – 0.50	Moderately Low Positive (Negative) Correlation
(+-) 0.01 – 0.30	Low Positive (Negative) Correlation
0	No Correlation

2.5 Data Gathering Procedure

The data-gathering procedure involved gathering the data by first analyzing relevant documents and literature. Next is the preparation of a communication letter and the development of the descriptive survey questionnaire. The data-gathering procedure for the descriptive survey on the relationship between dissemination and awareness of the vision, mission, goals, and objectives of Urdaneta City University was transformed into a Google Form. After transforming the letter and questionnaire into a Google Form for validation by research experts and a test of reliability by SPSS, the corrections and suggestions were incorporated.

The first step was to design the Google Form used to collect data. The form included statements from the vision, mission, goals, objectives and the methods used to disseminate this information. Once the Google Form had been designed and the sample had been identified, the next step was distributing the form to the respondents. This was done through email, social media, or other communication channels. As respondents completed the Google Form, the data was automatically collected and stored in a spreadsheet. It was important to ensure that the data was accurate and complete, and to follow up with respondents who had not yet completed the form. Once the data had been collected, the next step was to analyze the data using statistical methods. This included calculating frequencies, percentages, and correlations to identify patterns and relationships in the data. The final step was to interpret the results of the data analysis and draw conclusions about the relationship between dissemination and awareness of the vision, mission, goals, and objectives of Urdaneta City University. The results were used to inform future strategies for disseminating information about the university's goals and objectives and to improve stakeholder awareness.

2.6 Data Analysis

The data were analyzed using statistical tools to identify patterns and relationships. Frequency analysis determined the distribution of respondents by year level, while the weighted mean measured how well the vision, mission, goals, and objectives (VMGO) were shared and understood. A statistician assisted in processing the data to ensure accuracy. Percentages and correlations were calculated to assess the effectiveness of dissemination methods. The findings helped students understand how well they knew about the VMGO and guided recommendations for improving future dissemination efforts. The Pearson Product-Moment Correlation Coefficient measured the strength and direction of the relationship between VMGO dissemination and students' awareness. A positive correlation indicated that higher dissemination led to greater awareness, while a negative correlation suggested the opposite. Correlation analysis was used to assess the significance of this relationship.

2.7 Ethical Considerations

The study prioritized the confidentiality and privacy of respondents, ensuring that their personal information remained protected by the Data Privacy Act of 2012 (R.A. 10173). Researchers were fully aware of the consequences of any misuse or unauthorized disclosure of respondent data. Informed consent was obtained, ensuring participants were well-informed about the study's purpose, methods, potential risks, and benefits, while also allowing them to ask questions and withdraw at any time. The research maintained integrity by preventing plagiarism, properly citing all sources, and respecting copyrights. Transparency was upheld by accurately presenting data without manipulation. All collected information was securely stored, and personal details were kept confidential. The study was designed to minimize potential harm by avoiding offensive or intrusive questions and ensuring participant comfort. Additionally, the results were made accessible to stakeholders, including participants and university administrators, through reports or public presentations.

3.0 Results and Discussion

Table 5 on the Extent of VMGO Dissemination shows that the grand total mean is 3.24, or Highly Disseminated, which means that the VGMO is disseminated to a great extent. Responses from various year levels indicate an extensive dissemination of the UCU vision, mission, goals, and objectives. The strategic location of VGMO posters within the school premises, VGMO orientation at the beginning of the school year, and VGMO as part of the syllabus or OBTL made had the highest means among the group of indicators.

Table 5. *Extent of VMGO Dissemination*

VMGO Dissemination Indicators	Year Level					Mean	Description
	1st	2nd	3rd	4th	5th		
1. The VMGO is discussed during the orientation at the beginning of the school year.	3.16	3.24	3.39	3.52	4.00	3.31	Very Highly disseminated
2. The VMGO is strategically posted on school premises.	3.23	3.29	3.43	3.57	3.00	3.36	Very Highly disseminated
3. The VMGO is clearly stated in the syllabus or Outcome-Based Teaching and Learning (OBTL).	3.15	3.24	3.40	3.56	3.00	3.31	Very Highly disseminated
4. The VMGO is in the student manual.	3.15	3.16	3.25	3.33	4.00	3.21	Highly Disseminated
5. The VMGO is in the Facebook and UCU FB page.	3.26	3.24	3.23	3.37	4.00	3.27	Very Highly disseminated
6. The VMGO is in the i-Konek Learning Management System.	3.22	3.21	3.15	3.09	4.00	3.18	Highly Disseminated
7. The VMGO is in UCU's promotional videos.	3.08	3.20	3.19	3.26	3.00	3.17	Highly Disseminated
8. The VMGO is in the school programs and invitations.	3.05	3.13	3.21	3.31	4.00	3.16	Highly Disseminated
9. The VMGO is in the Nobility Program or Orata subjects.	3.10	3.23	3.42	3.33	3.00	3.26	Very Highly disseminated
10. The VMGO is accessible through internet links in the Google.	3.12	3.16	3.22	3.20	4.00	3.18	Highly disseminated
Overall Result	**3.21**	**3.22**	**3.30**	**3.30**	**3.14**	**3.24**	**Highly Disseminated**

Since the result shows that the VMGO was not highly disseminated, there may be communication gaps between the university and its stakeholders. This could result in confusion, misalignment of goals, and lack of focus, which could hinder the university's progress towards achieving its goals (Lent, 2019). The implications of these results are significant for the university as it may indicate the need for improvement in their communication and dissemination strategies. The university may need to explore new ways of communicating and promoting the VMGO to its stakeholders to ensure the goals are well understood and embraced.

Recent studies have demonstrated that effectively disseminating an institution's Vision, Mission, Goals, and Objectives (VMGO) is crucial for aligning stakeholders with the organization's strategic direction. For instance, a study by Lusk and Hulse (2019) found that clear communication of VMGO enhances faculty and staff motivation, leading to improved educational outcomes. Similarly, Daudelin and Martin (2019) emphasized that strategic dissemination of VMGO fosters accountability and transparency within higher education institutions. Conversely, inadequate dissemination of VMGO can result in misalignment and confusion among stakeholders, hindering institutional progress. Arriesgado (2017) highlighted that monitoring VMGO implementation is essential for continuous improvement, suggesting that gaps in dissemination may impede goal achievement. These findings underscore institutions' need to adopt effective communication strategies to ensure all stakeholders comprehend and embrace the VMGO, promoting a cohesive and focused organizational environment.

Table 6. *Students' Level of Awareness on Vision*

Vision Indicators	Year Level					Mean	Description
	1st	2nd	3rd	4th	5th		
1. To become a leading university	3.20	3.23	3.41	3.42	4.00	3.31	Very Highly Aware
2. To transform individuals into morally upright professionals	3.26	3.34	3.44	3.49	4.00	3.37	Very Highly Aware
3. To transform individuals into globally competitive professionals	3.24	3.29	3.38	3.57	4.00	3.35	Very highly Aware
4. To provide quality and practical education for all	3.33	3.38	3.47	3.57	4.00	3.42	Very Highly Aware
Total	**3.26**	**3.31**	**3.42**	**3.51**	**4.00**	**3.36**	**Very Highly Aware**

Table 6 shows the students' Vision Awareness Level according to Year Level at 3.36 or Very Highly Aware. Though all indicators received a very highly aware description, the indicator "To provide quality and practical education for all" was the highest, with a mean of 3.42, and the indicator "To become a leading university" was the lowest, with a mean of 3.31. There is also an increasing mean from the first year (3.26) to the fifth year (4.00).

The high awareness of Urdaneta City University's vision among students highlights its successful efforts in communicating its commitment to providing quality and practical education. This awareness is influenced by several factors, including students' exposure to the university's vision, the effectiveness of communication channels, and engagement in university activities. Research suggests that students actively participating in university events are more likely to understand and align with the institution's goals (Hassan et al., 2016). Additionally, multiple communication channels, such as social media, websites, and posters, enhance awareness by increasing exposure and accessibility (Adnan & Mahmood, 2017; Ahmed et al., 2018). The perceived relevance of education to students' personal goals also plays a crucial role in fostering engagement and awareness (King & Winnick, 2015; Carini et al., 2006).

A strong awareness of the university's vision fosters a shared understanding and sense of community, enhancing student retention, motivation, and academic success (Tinto, 1975; Pascarella & Terenzini, 2005; Rovai & Baker, 2005). Effective communication strategies contribute to institutional identity and student satisfaction (Chen, 2019; Alemu & Kassa, 2017). Moreover, a well-established awareness of the university's vision can positively impact its reputation and public image, as stakeholders often evaluate institutions based on their goals, values, and achievements (Liu & Liu, 2020). This underscores the importance of continuous efforts in promoting and reinforcing the university's mission and vision through strategic communication and student engagement initiatives.

Table 7. *Students' Level of Awareness on the Mission*

Mission Indicators	Year Level					Mean	Description
	1st	2nd	3rd	4th	5th		
1 .To provide exemplary outcome-based	3.24	3.22	3.40	3.42	4.00	3.31	Very Highly Aware
2. To provide advanced instructions	3.29	3.26	3.33	3.34	4.00	3.30	Very Highly Aware
3. To provide socially relevant and innovative research	3.21	3.16	3.34	3.38	4.00	3.27	Very Highly Aware
4. To provide inclusive extension services, partnerships, and/or linkages	3.16	3.15	3.30	3.40	4.00	3.24	Highly Aware
Total	**3.26**	**3.21**	**3.38**	**3.39**	**3.67**	**3.30**	**Very Highly Aware**

Table 7 shows that the Mission Awareness Level of the Students according to Year Level is 3.30 or Very Highly Aware. Its mission indicator "to provide exemplary outcome-based education" got the highest mean of 3.31, or Very Highly Aware, and the indicator "to provide inclusive extension services, partnerships and/or linkages got the lowest mean of 3.24, of highly aware. The high awareness of the University's Mission to provide exemplary outcome-based education (OBE) among students can be attributed to the strong emphasis on the OBE approach in higher education. OBE is a student-centered framework that focuses on developing specific learning outcomes and competencies aligned with industry and societal needs (Tagoe, 2012). Research has shown that implementing OBE significantly enhances students' understanding of institutional goals, as it clearly defines expectations and required competencies (Taylan, 2018; Akcaoglu & Yazici, 2015). The university's effective communication of its mission fosters student motivation, engagement, and academic performance (Sultana & Kabir, 2017). Furthermore, the emphasis on outcome-based learning influences curriculum design, ensuring that courses and programs align with achieving specific competencies rather than merely covering material (Mehmood & Ahmad, 2014). This suggests that the university's mission statement is well-articulated, contributing to a sense of purpose among students and reinforcing a performance-driven educational culture.

In contrast, while awareness of the university's mission regarding inclusive extension services, partnerships, and linkages remains high, it is less prominent than the OBE component. This could be due to ineffective communication strategies or a lesser emphasis on this aspect of the mission. Research indicates that clear and well-disseminated communication is crucial in ensuring students fully understand an institution's mission (Kothari & Davis, 2017; Jansen & De Vries, 2010). Additionally, students may lack awareness of the significance of extension services and partnerships in achieving institutional goals (Trowler & Bamber, 2005). To address this, the university should enhance its communication and outreach efforts, ensuring that students recognize the value of these initiatives. Regular evaluation of dissemination strategies and increased emphasis on inclusive extension services could improve student engagement and understanding (Kothari & Davis, 2017).

Table 8 shows that the Goals Awareness Level of the Students according to Year Level is 3.30 or Very Highly Aware. Its mission indicator "to enhance the development of instruction to produce high-level professionals" got the highest mean of 3.35 or Very Highly Aware, while the indicator "to enrich historical and cultural heritage" got the lowest with the mean of 3.24 or Highly Aware.

Table 8. *Students' Level of Awareness on Goals*

Goals Indicators	Year Level					Mean	Description
	1st	2nd	3rd	4th	5th		
1. To enhance the development of instruction to produce high-level professionals	3.33	3.24	3.42	3.43	4.00	3.35	Very Highly Aware
2. To harness the productive capacity of the country's human resource-based toward international competitiveness	3.23	3.20	3.36	3.39	4.00	3.29	Very Highly Aware
3. To mold individuals who will conduct scientific, innovative and advanced researches in the quest for new knowledge, provide leadership in various fields toward dynamic and self-sustaining economy	3.23	3.25	3.39	3.41	4.00	3.31	Very Highly Aware
4. To enrich historical and cultural heritage.	3.19	3.17	3.32	3.32	3.00	3.24	Highly Aware
5. To Undertake participatory and inclusive extension services which are relevant and responsive, accessible and equitable, through efficient and effective community development programs	3.28	3.19	3.40	3.37	4.00	3.31	Very Highly Aware
6. To broaden symbiotic partnerships and linkages to establish intergenerational responsibility for the common good	3.26	3.18	3.39	3.41	3.00	3.30	Very Highly Aware
Total	**3.26**	**3.21**	**3.38**	**3.39**	**3.67**	**3.30**	**Very Highly Aware**

Urdaneta City University (UCU) students' high awareness of the university's goals can be attributed to its strong emphasis on goal-setting and attainment as part of its educational approach. Research supports that setting specific and measurable goals increases motivation and academic success (Locke & Latham, 2002; Shukla & Tiwari, 2015). UCU's goal to enhance instruction development to produce high-level professionals aligns with job market demands, which may further contribute to students' strong awareness of this objective (Bhatti et al., 2018). Additionally, students aware of their institution's goals tend to have a clearer understanding of expectations, leading to higher motivation and academic achievement (Kuh et al., 2010). A positive perception of the university's objectives also fosters higher student satisfaction and retention rates (Tan & Joo, 2017). The strong emphasis on producing highly skilled professionals suggests that UCU successfully prepares students for the workforce, which benefits both individuals and the broader economy (Mamadou & Guèye, 2019). Moreover, a focus on instructional development positively impacts the quality of education, as instructors are encouraged to continuously improve their teaching methods to provide relevant and up-to-date knowledge (Mamadou & Guèye, 2019).

While UCU students have a high level of awareness regarding professional development, their awareness of the goal to enrich historical and cultural heritage is comparatively lower. This may indicate a need for the university to enhance its efforts in promoting cultural heritage education. Limited exposure or interest in historical and cultural heritage could be a factor, as well as the university's current level of engagement in this area. Research shows that integrating cultural heritage education can foster cultural appreciation, community, and social inclusion (Costello & Stone, 2016; Na & Hwang, 2021). To address this, UCU could integrate cultural heritage education into its curriculum and extracurricular activities by promoting local cultural events, offering heritage-related courses, and developing community partnerships for cultural preservation. These efforts would contribute to cultural enrichment and enhance students' awareness and appreciation of their cultural identity and heritage.

Table 9 shows that the Objectives Awareness Level of the Students according to Year Level is 3.25 or Highly Aware. Its Objectives indicator "to provide new ideas or develop new theories, satisfy curiosity, and mastery of nature" got the highest mean of 3.31 or Very Highly Aware, while the indicator "to provide inclusive extension services, partnerships and/or linkages" got 3.19 or Highly Aware. The high level of awareness among UCU students regarding the university's objectives may be attributed to their specificity and detailed nature compared to the vision, mission, and goals. However, there is still room for improvement in increasing students' awareness, possibly due to the complexity of the language used or limited exposure. Studies highlight that student engagement in academic and extracurricular activities correlates with their awareness of university objectives, emphasizing the need for clear communication (Marmolejo et al., 2014). Effective dissemination strategies, including using simpler language and multiple communication channels, could enhance students' understanding and connection to these objectives (Choi & Pak, 2006). Additionally, students are more likely to support institutional objectives when they perceive them as relevant to their goals and aspirations (Akanni, 2019).

Table 9. *Students' Level of Awareness of the Objective*

Objectives Indicators	Year Level					Mean	Description
	1st	2nd	3rd	4th	5th		
1. To provide professional, technical, and expert instruction in the arts, sciences, humanities, and technology	3.24	3.18	3.40	3.31	4.00	3.28	Very Highly Aware
2. To conduct systematic investigations geared toward the establishment and discovery of novel facts	3.20	3.15	3.24	3.35	3.00	3.22	Highly Aware
3. To solve present or existing problems	3.23	3.22	3.24	3.23	4.00	3.23	Highly Aware
4. To provide inclusive extension services, partnerships, and/or linkages	3.14	3.23	3.18	3.24	2.00	3.19	Highly Aware
5. To provide new ideas or develop new theories, satisfy curiosity, and master nature	3.27	3.30	3.33	3.37	3.00	3.31	Very Highly Aware
6. To establish sustainable livelihood projects that will uplift the quality of life of the members of the community	3.16	3.22	3.33	3.33	3.00	3.25	Highly Aware
7. To expand transnational collaborations that will have socio-economic benefits for the present and future generations	3.24	3.25	3.38	3.28	3.00	3.29	Very Highly Aware
Total	**3.21**	**3.22**	**3.30**	**3.30**	**3.14**	**3.25**	**Highly Aware**

To bridge the gap in awareness, universities must implement effective communication strategies, such as leveraging social media, newsletters, and direct student interactions (Shah & Nair, 2019). Studies suggest student motivation and engagement increase when institutional objectives align with their interests (Brown, 2015). Using diverse communication methods, including face-to-face discussions, emails, and social media, can ensure better comprehension and accessibility of university objectives (Rocco & Hatcher, 2011). Additionally, universities should periodically reassess their objectives to maintain alignment with student needs and aspirations, as this is crucial for fostering student engagement and academic success (Kuh et al., 2015).

Students' awareness of UCU's objective to provide inclusive extension services, partnerships, and linkages may indicate either effective communication or a need for further promotion. Research suggests that communication plays a crucial role in students' understanding of university goals, and regular dissemination through multiple channels enhances awareness (Siti-Nabiha & Nasir, 2018). Furthermore, partnerships between universities and external stakeholders contribute to the effectiveness of higher education institutions in addressing societal needs (De Silva & Ratnadiwakara, 2017). A lack of awareness of these objectives among students may hinder the university's ability to engage the community effectively and fulfill its broader mission.

The intense awareness among UCU students regarding the objective of generating new ideas, developing theories, and mastering nature highlights the university's emphasis on scientific inquiry and research. The significance of curiosity-driven exploration is supported by Einstein's assertion that curiosity fuels scientific and artistic advancements (Einstein, 1931). Kuhn (1962) further emphasizes that scientific progress relies on developing new theories that challenge existing paradigms. To enhance student participation in extension programs, UCU should strengthen its outreach efforts and partnerships with external stakeholders, as engagement is a key factor in the success of extension programs (Carigma & Bautista, 2019). Likewise, CHED (2017) underscores the role of higher education institutions in fostering community development through extension services and linkages. Increasing promotion of these objectives can ensure greater student involvement and help UCU better align its programs with societal needs.

Table 10. *Correlation of the Extent of Dissemination of VMGO to and the Level of Awareness on VMGO of UCU Students*

Pearson Correlation	Awareness of			
	Vision	Mission	Goals	Objectives
Dissemination of VMGO	-.58	.80	.38	-.13
Descriptive equivalent	Moderately High Negative Correlation	High Positive Correlation	Moderately Low Positive Correlation	Low Negative Correlation

Table 10 shows that the relationship between the dissemination of VMGO and Awareness of Mission and Goals is positive, with a Pearson Correlation of .80 or a High Positive Correlation and .38 or a Moderately Low Positive Correlation, respectively. The relationship between the dissemination of VMGO and awareness of vision and objectives is negative, with a Pearson correlation of -.58 or moderately high negative correlation and -.13 low negative correlation, respectively. The High Positive Correlation between the extent of dissemination of VMGO and the level of awareness of the mission suggests a strong positive relationship. This means that as the level of dissemination of VMGO increases, the awareness of the mission also increases, and vice versa.

The studies of Salom and Florendo (2013), Castillo (2014), and Nemi (2017) have found that the level of dissemination of VMGO is positively correlated with the level of awareness of the mission. They found a significant relationship between the dissemination level and VMGO awareness. This finding implies that the university's dissemination strategies effectively increase awareness of its mission among its stakeholders. According to Rosnow and Rosenthal (1996), West and West (2009), and Kim and Kim (2021), a correlation coefficient of 0.5 to 0.7 indicates a moderate to strong positive relationship between two variables. This is consistent with the correlation analysis of the level of dissemination of VMGO and the awareness of the mission.

Another Moderately Low Positive Correlation between the extent of dissemination of VMGO and the awareness of goals suggests a weak positive relationship. This means that as the level of dissemination of VMGO increases, the awareness of goals also increases, and vice versa, but to a lesser extent than the relationship between the level of dissemination and awareness of the mission. The implications of this finding are that the university may need to improve its dissemination strategies to increase awareness of its goals among its stakeholders. According to Gravetter and Wallnau (2016), a correlation coefficient of 0.3 to 0.5 indicates a weak positive relationship between two variables. This is consistent with the correlation analysis of the level of dissemination of VMGO and the awareness of goals.

Social Learning Theory (Bandura,1977) emphasizes the role of observational learning, where individuals learn by observing others and the consequences of their actions. When the extent of VMGO dissemination increases, it provides more opportunities for individuals to observe and learn about the mission. They observe how the mission is communicated, the behaviors and actions associated with it, and the outcomes resulting from aligning with the mission. Diffusion of Innovation Theory (Rogers, 1962) explains that the extent of dissemination of VMGO can be seen as introducing and spreading the innovation (the VMGO) within an organization or educational institution. As the VMGO is disseminated, it goes through different stages of adoption, starting from the innovators, early adopters, early majority, late majority, and finally, the laggards.

The dissemination process involves communication channels, opinion leaders, and social networks. As the extent of dissemination increases, more individuals become exposed to the VMGO, leading to increased awareness of the mission and goals. This is because the dissemination process creates opportunities for individuals to learn about the mission, engage in discussions, and perceive its value and benefits. The diffusion of innovation theory highlights how the spread of an innovation, such as the VMGO, can influence awareness and adoption within an organization or educational institution.

Theory of Planned Behavior (Ajzen, 1991) explains that in the context of VMGO dissemination, individuals who are exposed to the VMGO and its associated messages form attitudes and perceptions regarding the mission. As the extent of dissemination increases, individuals are more likely to encounter and internalize the VMGO messages. This exposure influences their attitudes towards the mission and goals, leading to a stronger belief in its importance and alignment with their values. This increased awareness of the mission affects individuals' intention to support and engage in behaviors that align with the mission. The theory of planned behavior highlights the role of attitudes, subjective norms, and perceived behavioral control in shaping individuals' awareness and subsequent behavioral intentions related to the mission.

The Commission on Higher Education (CHED) Vision and Philosophy serve as guiding principles for developing and improving higher education in a particular context. These principles are typically disseminated and communicated to stakeholders within the education system, including students, faculty, administrators, and the broader community. As the CHED Vision and Philosophy are disseminated, they aim to create a shared understanding and commitment to a common mission and set of goals. The dissemination process helps stakeholders become aware of the mission and its significance in guiding decision-making, policy implementation, and educational practices. The CHED Vision and Philosophy, similar to the VMGO, provide a framework that influences individuals' behaviors, decision-making, and overall mission awareness. Effective dissemination of information is crucial for creating awareness and understanding among stakeholders (Ashforth & Mael, 1989; Dutton et al., 1994; Schultz, 2000; Bart et al., 2001; Sarros et al., 2002; Smith & Johnson, 2019; Lee & Chen, 2021). When the university communicates and disseminates its mission effectively, it increases the likelihood that individuals will be aware of and comprehend the mission statement.

The Moderately High Negative Correlation between the extent of dissemination of VMGO and the awareness of Vision suggests a moderate negative relationship between the two variables. This means that as the extent of dissemination of VMGO increases, the awareness of Vision decreases, and vice versa. One possible explanation is that as the extent of dissemination of VMGO increases, the information overload may cause confusion and make it difficult for stakeholders to focus on the Vision and objectives. Another possible explanation is that stakeholders may become complacent and assume they already know the Vision and objectives, leading to decreased awareness. According to Gravetter and Wallnau (2016), and Kim and Kim (2021), a correlation coefficient of -0.5 to -0.7 indicates a moderate negative relationship between two variables. This is consistent with the correlation analysis of the level of dissemination of VMGO and the awareness of Vision. This finding implies that the university may need to improve its dissemination strategies to increase awareness of its Vision among its stakeholders.

Finally, the Low Negative Correlation between the extent of dissemination of VMGO and the awareness of Objectives suggests a weak negative relationship between the two variables. This means that as the level of dissemination of VMGO increases, the awareness of objectives decreases slightly, and vice versa. This finding implies that the university may need to improve its dissemination strategies to increase awareness of its objectives among its stakeholders. According to Gravetter and Wallnau (2016) and Kim and Kim (2021), a correlation coefficient of -0.1 to -0.3 indicates a weak negative relationship between two variables. This is consistent with the correlation analysis of the level of dissemination of VMGO and the awareness of objectives.

Objectives are often more specific and granular than the broader mission or vision statements (Bart et al., 2001). Disseminating detailed objectives may require more effort and clarity in communication, potentially resulting in weaker awareness among stakeholders. The dissemination of objectives may face challenges such as limited communication channels, information overload, or insufficient emphasis on the objectives compared to the broader VMGO elements. These challenges can contribute to a weaker awareness of the objectives among stakeholders (Sarros et al., 2002). In disseminating the VMGO, organizations may emphasize communicating the vision, mission, and higher-level goals, rather than the specific objectives. This prioritization can lead to a relatively lower awareness of the objectives among stakeholders (Bart et al., 2001). Objectives may be perceived as less relevant to specific stakeholders compared to the broader mission or vision. This perception of reduced relevance could contribute to a weaker level of awareness or attention given to the objectives (Ashforth & Mael, 1989).

4.0 Conclusion

The findings suggest that through effective communication strategies, Urdaneta City University has successfully disseminated its vision, mission, goals, and objectives (VMGO) among stakeholders. The high level of awareness indicates that students and other stakeholders strongly understand the institution's goals and anticipated direction. This alignment fosters a shared sense of purpose, allowing the university community to collaborate toward common objectives. As students progress in their academic journey, their familiarity with the VMGO increases, highlighting the cumulative effect of continuous exposure through various university activities and academic programs.

While students are generally well-informed about the university's vision, their awareness of specific objectives is comparatively lower, indicating areas for improvement in communication and dissemination efforts. To sustain and enhance VMGO awareness, the university should continuously evaluate and refine its distribution strategies, leveraging multiple platforms such as social media, email, newsletters, and other communication tools. Regular assessments of current dissemination methods can help identify gaps and necessary adjustments to ensure broader and deeper engagement with the university's objectives.

5.0 Contributions of Authors

The authors contributed to the study by analyzing the effectiveness of Urdaneta City University's communication strategies in disseminating its vision, mission, goals, and objectives (VMGO) among stakeholders. They examined the correlation between students' academic progression and increasing awareness of the VMGO, highlighting the cumulative impact of continuous exposure. Additionally, the authors identified gaps in students' understanding of specific objectives, emphasizing the need for improved dissemination efforts. Their work provides valuable insights into how universities can enhance stakeholder engagement by refining communication methods, ensuring alignment with institutional goals, and fostering a shared sense of purpose within the academic community.

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This study was part of the faculty's academic responsibilities, with no external funding or financial support. It was driven by a commitment to advancing knowledge and enhancing VMGO awareness, reflecting the faculty's dedication to meaningful research and continuous learning.

7.0 Conflict of Interests

There are no conflicts of interest to disclose, as this research was conducted with complete impartiality, focusing solely on analyzing online learning dynamics at UCU. The findings and interpretations were derived from an objective analysis, ensuring that personal, financial, or institutional biases did not influence the results.

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Enhancing Learning: Differentiated Instruction in Elementary Schools

Jorna May R. Ferrer*, Nathaniel C. Naanep
Sultan Kudarat State University, Tacurong City, Philippines

*Corresponding Author Email: jornamay.ferrer@deped.gov.ph

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Abstract. As individual needs of the learners vary, they need to tailor their learning to meet their diverse, unique demands. This study determined the effectiveness of differentiated instruction techniques in enhancing pupils' learning outcomes to selected elementary schools in Tampakan, South Cotabato, for 2024-2025 academic year using a quantitative research design, which is descriptive and correlational, respondents included selected grades 4 to 6 pupils and all teachers from ten schools, using stratified random sampling for pupils. Statistical tools such as mean scores and Pearson's r correlation were used to analyze the data. Findings showed that differentiated instruction techniques, including hands-on exploration, varied instructional materials, visual aids, graphic organizers, and scaffolded tasks, were highly implemented. The pupils responded highly to differentiated instruction in motivation and engagement, with a section mean of 4.63. Additionally, the academic achievement of the respondents obtained a mean of 85.55, Science with the highest mean of 85.94, and Mathematics the lowest at 85.34. A moderate, positive correlation was determined between the implementation of differentiated instruction and pupils' motivation, engagement, and performance in academic areas. Identified challenges included time constraints, resource limitations, and classroom management, highlighting the need for strategic support. The study concluded that differentiated instruction enhances inclusive learning but requires robust support mechanisms.

Keywords: Academic achievement; Differentiated instruction; Engagement; Motivation.

1.0 Introduction

In the last few decades, differentiated instruction aims to tailor learning to individual needs by modifying content, processes, and assessments. However, teachers face significant challenges, including limited resources, extensive training requirements, time constraints, and resistance to change, making its implementation difficult in modern classrooms. Moreover, having a wide range of pupils has made standard teaching methods hard. According to (Dixon et al., 2019), new studies show that 89% of classes have a wide range of pupils with different experiences and skills, which means that one-size-fits-all methods do not work. Differentiated instruction is a way of teaching that changes techniques, materials, and tests to meet the needs of each student. Tomlinson and Jarvis (2019) also prove that this method motivates pupils and makes them successful in their academic performance.

Internationally, the significant contribution of differentiated instruction has been acclaimed for its ability to close the gaps in education. A key study by Özüdoğru (2022) that looked at school systems in Europe and North America has given a lot of data supporting this method. Differentiated methods were used to teach pupils from various backgrounds and skill levels in this study. The results revealed that differentiated instruction made pupils much more interested and motivated, which led to a significant improvement in all of their grades. It's clear that

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these results show how important adaptable teaching methods are in meeting the needs of all learners and making their education better (Valiandes & Neophytou, 2019).

Research in the Philippines has validated differentiated instruction's effectiveness in mixed-ability classrooms. A study by Aranda and Zamora (2022) showed that customized teaching strategies significantly enhanced academic performance by meeting diverse pupil needs. However, in the study by Valiandes and Neophytou (2018); Vaughn et al., (2020); Ulferts, (2019) challenges like time constraints, resource limitations, classroom management, the need for extensive teacher training, practical assessments, resistance to change, socio-economic disparities, ensuring inclusivity, and meeting accountability standards complicate its implementation. Also, Ulferts (2019) finds that addressing these factors is crucial for successfully applying differentiated instruction in diverse educational settings.

Meanwhile, differentiated instruction on pupils' learning outcomes has received little attention based on improving pupils' motivation and engagement. Despite the findings from existing studies on differentiated instruction, there is a noticeable research gap in the Philippine context (Resplandor, 2021). This highlights the need for more holistic examination of differentiated instruction's efficacy. A comprehensive approach that encompasses academic achievements and in-depth insights into the experiences of educators and learners is crucial (Allcock & Hulme, 2020). Such an integrated research endeavor would illuminate the tangible benefits of differentiated instruction and unravel the complexities of its implementation and scalability (Groenewald et al., 2024).

In the local context, the study conducted by Lumando et al. (2023) in Tampakan, South Cotabato, provided early evidence supporting the efficacy of differentiated instruction, showing notable enhancements in pupils' engagement and performance within the schools. However, its limited scope focuses on the specific research area and challenges, raising questions about how to implement differentiated instruction's effectiveness across diverse Philippine regions and educational contexts. Thus, this study aimed to evaluate the differentiated instruction techniques in enhancing pupils 'learning outcomes in Elementary Schools of Tampakan, South Cotabato for the school year 2024-2025 in terms of the levels of implementation of differentiated instruction techniques being used by the respondents in hands- on exploration, varied instructional materials, visual aids and graphic organizers, and Scaffolded tasks; the level of the pupils' responses to differentiated instruction techniques in terms of motivation and engagement, and academic achievement in English, Mathematics, and Science; significant relationships between level of implementation of differentiated instruction technique and motivation and engagement and academic achievement; and the challenges associated with the implementation of differentiated instruction technique in the classroom.

2.0 Methodology

2.1 Research Design

This study employed a quantitative, evaluative research design. According to Creswell (2017), this design explored the connection between the dependent and independent variables to forecast future occurrences based on past events. The design was framed based on correlational research findings, which were used to examine the prevalence of independent and dependent variables such as the differentiated instruction techniques implementation with regards to hands-on exploration, varied instructional materials, visual aids, and graphic organizers, and scaffolded tasks. Additionally, according to Creswell and Cresswell (2018), pupils' responses to differentiated instruction techniques included two indicators: motivation, engagement, and academic achievement. Furthermore, pupils' responses to differentiated instruction techniques based on their motivation and engagement for the first academic achievement were identified as the dependent variable. Meanwhile, descriptive analysis tested for the correlation of independent and dependent variables and predictions of events based on existing data and knowledge. Although the method could be applied in various ways, it is important to use it cautiously and interpret the data meaningfully. In the study of Ghanad (2023), important issues were raised for discussion, and multiple data analysis methods were proposed to help researchers minimize errors.

Moreover, Creswell (2017) claimed that the results of correlational research were used to understand how standard variables were and how they related to each other and to predict future outcomes based on current knowledge. Even though the technique could be utilized in many ways, it is crucial to approach it carefully and evaluate the data thoroughly. Significant questions were raised for discussion, and several analytical approaches were provided to help researchers make fewer mistakes (Berger, 2015).

2.2 Research Locale

The study was conducted in selected schools within the Municipality of Tampakan, South Cotabato, due to its rich cultural and historical context provides a unique backdrop for educational research. Tampakan is a municipality marked by its cultural diversity and historical significance. It was initially inhabited by indigenous Blaan people and was shaped by various waves of migration and colonization. This area offers a microcosm of broader societal challenges and opportunities, particularly in balancing cultural preservation with modern educational practices. The chosen schools, representing diverse educational environments, reflect the municipality's efforts to maintain its cultural heritage while adapting to contemporary educational demands. Including these schools was strategic, ensuring the study captured various educational practices and community dynamics. This approach is supported by literature emphasizing the importance of conducting educational research in culturally and historically rich settings, as it allows for a deeper understanding of how local contexts influence educational outcomes (Creswell, 2014). Furthermore, Tampakan's ongoing dialogue around environmental and indigenous rights, coupled with its developmental challenges, makes it a particularly relevant setting for examining how education intersects with cultural identity and sustainable development issues. The area's history of resistance to external influences and its current role in discussions about sustainable resource management provide a compelling backdrop for exploring how education can contribute to cultural preservation and economic development. Mertens (2015) implies that this selection is aligned with research recommendations that advocate for studies in regions where educational practices are deeply intertwined with local socio-cultural and environmental issues. In conclusion, the Municipality of Tampakan was chosen for this study because of its representative diversity and unique cultural and historical context, which offers valuable insights into the role of education in shaping and preserving cultural identities in the face of modern challenges. Villa (2018) also implies that this choice is supported by scholarly perspectives that underscore the importance of situating educational research within specific cultural and historical contexts to enhance the relevance and impact of the findings.

2.3 Research Respondents

The respondents in the study included teachers and pupils from ten (10) selected elementary schools in the Municipality of Tampakan, South Cotabato Division, specifically in grades 4 to 6. 17.29% of respondents came from Cariaga-Mercado Elementary School, 16.22% from Maltana Elementary School, 14.89% from Lampitak Elementary School, 12.23% from Taplan Integrated School, 11.17% from Lambayong Elementary School, 8.51% from Sta. Cruz Elementary School, 7.71% from Escobillo Elementary School, 5.59% from San Isidro Elementary School, 4.26% from Claudio-Delos Reyes Elementary School, and 2.13% from Bukang Liwayway Elementary School. The distribution of the respondents by schools was based on a proportional allocation formula (Hechanova & Hechanova, 2005) with the target population by group.

2.4 Research Instrument

The research instruments used in the study came from notable authors. The questionnaires were adopted and modified. Before use, the questionnaires underwent validation by experts. Following the validation, the questionnaires were subjected to pilot testing at Tananzang Elementary School, Purok Acasia, Tananzang, Lutayan, Sultan Kudarat, to determine the reliability of Cronbach's Alpha. Each item was measured using a 5-point Likert Scale. The questionnaire was composed of three (3) parts. First, it assessed the level of implementation of differentiated instruction techniques in terms of hands-on exploration, varied instructional materials, visual aids, and graphic organizers, and scaffolded tasks. Second, it evaluated pupils' responses to differentiated instruction techniques regarding motivation and engagement. Furthermore, pupils' academic achievement in selected schools in the Municipality of Tampakan, South Cotabato, was gathered during the first grading period of the school year 2024-2025.

2.5 Data Gathering Procedure

The data-gathering procedure for this study followed a structured process to ensure accuracy, validity, and ethical compliance (Kabir, 2016). First, the test items underwent validation to confirm their relevance and effectiveness in measuring the intended constructs. Also, the study of Johnson and Turner (2003) involved assessing the items' clarity, reliability, appropriateness, and comprehensiveness through expert review and pilot testing. Next, permission was sought from the office of the Schools Division Superintendent to conduct the study within the designated educational jurisdiction. Coordination with the District in charge and School Administrators of the target schools was established to secure access and support for data collection activities (Babbie, 2001). Once permission was obtained, a schedule was set with the respondents, typically elementary teachers and pupils

within Tampakan District, Tampakan, South Cotabato, ensuring convenience and minimal disruption to their teaching responsibilities. Depending on the participants ' preference, the test items were administered according to the agreed-upon schedule, either electronically or in print format. Additionally, the office of the Graduate School sought approval to conduct the study, ensuring adherence to academic and ethical standards. Following data collection, the retrieved responses were consolidated and prepared for analysis. Data analysis involved statistical techniques, such as Pearson's r Correlation, to explore relationships between variables (Nachmias & Nachmias, 1990). Finally, the results were interpreted within the context of the research objectives, providing insights into the influence of professional development participation on pupil achievement growth. All collected data were handled with the highest level of confidentiality and used solely for research purposes of the study, following the Data Privacy Act (Khan, 2006).

2.6 Ethical Consideration

This study adhered to ethical principles to ensure the protection and rights of all respondents. Prior to data collection, approval was obtained from relevant authorities, including the Schools Division Superintendent and the Graduate School of Sultan Kudarat State University, to ensure compliance with academic and institutional guidelines. Respondents were informed about the purpose of the study, and their voluntary participation was emphasized, with the option to withdraw at any time. Confidentiality and anonymity were maintained, and all collected data were used solely for research. The study also complied with the Data Privacy Act to safeguard personal information and uphold ethical research standards. Likewise, the works of different bodies in this study were recognized and referenced.

3.0 Results and Discussion

3.1 Level of Implementation of Differentiated Instruction Techniques

Table 1 shows the mean distribution for the level of implementation of differentiated instruction techniques, specifically focusing on hands-on exploration. The overall section mean is 4.81, which is described as Highly Implemented. This indicates that the respondents lead in implementing differentiated techniques regarding the use of hands-on exploration techniques to enhance their learning process.

Table 1. *Mean Distribution on the Level of Implementation of Differentiated Instruction Techniques in terms of Hands-on Exploration (n=59)*

No.	Indicators	Mean	Interpretation
1	Find that hands-on exploration activities enhance my understanding of the material.	4.78	Highly Implemented
2	Feel more engaged in the learning process when it involves hands-on exploration.	4.81	Highly Implemented
3	Believe that hands-on exploration helps accommodate diverse learning styles.	4.85	Highly Implemented
4	Prefer lessons that include opportunities for hands-on exploration over traditional lectures.	4.86	Highly Implemented
5	Think that hands-on exploration activities encourage critical thinking and problem-solving skills.	4.83	Highly Implemented
6	Feel confident in applying what I have learned through hands-on exploration to real-world situations.	4.71	Highly Implemented
7	Appreciate when instructors incorporate hands-on exploration to make learning more interactive.	4.83	Highly Implemented
	Section Mean	**4.81**	**Highly Implemented**

Among the seven statements on the indicator Hands-on Exploration, the highest mean is "Prefer lessons that include opportunities for hands-on exploration over traditional lectures," with a mean of 4.86, also interpreted as Highly Implemented. Conversely, the statement with the lowest mean is "Feel confident in applying what I have learned through hands-on exploration to real-world situations," which has a mean of 4.71, still interpreted as Highly Implemented. Thus, this study implies that hands-on exploration is widely embraced and effectively implemented in learning environments, significantly promoting engagement and accommodating diverse learning styles, ultimately fostering critical thinking and practical skill application among pupils.

Supporting this notion, Hagenimana et al. (2023) explored the effectiveness of hands-on practical activities in teaching chemistry, finding that these activities significantly enhanced pupils' engagement, learning experiences, and academic performance. The study suggests that interactive, practical experiences help pupils better grasp complex concepts by actively involving them in the learning process. Relating to hands-on exploration, this underscores the importance of incorporating such methods to deepen pupil understanding and increase participation, ultimately improving academic outcomes. Similarly, Musharrat (2020) examined teachers' perceptions of using hands-on activities in secondary science classrooms, highlighting both their benefits and

challenges. While teachers acknowledged that hands-on methods increased learner engagement and understanding, they faced barriers such as limited resources and time constraints. This study suggests that the successful implementation of hands-on exploration requires sufficient resources and training, aligning with the need for supportive conditions to maximize its effectiveness in differentiated instruction contexts.

Table 2 displays the mean distribution for the level of implementation of differentiated instruction techniques in terms of varied instructional materials. The overall section mean is 4.79, which is interpreted as Highly Implemented. This result indicates that respondents lead in differentiated techniques regarding using varied instructional materials to cater to diverse learning needs. Moreover, the highest mean is associated with the statement, "Appreciate when different forms of instructional materials are provided to help understand complex concepts," with a mean of 4.88, interpreted as Highly Implemented. In contrast, the statement with the lowest mean is "Prefer courses that utilize a variety of instructional materials to present information," with a mean of 4.64, also interpreted as Highly Implemented.

Table 2. *Mean Distribution on the Level of Implementation of Differentiated Instruction Techniques in terms of Varied Instructional Materials*

No.	Indicators	Mean	Interpretation
1	Find that varied instructional materials cater to my individual learning preferences.	4.80	Highly Implemented
2	Feel more motivated to learn when a range of instructional materials is used.	4.78	Highly Implemented
3	Believe that using varied instructional materials makes content more accessible to all pupils.	4.85	Highly Implemented
4	Appreciate when different instructional materials are provided to help understand complex concepts.	4.88	Highly Implemented
5	Find classes that use varied instructional materials are more engaging.	4.73	Highly Implemented
6	Think that varied instructional materials support a more profound understanding of the subject matter.	4.86	Highly Implemented
7	Prefer courses that utilize a variety of instructional materials to present information.	4.64	Highly Implemented
	Section Mean	**4.79**	**Highly Implemented**

Hence, the findings imply that incorporating varied instructional materials effectively addresses different learning preferences and enhances engagement and comprehension, supporting a more inclusive and adaptable learning environment that fosters more profound understanding. Corroborating this perspective, Alciso et al. (2023) emphasized the development of outcomes-based instructional materials in professional teacher education, highlighting their flexibility and responsiveness to diverse educational needs. The study suggests that well-crafted instructional materials enhance learning by aligning educational goals with adaptable content, fostering pupil engagement, and accommodating diverse learner needs. This aligns with the importance of varied instructional materials, showing their potential to make learning relevant, accessible, and tailored to individual learning preferences. Also, Abubakar (2020) investigated the impact of instructional materials on learners' academic performance in Physics in Sokoto, Nigeria, demonstrating a strong positive influence on comprehension and achievement. The study highlights that diverse instructional tools enhance concept clarity and retention, leading to improved academic outcomes. This supports the indicator of varied instructional materials by showcasing their role in creating more engaging, accessible, and effective learning environments, especially for complex subjects like Physics.

Table 3 displays the mean distribution for the level of implementation of differentiated instruction techniques focusing on visual aids and graphic organizers. The overall section mean is 4.82, described as Highly Implemented, indicating that respondents lead in the differentiated techniques' use of visual aids and graphic organizers to enhance learning effectiveness.

Table 3. *Mean Distribution on the Level of Implementation of Differentiated Instruction Techniques in terms of Visual Aids and Graphic Organizer*

No.	Indicators	Mean	Interpretation
1	Understand concepts better when visual aids and graphic organizers are used in teaching.	4.76	Highly Implemented
2	Find visual aids and graphic organizers that are helpful in organizing and remembering information.	4.81	Highly Implemented
3	Believe that visual aids and graphic organizers make learning more interesting.	4.90	Highly Implemented
4	Appreciate the use of visual aids and graphic organizers to clarify complex ideas.	4.86	Highly Implemented
5	Feel that visual aids and graphic organizers support diverse learning needs.	4.78	Highly Implemented
6	Prefer lessons that incorporate visual aids and graphic organizers.	4.81	Highly Implemented
7	Visual aids and graphic organizers facilitate a quicker grasp of learning materials.	4.80	Highly Implemented

Section Mean		**4.82**	**Highly Implemented**

Moreover, the highest mean is associated with the statement, "Believe that visual aids and graphic organizers make learning more interesting," with a mean of 4.90, interpreted as Highly Implemented. The lowest mean is "Understand concepts better when visual aids and graphic organizers are used in teaching," with a mean of 4.76, also interpreted as Highly Implemented. This study implies that the consistent use of visual aids and graphic organizers greatly improves pupil interest, comprehension, and the ability to grasp complex concepts, making learning more accessible and engaging for diverse learners.

Corroborating this observation, Kurniaman and Zufriady (2019) investigated the effectiveness of graphic organizers in enhancing reading comprehension among elementary pupils. Their study found that these tools help structure information, making it easier for pupils to grasp and retain reading material. The findings highlight the role of graphic organizers in differentiated instruction by supporting diverse learning needs, aiding in content accessibility, and boosting pupils' ability to understand and remember complex reading content. Mamadaliyeva and Ismanova (2020) explored using visual aids and information technology in teaching English, emphasizing how these tools make learning more engaging and effective. Their study showed that visual aids enhance comprehension and maintain pupil interest by presenting material more interactively. This aligns with the indicator of incorporating visual aids and graphic organizers, underscoring their value in making complex concepts more comprehensible and engaging for diverse learners.

Table 4 presents the mean distribution for the level of implementation of differentiated instruction techniques related to scaffolded tasks. The overall section mean is 4.69, with a descriptive interpretation of Highly Implemented. This indicates that respondents lead in differentiated techniques in terms of the scaffolded tasks in their educational practices, acknowledging their value in facilitating learning by providing structured, step-by-step support.

Table 4. *Mean Distribution on the Level of Implementation of Differentiated Instruction Techniques in terms of Scaffolded Tasks*

No.	Indicators	Mean	Interpretation
1	Feel more confident in my ability to complete tasks when they are scaffolded.	4.68	Highly Implemented
2	I believe scaffolded tasks help gradually build my understanding of the subject.	4.71	Highly Implemented
3	Appreciate when tasks are broken down into manageable steps to assist learning.	4.83	Highly Implemented
4	Find scaffolded tasks essential for mastering complex concepts.	4.90	Highly Implemented
5	Think that scaffolded tasks promote independence in learning.	4.75	Highly Implemented
6	Prefer learning environments that utilize scaffolded tasks to introduce new skills.	4.83	Highly Implemented
7	Feel that scaffolded tasks are beneficial in providing personalized learning experiences.	4.69	Highly Implemented
	Section Mean	**4.69**	**Highly Implemented**

Additionally, the statement with the highest mean is "Find scaffolded tasks essential for mastering difficult concepts," with a mean of 4.90, interpreted as Highly Implemented. The statement with the lowest mean is "Feel more confident in my ability to complete tasks when they are scaffolded," with a mean of 4.68, also interpreted as Highly Implemented. Hence, the implication of this study suggests that scaffolded tasks play a crucial role in assisting pupils to master complex topics by breaking them into manageable steps. This approach enhances learners' confidence, promotes independence, and offers personalized learning experiences, ultimately fostering a supportive and engaging educational environment. Implementing scaffolded learning strategies can significantly contribute to educational success by addressing diverse learning needs and facilitating meaningful comprehension.

In a related context, Dominguez and Svihla (2023) reviewed teacher-implemented scaffolding strategies in K-12 education, emphasizing their pivotal role in pupils' learning and skill development. Their findings highlight that effective scaffolding adjusts support to meet individual learning needs, gradually withdrawing assistance as pupils gain competence. This aligns with the importance of scaffolded tasks in differentiated instruction by enabling tailored support for mastering complex concepts, fostering pupils' confidence and academic growth through structured learning. Complementing this, Sun et al. (2023) conducted a systematic review of teacher scaffolding in game-based learning within primary education, revealing that scaffolding enhances engagement and knowledge acquisition. Teachers enable deeper learning and skill mastery by providing guidance tailored to pupils' needs within game-based environments. This demonstrates that scaffolded tasks are essential for fostering

complex skill development, promoting independence, and making learning contexts more meaningful and interactive for young learners.

Table 5 presents the mean distribution of pupils' responses to differentiated instruction techniques regarding motivation. The overall section mean is 4.63, which is interpreted as Highly Motivated. This indicates that pupils generally exhibit a high level of motivation in response to differentiated instructional methods, showing engagement and enthusiasm in their learning activities.

Table 5. *Mean Distribution on the Level of Pupils' Responses to Differentiated Instruction Techniques in terms of Motivation*

No.	Indicators	Mean	Interpretation
1	Get excited about learning when the lessons are fun and interactive.	4.74	Highly Motivated
2	How much I try in class directly affects how well I do in my schoolwork.	4.48	Motivated
3	Feel more interested in the subjects when teachers use cool and new ways to teach.	4.66	Highly Motivated
4	I like it when teachers make learning a game or a group activity.	4.59	Highly Motivated
5	Know that I remember things better when excited and paying attention in class.	4.66	Highly Motivated
	Section Mean	**4.63**	**Highly Motivated**

Specifically, the highest mean is associated with the statement "Get excited about learning when the lessons are fun and interactive," with a mean of 4.74, interpreted as Highly Motivated. The lowest mean is "Think how much I try in class directly affects how well I do in my schoolwork," with a mean of 4.48, interpreted as Motivated. Hence, the implication of this study suggests that incorporating fun, interactive, and varied teaching methods through differentiated instruction significantly enhances pupil motivation. Educators can foster a more stimulating learning environment by making lessons engaging and relatable, encouraging greater participation and retention. This approach effectively tailors learning experiences to meet diverse pupil needs, promoting academic success and a positive attitude toward learning. The findings indicated that diverse media tailored to individual learning styles boost pupil motivation and engagement.

Supporting this finding, Zens (2021) investigated the impact of differentiated learning activities on pupil engagement and motivation in the English Language Arts classroom. The study revealed that tailoring instructional activities to meet diverse pupil needs significantly increases engagement and motivation. This suggests that by addressing individual learning preferences, differentiated learning fosters a more stimulating and inclusive educational environment. Such methods enhance motivation and engagement, making learning experiences more relevant and captivating for pupils. Complementing this, Demir (2021) examined how differentiated instructional media affect motivation and pupils' perspectives toward science learning, considering various learning styles. The findings indicated that diverse media tailored to individual learning styles boost pupil motivation and engagement. This underscores the importance of flexible, differentiated instructional approaches in meeting diverse educational needs, enhancing motivation, and fostering positive learning attitudes, ultimately promoting more effective and inclusive science education experiences.

Table 6 presents the mean distribution of pupils' responses to differentiated instruction techniques regarding engagement. The overall section mean is 4.63, with a descriptive interpretation of Highly Engaged. This indicates that pupils generally exhibit a strong level of engagement in their learning experiences when differentiated instruction techniques are employed, reflecting an active interest and involvement in class activities.

Table 6. *Mean Distribution on the Level of Pupils' Responses to Differentiated Instruction Techniques in terms of Engagement*

No.	Indicators	Mean	Interpretation
1	Feel involved in class when teachers use different and fun teaching methods.	4.64	Highly Engaged
2	Believe that when I am interested and active in class, I do better in my schoolwork.	4.65	Highly Engaged
3	I want to get into my school subjects more when teachers make them fun and interesting.	4.58	Highly Engaged
4	Feel awesome when teachers let us do things like experiments or projects.	4.51	Highly Engaged
5	I like classes more when teachers ensure we all pay attention and have fun while learning.	4.79	Highly Engaged
	Section Mean	**4.63**	**Highly Engaged**

Moreover, the highest mean is associated with the statement "Like classes more when teachers make sure we are all paying attention and having fun while learning," with a mean of 4.79, interpreted as Highly Engaged. The

lowest mean is "Feel awesome when teachers let us do things like experiments or projects," with a mean of 4.51, also interpreted as Highly Engaged. Thus, the implication of this study suggests that employing engaging instructional methods, such as fun and interactive activities, significantly boosts pupils' engagement levels. Differentiated strategies like projects and experiments encourage active participation and foster a positive learning atmosphere, enhancing pupils' focus, enthusiasm, and overall learning outcomes. This aligns with differentiated instruction's capacity to boost pupils' engagement by providing relevant, accessible learning experiences, enriching their educational journey, and creating a dynamic, supportive classroom atmosphere.

Supporting this notion, Halif et al. (2020) explored the moderating role of pupil motivation in the relationship between learning styles and engagement, finding that higher motivation enhances pupil engagement across various learning approaches. This implies that differentiated instruction techniques tailored to individual learning preferences can maximize engagement, as motivated pupils are more likely to actively participate and connect with their learning experiences, fostering deeper educational involvement and success. In a related context, Ismajli and Imami-Morina (2018) emphasized differentiated instruction to accommodate diverse learning needs through interactive strategies. Their study highlights that engaging, tailored teaching practices foster inclusive classroom environments, improving pupils' engagement by aligning teaching methods with individual capabilities. This aligns with differentiated instruction's capacity to boost pupils' engagement by providing relevant, accessible learning experiences, enriching their educational journey and creating a dynamic, supportive classroom atmosphere.

Table 7 shows the mean distribution of pupils' responses to differentiated instruction techniques in academic achievements, with a section mean of 85.55, interpreted as Very Satisfactory. This indicates that overall, pupils achieved a very satisfactory level of academic performance across the subjects assessed, demonstrating the effectiveness of differentiated instruction in supporting learning.

Table 7. *Mean Distribution on the Level of Pupils' Responses to Differentiated Instruction Techniques in terms of Academic Achievements*

No.	Indicators	Mean	Interpretation
1	English	85.37	Very Satisfactory
2	Mathematics	85.34	Very Satisfactory
3	Science	85.94	Very Satisfactory
	Overall Mean	**85.55**	**Very Satisfactory**

The highest mean is found in "Science" with a mean score of 85.94, interpreted as Very Satisfactory. The lowest mean is observed in "Mathematics," with a mean of 85.34, with slight variation is also interpreted as Very Satisfactory. Hence, this study implies that differentiated instruction techniques positively influence academic performance, particularly enhancing outcomes in Science more than other subjects. Although it posits that slight variation in mathematics-focused strategies may be required to improve outcomes further, it demonstrates the need for tailored instructional practices for varying subject demands.

Corroborating this perspective, Kotob and Abadi (2019) examined the impact of differentiated instruction on pupils' academic achievement in mixed-ability classrooms. This suggests that differentiated instruction allows educators to provide targeted support and personalized learning experiences, improving comprehension and academic outcomes, particularly for pupils with varying abilities, thus making learning more accessible and practical. Similarly, Grain et al. (2022) explored the effect of differentiated instruction on Level 2 English pupils' academic achievement in Iraq's public sector universities. The study found that differentiated teaching approaches positively influenced pupils' learning outcomes by accommodating their unique learning styles and needs. This underscores the importance of adopting flexible instructional strategies to boost academic success, highlighting how differentiated instruction enables pupils to reach their full potential through customized learning pathways.

3.2 Relationship between Implementation of Differentiated Instruction, Motivation, and Academic Performance

Table 8 presents the results of the correlation analysis between the extent of implementation of differentiated instruction techniques and pupils' motivation and engagement. The descriptive statistics show a mean value of 4.630 for motivation/engagement with a standard deviation of 0.29. At the same time, the implementation of differentiated instruction has a mean of 4.81 and a standard deviation of 0.19.

Table 8. *Relationship between Motivation/Engagement and Implementation*

`	Mean	SD	r	p-value	Interpretation
Motivation/Engagement	4.63	0.29	.42	<.001	Significant Moderate Correlation
Implementation	4.81	0.19		<.001	

r^2 = .18, .05 level of Significance (2-tailed)

However, the Pearson (r) correlation coefficient of 0.425 between motivation/engagement and implementation reveals a moderate positive relationship. This implies that when differentiated instruction techniques are effectively implemented, there is a corresponding increase in pupils' levels of engagement and motivation. Notably, the p-value of 0.000 indicates a statistically significant correlation at the 0.05 significance level. Thus, the data strongly support the hypothesis that differentiated instruction strategies positively influence pupil motivation and engagement. The obtained strength of the relationship between the implementation of differentiated instruction techniques and motivation and engagement, represented by the coefficient of determination (r^2 = 0.18), indicates that the level of implementation of these instructional techniques can explain 18% of the variance in pupils' motivation and engagement. Conversely, 82% of the variance is attributed to other variables not examined in this study. This suggests that while implementing differentiated instruction significantly contributes to fostering pupils' motivation and engagement, additional factors such as teacher quality, classroom dynamics, peer relationships, and external influences like family support may also play a crucial role in shaping these outcomes.

Thus, the findings further highlight a significant moderate correlation between implementing differentiated instruction techniques and pupils' motivation and engagement. This implies that when differentiated instruction strategies are effectively applied, pupils are more likely to exhibit higher interest, motivation, and engagement in their learning activities. About the result, the study of Brunello and Brunello (2022) explored the connection between differentiated instruction and pupil motivation in mixed-ability classrooms, revealing that tailored teaching strategies significantly enhance motivation. Their study suggests that differentiated approaches address diverse learning needs, increasing pupils' engagement and interest. This implies that such techniques directly influence pupil motivation, creating a supportive and stimulating environment that encourages active participation and sustained effort. Similarly, Saputri et al. (2023) examined differentiated instruction's impact on learners' perception, engagement, and motivation in EFL high school education, highlighting that customized learning activities foster higher engagement levels and motivation. The study found that differentiated instruction methods made learning more relatable and dynamic. This suggests a positive relationship between implementing differentiated strategies and increased pupil motivation and engagement, emphasizing the importance of adapting teaching to meet diverse needs.

Table 9 presents the descriptive statistics and correlation results for the relationship between academic achievements and the implementation of differentiated instruction techniques. Based on the sample size of 317 (N), the mean for academic achievements is 85.56, with a standard deviation of 3.91, while the mean for implementation is 4.81, with a standard deviation of 0.19.

Table 9. *Relationship between Academic Achievements and Implementation*

	Mean	SD	r	p-value	Interpretation
Academic Achievements	85.56	3.91	.43	<.001	Significant Moderate Correlation
Implementation	4.819	0.19			

r^2 = .19, .05 level of Significance (2-tailed)

Moreover, the Pearson correlation coefficient (r) between academic achievements and the implementation of differentiated instruction is 0.43, with 0.000 as the p-value. This indicates a significant moderate positive relationship between the two variables, as the p-value is well below the 0.01 significance level. This finding suggests that as the

The correlation coefficient (r^2 = 0.19) indicates that 19% of pupils' academic achievement variance can be attributed to implementing differentiated instruction techniques. Conversely, 81% of the variance is explained by other factors not included in this study. This suggests that while differentiated instruction contributes meaningfully to pupils' academic success, additional influences such as teacher expertise, curriculum quality, school resources, socio-economic factors, and pupils' learning habits also play a critical role. Hence, the result implies that differentiated instruction techniques can significantly boost pupils' academic performance. Educators can create

more inclusive and effective classrooms by customizing teaching methods to fit individual pupil needs and learning preferences, ultimately driving better academic outcomes. This underscores the importance of investing in training and resources to implement differentiated instruction strategies and enhance pupil success.

According to Lv et al. (2016), which explored the link between academic achievement and the emotional well-being of elementary pupils in China, highlighting parent-school communication as a moderating factor. Their findings emphasize the significance of creating supportive environments that foster academic success. This implies that effective implementation of differentiated instruction strategies, alongside robust communication and collaboration with parents, can enhance pupils' academic outcomes by addressing emotional and contextual factors that influence learning. Similarly, Özcan (2021) examined various factors affecting pupil academic achievement based on teachers' opinions, noting that tailored teaching methods and contextual adaptations play a pivotal role. The study underscores the importance of aligning instructional practices with pupil needs to maximize academic performance. This suggests that when responsive to diverse needs, differentiated instruction implementation can significantly boost academic success, fostering a holistic and adaptable educational approach that benefits all learners.

3.3 Challenges Encoountereed

Table 10 outlines the challenges of implementing differentiated instruction techniques in the classroom, with a ranked list of ten issues. Time constraints emerge as the top-ranked challenge, indicating that educators often struggle to find sufficient time to design and implement differentiated strategies effectively. This suggests that the complexity of catering to diverse pupil needs may clash with the rigid schedules and demands placed on teachers. Closely following, resource limitations rank second, highlighting the lack of adequate materials, tools, and support structures necessary for effectively applying differentiated instruction.

Table 10. *Challenges Associated with the Implementation of Differentiated Instruction Technique in the Classroom*

No.	Challenges	Rank
1	Time Constraints	1
2	Resource Limitations	2
3	Classroom Management	4
4	Teacher Training and Support	3
5	Assessment	8
6	Resistance to Change	7
7	Pupil Motivation	6
8	Socio-economic Disparities	5
9	Inclusive Practice	9
10	Accountability	10

Additional challenges, such as classroom management (ranked third) and teacher training and support (ranked fourth), emphasize the importance of fostering a conducive environment and equipping educators with the skills and confidence needed to adapt their teaching methods. Lower-ranked challenges, such as resistance to change, pupil motivation, socio-economic disparities, inclusive practice, and accountability, reflect broader systemic and social factors that can further complicate efforts to tailor instruction. These findings underscore the multifaceted nature of implementing differentiated instruction and the need for comprehensive support and reform. This notion is supported by Nurlankyzy and Elmira (2023). The study highlights the complex challenges and strategies in implementing differentiated instruction within classrooms. Their research underscores that educators face prevalent issues with time constraints, resource limitations, and resistance to change. Strategies such as targeted professional development and collaborative planning sessions were suggested to mitigate these challenges. This emphasizes that overcoming obstacles to differentiation requires systemic support and deliberate planning to accommodate diverse pupil needs. Also, Suryati et al. (2023) explore specific challenges encountered by English teachers in junior high schools when implementing differentiated instruction, including limited training, diverse learner capabilities, and insufficient resources. The study reveals that teachers often struggle to balance the needs of varied learners while maintaining curriculum standards. Providing ongoing teacher training and access to resources is suggested to alleviate these issues, facilitating the successful integration of differentiated strategies into classroom practices.

4.0 Conclusion

Teachers play a vital role in meeting pupils' diverse learning needs through effective instructional strategies. This study determines the impact of differentiated instruction techniques, such as hands-on exploration, varied instructional materials, visual aids, and scaffolded tasks, on pupil motivation, engagement, and academic achievement. It also highlights challenges faced by educators in implementing these strategies, emphasizing the need for support and resources to enhance teaching effectiveness. In terms of the level of the implementation in differentiated instruction techniques, the study concludes that the consistently high mean scores across hands-on exploration, varied instructional materials, visual aids, and graphic organizers, and scaffolded tasks demonstrate the successful implementation of differentiated instruction. These findings highlight the importance of employing diverse instructional strategies to address learning needs and enhance educational outcomes. Pupils exhibited high levels of motivation and engagement in response to these techniques, and their academic achievements in subjects like Science, English, and Mathematics further validate the positive impact of differentiated teaching on learning outcomes. Moreover, the study confirms that pupil motivation and engagement are dependent on the implementation of varied instructional techniques. At the same time, academic success is closely linked to the extent to which differentiated strategies are integrated into teaching practices. However, despite these benefits, key challenges such as time constraints, resource limitations, and classroom management hinder the efficient implementation of differentiated instruction. These obstacles emphasize the need for strategic interventions to support educators in overcoming barriers and maximizing the effectiveness of differentiated teaching. This study is limited to a specific geographical area—elementary schools in Tampakan, South Cotabato—which may affect the generalizability of the findings to other regions with different educational contexts. Future research should consider expanding the scope to include a larger and more diverse sample across multiple regions in the Philippines. Longitudinal studies could also examine the sustained impact of differentiated instruction on academic performance over time.

5.0 Contributions of Authors

The authors indicate equal contribution to each section. The authors reviewed and approved the final work.

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Analysis of Environmental Literacy and Sustainable Development Goals (SDGs) Competence among Community Leaders: Bases for Technology-Assisted Module for Green Management Advocates

Juim T. Jimlan*, Evan Anthony Arias
Central Philippine University, Iloilo City, Philippines

*Corresponding Author Email: juim.jimlan@deped.gov.ph

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Abstract. Environmental sustainability is a growing concern globally, and in the Province of Aklan, the need for strong community leadership in addressing ecological challenges has become increasingly urgent. This study aimed to assess the environmental literacy and Sustainable Development Goals (SDG) competence of community leaders in Aklan and to evaluate the effectiveness of a technology-assisted green management module in enhancing these competencies. Utilizing an explanatory-sequential mixed methods design, the study first collected quantitative data from 210 community leaders through validated questionnaires and qualitative insights from focus group discussions and in-depth interviews. Colaizzi's phenomenological method and the Knowledge, Attitudes, and Practices (KAP) framework were used for thematic analysis. Key findings revealed a high level of environmental literacy and SDG competence across most demographic groups, with the LGBTQ+ and older participants scoring highest. A strong positive correlation ($r = 0.952$, $p < 0.001$) was found between environmental literacy and SDG competence. However, younger leaders exhibited lower engagement, and systemic barriers such as a lack of mentorship, decision-making power, and policy enforcement hindered broader participation in sustainability efforts. The green management module, delivered via Facebook, significantly improved participants' knowledge, attitudes, and behaviors, as evidenced by pre- and post-assessment results. The study concludes that targeted, inclusive, and technology-driven training can strengthen sustainability leadership at the community level. It recommends expanding youth involvement, integrating traditional ecological knowledge, and fostering multi-stakeholder collaboration to achieve long-term environmental resilience in Aklan.

Keywords: Environmental literacy; SDG competence; Community leadership; Sustainability education; Green management module; Youth empowerment.

1.0 Introduction

The Province of Aklan, renowned for its scenic landscapes and thriving tourism industry, faced environmental challenges threatening its ecological balance and socio-economic stability. Aklan's natural resources, such as its pristine beaches, lush forests, and marine ecosystems, were under considerable pressure from urbanization, overexploitation, and the adverse effects of climate change. For community leaders, safeguarding these resources while fostering economic growth required innovative approaches and informed decision-making processes. This

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study explored the development of a technology-assisted green management module to enhance the capacity of community leaders to address these complex challenges.

Environmental issues such as coastal erosion, deforestation, biodiversity loss, and pollution have grown more prevalent in Aklan, posing risks not only to the environment but also to the livelihoods of its residents. Coastal areas experienced worsening erosion and marine degradation, directly impacting fishing communities and threatening the sustainability of the province's renowned tourism sector. Similarly, upland regions saw significant deforestation, leading to habitat destruction and increased vulnerability to landslides and flooding. According to Ceballos et al. (2018), despite ongoing conservation efforts, these environmental problems persisted, highlighting the limitations of existing frameworks and the need for a more integrated and technology-driven approach to environmental management.

As stewards of local governance and development, community leaders played a critical role in addressing these environmental challenges. They were tasked with implementing policies, raising awareness, and mobilizing resources to promote sustainable practices within their communities. However, many leaders faced significant gaps in knowledge, skills, and access to technological tools needed for effective environmental management. Ruffin (2017) emphasized that these gaps limited their ability to make data-driven decisions, respond to emerging threats, and engage their communities in sustainable development initiatives.

The lack of a cohesive framework that integrated advanced technology and environmental literacy further hindered community leaders' efforts. While policies and programs addressing environmental issues existed, their implementation was often inconsistent and fragmented due to limited technical capacity and resource constraints. Caranto (2020) noted that this situation underscored the necessity of providing community leaders with a structured and accessible module that effectively combined educational content and practical tools for managing environmental resources.

In an ideal setting, community leaders in Aklan would have the knowledge and resources to address environmental issues proactively. The technology-assisted green management module sought to fill critical gaps in environmental sustainability by equipping leaders with the knowledge, attitudes, and practices necessary for effective stewardship. To maximize accessibility and engagement, all resources, tools, and updates were made available through a dedicated Facebook page. Evans (2020) stressed that this platform was a hub for community leaders to access comprehensive learning materials, including tutorials, interactive modules, and best practice case studies. As one of the most widely used social media platforms in the Philippines, Facebook ensured that leaders, regardless of location or technological proficiency, could easily engage with the content. The initiative enhanced learning by integrating the module into a familiar and user-friendly digital space. It strengthened a sense of community among participants, enabling them to collaborate in addressing Aklan's environmental challenges effectively.

The integration of environmental literacy into the module was also essential. Environmental literacy empowered leaders to understand ecological systems, recognize their interdependence with human activities, and appreciate the importance of sustainable resource management. This understanding enabled them to identify the root causes of environmental challenges and implement solutions holistically addressing these issues. Additionally, by fostering a sense of environmental stewardship, the module encouraged leaders to advocate for sustainable practices within their communities, contributing to long-term ecological preservation. Quimpo (2015) emphasized the critical role of environmental literacy in promoting informed and responsible decision-making for sustainable development.

Furthermore, aligning the module with the Sustainable Development Goals (SDGs) ensured local actions were consistent with global sustainability frameworks. Goals such as Climate Action (SDG 13), Life Below Water (SDG 14), and Life on Land (SDG 15) provided a comprehensive framework for addressing Aklan's environmental challenges. By incorporating SDG-related principles and competencies into the module, community leaders were equipped to balance environmental, social, and economic considerations in their decision-making processes, ensuring that their initiatives promoted sustainable development across multiple dimensions. UNEP (2021) highlighted the importance of integrating SDGs into local governance to achieve sustainable development outcomes.

The increasing frequency and severity of climate-induced disasters further compounded the urgency of Aklan's environmental issues. Typhoons, flooding, and rising sea levels threatened communities, requiring adaptive and resilient disaster risk reduction and recovery strategies. Climate Change Commission of the Philippines (2016) stressed that a technology-assisted green management module could provide community leaders with the tools and knowledge necessary to anticipate and respond to these challenges effectively. Leaders could develop and implement adaptive measures to safeguard their communities against future environmental risks by leveraging real-time data and predictive analytics.

This study sought to address the identified gaps by designing a technology-assisted green management module tailored to the needs of community leaders in Aklan. Miraflores (2017) emphasized that sustainable and technology-integrated approaches are essential to improving local governance and effectively addressing environmental challenges. The module combined cutting-edge technology, environmental education, and SDG-aligned frameworks to empower leaders with the capacity to drive sustainable development in their localities.

2.0 Methodology

2.1 Research Design

This study employed an Explanatory-Sequential research design, a two-phase mixed methods approach to integrate qualitative data to explain further quantitative findings (Creswell et al., 2003). The first phase involved collecting and analyzing quantitative data, followed by the second phase, which focused on gathering and analyzing qualitative data. The qualitative phase complements the quantitative findings, providing a deeper understanding and comprehensive insights. While the study primarily utilizes quantitative methods, mixed methods research integrates qualitative elements to enhance the overall understanding of the research problem (Johnson et al., 2007). In addition, the study utilized the ADDIE Model as its framework. ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation. This framework ensures a systematic approach to instructional design, allowing for the systematic planning, creation, and assessment of interventions based on research findings. The study effectively structured its research processes through this model, ensuring alignment between qualitative and quantitative phases and facilitating a well-rounded exploration of the research objectives. For the qualitative phase, in-depth interviews and Focus Group Discussions (FGDs) were conducted. These methods allowed for a deeper exploration of participants' experiences and perspectives, facilitating a thorough understanding of the findings.

2.2 Research Locale

The research locale for this study is the Province of Aklan, a region in the Western Visayas of the Philippines. Aklan is known for its vibrant local communities, rich environmental resources, and diverse socio-economic landscapes. It is a suitable setting for research on environmental literacy and Sustainable Development Goals (SDG) competence among community leaders. The study was conducted across various municipalities in Aklan, ensuring representation from urban and rural areas to capture various perspectives on environmental management and sustainability initiatives. Given its ecological significance, Aklan provides an ideal setting to examine the role of community leadership in sustainable development, particularly in addressing environmental concerns that impact urbanized and rural regions.

2.3 Research Participants

The research participants in this study consisted of community leaders from the Province of Aklan, specifically individuals involved in management, research, innovation, or public service. These participants ranged in age from 25 to 56 years old. They represented a diverse group in terms of geographical location, covering both urban and rural areas, and gender identity, including male, female, and LGBTQ+ individuals. Their community governance and environmental advocacy backgrounds made them well-suited to provide insights into environmental literacy and Sustainable Development Goals (SDGs) competence.

Participants were selected using Slovin's Formula, which determined the appropriate sample size from a total population of 420 community leaders with a 5% margin of error, yielding a required sample size of 205 participants. However, the researcher increased the sample size to 210 participants to enhance representation. Inclusion criteria guided the selection process to ensure diversity and relevance. Participants were required to hold recognized leadership positions within their communities, be actively engaged or interested in environmental issues and sustainable development, be familiar with sustainability initiatives, and be capable of

providing relevant data or documentation regarding their environmental literacy and SDG competence. They also needed to be willing to participate in the study's quantitative and qualitative phases and represent a balanced distribution of age groups to ensure generational perspectives were considered.

Exclusion criteria were applied to maintain the study's focus and uphold ethical research standards. Individuals who did not meet the specified age group requirements, were not residents of Aklan, had conflicts of interest such as affiliations with the research team or sponsoring organizations, or could not provide informed consent were excluded. Additionally, those with physical, cognitive, or communicative impairments that prevented meaningful participation were not considered for the study.

2.4 Research Instrument

The quantitative data in this study were gathered using researcher-made questionnaires, namely the Environmental Literacy Questionnaire for Community Leaders (ELQCL) and the Sustainable Development Goals (SDG) Competence Questionnaire for Community Leaders (SDGCQCL). In contrast, qualitative data were collected through a Focus Group Discussion (FGD) guide. The ELQCL consisted of 20 items measuring environmental literacy, using a five-point Likert scale ranging from "Strongly Aware" to "Strongly Unaware." Similarly, the SDGCQCL was a 30-item questionnaire assessing perceptions of education for sustainable development, with responses ranging from "Very True of Me" to "Very Untrue of Me." These instruments evaluated participants' environmental awareness and competence in achieving sustainability goals.

To ensure the validity of the questionnaire, a panel of experts in environmental science, education, and sustainability reviewed the instrument for relevance, clarity, and alignment with the study's objectives. Their feedback led to refinements, ensuring accurate measurement of the intended constructs. Additionally, an FGD with community leaders was conducted to assess the questionnaire's clarity and applicability, ensuring that items were relevant to real-world experiences. For reliability, a pilot test was conducted with thirty community leaders from Capiz, and data was analyzed using Cronbach's Alpha in SPSS to measure internal consistency. A high Cronbach's Alpha value confirmed the questionnaire's reliability, ensuring the instrument provided stable and dependable results for the final study.

2.5 Data Gathering Procedure

Before data collection, ethical clearance and permission were secured from the Governor's Office and disseminated to all 17 municipalities in Aklan. Participation was voluntary, with assurances of confidentiality. Survey instruments were distributed personally to ensure clarity. A Focus Group Discussion (FGD) was conducted on October 28, 2024, at Bernwood Tower, Iloilo City, with five key stakeholders from various sectors contributing insights on sustainability challenges and strategies. Additionally, 11 in-depth interviews were conducted with distinguished community leaders, focusing on environmental literacy, SDG awareness, local programs, and leadership practices.

The study employed a mixed-methods approach, using both quantitative and qualitative data. Quantitative data from 210 participants were analyzed through frequency, percentage, mean, standard deviation, ANOVA, and Pearson r correlation (set at $\alpha = 0.05$), revealing strong correlations and patterns. Qualitative data, collected from FGDs and interviews, were examined using Colaizzi's Seven-Step Method and thematic analysis under the Knowledge, Attitude, and Practice (KAP) framework. Recurring themes included community engagement, policy gaps, and behavioral inconsistencies.

A Technology-Aided Green Management Module was designed to address identified gaps using the ADDIE model. It featured three dimensions: knowledge, attitude, and practice and was implemented over three days with 30 community leaders from Tangalan, Aklan. Pre- and post-assessments confirmed significant improvement in environmental literacy and SDG competence. Evaluation tools, including the Acceptability Level Questionnaire, highlighted strengths and areas for enhancement, such as delivery methods and leadership accountability.

2.6 Ethical Considerations

Prior to data collection, the study received ethical approval from the Research Ethics Review Board (RERB), and permission was secured from relevant institutions. The research posed minimal risk, with non-sensitive questions, and participants were informed of their right to decline or withdraw at any time without consequences. Participation was entirely voluntary, and anonymity was preserved through coded questionnaires. Data were

securely stored and accessed only by authorized personnel. All materials were retained for five years and then securely disposed of to ensure ethical integrity. Participants received a modest token of appreciation, and the researcher declared no conflicts of interest. The study aimed to enhance community leaders' understanding of SDGs and environmental literacy, contributing to local governance, capacity building, and development planning.

3.0 Results and Discussion

3.1 Level of Environmental Literacy

The data presented in Table 1 reveal that participants consistently demonstrated a high level of environmental literacy across four dimensions, with an overall mean score of 3.55 (SD = 0.843). Among these, the highest-rated was Action and Engagement in Environmental Citizenship (Mean = 3.64, SD = 0.887), indicating strong involvement in sustainability efforts. Critical thinking was also evident in the Examination and Evaluation of Community Environmental Issues and Solutions (Mean = 3.54, SD = 0.873). The other two dimensions—Foundation of Community-Based Ecological Practices (Mean = 3.51, SD = 0.865) and Awareness of Issues and Values in Community Context (Mean = 3.48, SD = 0.853)—reflected a solid grasp of local ecological values and practices. These findings align with contemporary frameworks such as Chen's (2022) Revised Environmental Literacy Framework and Rickmann's (2022) Contextual Influences Model, which underscore the importance of both knowledge and engagement in cultivating environmental literacy.

Table 1. *Level of Environmental Literacy*

Level of Environmental Literacy	Mean	SD	Description
Level 1. Foundation of Community-Based Ecological Practices	3.51	0.86	High
Level 2. Awareness of Issues and Values in Community Context	3.48	0.85	High
Level 3. Examination and Evaluation of Community Environmental Issues and Solutions	3.54	0.87	High
Level 4. Action and Engagement in Environmental Citizenship	3.64	0.88	High
Overall	**3.55**	**0.84**	**High**

Scale: 4.21- 5.00 Extremely High; 3.41-4.20 High; 2.61-3.40 Moderate; 1.81-2.60 Low; 1.00-1.80 Extremely Low

This robust environmental awareness was vividly illustrated in the interview. As Discussant 2 shared, *"Environmental conservation was not just a slogan—it became a regular part of our collective lives."* Within local government units (LGUs), nature-centered initiatives like tree planting, coastal clean-ups, and recycling drives were implemented in collaboration with community groups, schools, and volunteers. Branded under the key responsibility area of *Makakalikasan*, these programs reflected strategic planning and genuine grassroots participation. This community-driven model supports Kim's (2020) Sustainability-Linked Environmental Literacy Framework, which emphasizes transforming knowledge into empowered, sustainable action. The shared responsibility between LGUs and citizens exemplifies how environmental literacy, when deeply rooted in local values and community engagement, can lead to meaningful and lasting ecological stewardship.

3.2 Level of Sustainable Development Goals Competence

Table 2 revealed that respondents demonstrated high levels of competence across all dimensions of the Sustainable Development Goals (SDGs), with the strongest performance in Environmental SDGs (Mean = 3.57, SD = 0.857), followed closely by Social (Mean = 3.46, SD = 0.830) and Economic (Mean = 3.42, SD = 0.860) dimensions. The aggregate score of 3.48 (SD = 0.832) affirms a well-rounded understanding of sustainable development. This echoes the findings of Sarbassova and Smagulova (2021), who emphasized the importance of environmental literacy, and aligns with UNESCO's (2023) focus on SDG 10—Reducing Inequalities—as well as Ramirez's (2022) and Chen's (2022) work on inclusive economic policy. Such competence reflects knowledge and readiness to implement these principles, addressing pressing global challenges through education, equity, and environmental stewardship.

Table 2. *Level of Sustainable Development Goals Competence*

Sustainable Development Goals Competence	Mean	SD	Description
Economic Sustainable Development Goals	3.42	0.86	High
Social Sustainable Development Goals	3.46	0.83	High
Environment Sustainable Development Goals	3.57	0.85	High
Over All	**3.48**	**0.83**	**High**

This readiness is more than theoretical, as shown in the responses. As Discussant 2 underscored the importance of internalizing the goals. *"Living by the SDGs means weaving their values into your daily decisions,"* they shared, emphasizing that authentic leadership involves modeling sustainable behavior in both personal and public life. In communities like Aklan, where leaders are equipped with this level of competence, there is a powerful opportunity to translate understanding into action—crafting inclusive programs, influencing policy, and fostering collective responsibility. This positions them not just as administrators, but as change agents capable of driving holistic development that resonates with both global targets and local needs.

3.3 Relationship between Environmental Literacy and Demographic Profile

Table 3 indicates a consistent level of environmental literacy across age groups, geographical locations, and sex, revealing no significant differences among these demographic categories. Specifically, ANOVA results for age groups [F(209) = 0.607, p = 0.658] and sex [F(209) = 1.685, p = 0.188] demonstrate that respondents' environmental awareness is uniform, irrespective of age or gender identity. Furthermore, the t-test results for geographical location [t(208) = 0.307, p = 0.759] affirm that both rural and urban respondents exhibit comparable levels of environmental literacy. This consistency reflects a shared understanding of environmental concerns across diverse groups, suggesting that demographic variables do not limit foundational environmental knowledge.

Table 3. *Difference in the Level of Environmental Literacy when Classified into Demographic Profile*

Demographic Profile	Mean	t/ F value	df	p	Decision
Age					
younger 25 years old	3.08				
26-35 years old	3.54				
36-45 years old	3.64	0.60	209	.658	Accept Ho
45-55 years old	3.54				
56 years old and older	3.41				
Geographical Location					
Rural	3.57	0.30	208	.759	Accept Ho
Urban	3.53				
Gender					
Male	3.51				
Female	3.53	1.68	209	.188	Accept Ho
LGTBQIA+	4.02				

**p 0.05% level of significance*

3.4 Relationship between SDG Competence and Demographic Profile

Table 4 revealed no significant differences in Sustainable Development Goals (SDG) competence based on age, geographical location, or sex, indicating a consistent understanding of these competencies among various demographic groups. Specifically, the ANOVA results showed that age does not significantly affect SDG competence [F(209) = 0.800, p = 0.526], while a t-test demonstrated no notable difference between rural and urban respondents [t(208) = 0.295, p = 0.768]. Additionally, the ANOVA results confirmed that males, females, and LGBTQ individuals exhibit similar levels of SDG competence [F(209) = 1.884, p = 0.155]. These findings suggest a shared foundation across diverse sectors for promoting awareness and participation in sustainability efforts. This uniformity can empower community leaders, particularly in Aklan, to design inclusive programs that transcend demographic divisions and foster collective action toward the 2030 Agenda.

This consistency in competence was mirrored in the field, where stories of local engagement demonstrated that people from all walks of life embraced sustainable development. In Iloilo, high school students presented vibrant infographics on climate action and quality education, while elderly women from a rural cooperative organized clean-up drives supporting clean water and sanitation, which were examples that illustrated how shared passion for the SDGs cut across age and geography. In a coastal barangay, fisherfolk independently adopted eco-friendly practices aligned with Life Below Water, proving that awareness often precedes policy. However, one discussant noted that awareness alone is insufficient—sustainability requires systems, monitoring, and commitment. These real-world accounts echoed the study's findings: while understanding may be widespread, turning that knowledge into lasting impact requires participation and perseverance.

Table 4. *Difference in the Level of Sustainable Development Goals Competence When Classified into Demographic Profile*

Demographic Profile	Mean	t/ F value	df	p	decision
Age					
younger 25 years old	2.90				
26-35 years old	3.58				
36-45 years old	3.59	0.80	209	.526	Accept Ho
45-55 years old	3.45				
56 years old and older	3.36				
Geographical Location					
Rural	3.50	0.29	208	.768	Accept Ho
Urban	3.47				
Gender					
Male	3.44				
Female	3.48	1.88	209	.155	Accept Ho
LGTBQIA+	3.97				

**p 0.05% level of significance*

3.5 Relationship between Environmental Literacy and SDG Competence

Table 5 revealed a strong, significant positive relationship between the Level of Environmental Literacy and Sustainable Development Goals (SDG) Competence ($r = 0.952$, $p < 0.001$), indicating an almost perfect correlation. This suggests that as environmental literacy increases, so does SDG competence, with the extremely low p-value confirming the result's high statistical significance. In practical terms, individuals with higher environmental literacy are more likely to understand and engage meaningfully with sustainability initiatives. This underscores environmental education's critical role in shaping competent leaders who can navigate and address complex global issues through informed, interconnected approaches. Discussants echoed this by highlighting how environmental literacy bridges knowledge gaps, enabling even the most remote communities to align local actions with global goals, demonstrating that education is not just informative but transformative.

Table 5. *Relationship between the Level of Environmental Literacy and Sustainable Development Goals Competence*

Variables	r value	p value*	Decision
Level of Environmental Literacy Sustainable Development Goals Competence	0.952	0.000	Reject Ho

**p 0.05% level of significance*

One vivid example comes from a coastal village where the mayor, once skeptical of environmental efforts, began personally leading recycling and clean-up drives. Rather than issuing directives, she joined residents on the shoreline, picking up trash and modeling eco-conscious behavior. Discussant 1 noted how her actions sparked a cultural shift—villagers began adopting sustainable habits, from waste segregation to regular coastal clean-ups. This vignette exemplifies how environmentally literate leadership inspires collective responsibility and long-term ecological commitment. For leaders in Aklan and similar communities, this affirms the value of integrating environmental literacy into leadership development. By empowering leaders with knowledge and modeling sustainable practices, communities can foster resilient systems that address present environmental challenges and build a future rooted in shared stewardship and sustainable progress.

Sustainability is a growing global concern, with young leaders at the forefront of advocacy. However, despite their strong awareness, many face institutional and systemic barriers that hinder the implementation of sustainability initiatives. Using Colaizzi's phenomenological method within the Knowledge, Attitude, and Practice (KAP) framework, this study explores the lived experiences of youth-led sustainability leadership. Findings reveal key challenges, such as knowledge gaps, lack of mentorship, limited decision-making power, and resistance from older leaders, all of which contribute to the gap between awareness and meaningful action. While some grassroots efforts like urban gardening and climate education have succeeded, broader structural issues such as token youth representation and limited funding persist. Literature supports these findings, with scholars like Alvarez (2021) emphasizing the need for practical skills, inclusion of Traditional Ecological Knowledge (TEK), and recognition of indigenous contributions. The study also highlights intergenerational tensions, where older leaders prioritize short-term economic goals over long-term sustainability, creating friction in governance. The research underscores the importance of reimagining leadership through inclusive policymaking, mentorship, and intergenerational collaboration. Theoretical frameworks such as Transformational Leadership, Intergenerational Governance, and the Theory of Planned Behavior all support the idea that while young leaders are capable, institutional reforms

are needed to unlock their full potential. Recommendations include bridging knowledge gaps through mentorship, increasing youth roles in governance, integrating TEK, scaling successful grassroots projects, and fostering structured dialogues between generations.

4.0 Conclusion

Based on the study's findings, several conclusions were drawn regarding community leaders' environmental literacy and sustainability competence. First, although community leaders generally demonstrated good environmental literacy, younger and marginalized leaders showed lower engagement and leadership capacity in sustainability efforts. This highlights the existence of environmental literacy disparities across demographic groups. While participants generally understood the Sustainable Development Goals (SDGs), their practical application remained limited, particularly in aligning SDG frameworks with local policies and initiatives. Moreover, demographic factors such as age, leadership experience, and geographical location significantly influenced both environmental literacy and SDG competence, signaling the need for targeted educational and policy interventions.

A key finding was the strong positive correlation between environmental literacy and SDG competence, suggesting that enhancing environmental education directly improves leaders' ability to implement sustainability goals effectively. The study also emphasized the importance of leadership advocacy and capacity-building, particularly in collaborative environmental stewardship and community resilience. However, several barriers to sustainability action were identified, including a lack of awareness, limited leadership experience, and poor policy integration. To address these issues, there is a pressing need for inclusive, youth-centered training programs, especially tailored for younger leaders and marginalized groups such as the LGBTQ community, to enhance participation and leadership in environmental efforts.

The study further concluded that the Technology-Assisted Green Management Module improved participants' environmental knowledge, attitudes, and practices. Pre-test and post-test results confirmed significant behavioral and knowledge gains, demonstrating the intervention's success in fostering proactive sustainability actions. However, to maximize its impact, particularly among younger users, there is a need for continuous improvement through enhanced emotional engagement, greater social media interactivity, and platform optimization. Lastly, the research underscored the crucial role of multi-stakeholder collaboration. Strengthening partnerships among government agencies, educational institutions, NGOs, and community leaders is essential to achieving long-term environmental resilience and integrating sustainability into policy and practice.

5.0 Contributions of Authors

Dr. Juim Jimlan contributed to the overall paper, while Dr. Evan Anthony Arias advised on quality assurance.

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7.0 Conflict of Interests

The authors declare that no conflicts of interest are associated with this research.

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English Proficiency Profile of BSEd Students: Implications for Student Enhancement Activity Material (SEAM)

Alfonso M. Samillano Jr.*, Grace C. Pastolero
University of Antique, Sibalom, Antique, Philippines

*Corresponding Author Email: alfonso.samillano@antiquespride.edu.ph

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Abstract. This study examined the English proficiency of Bachelor of Secondary Education (BSEd) students to determine if they meet the expected proficiency level for teachers in the Philippines. With the hope of pinpointing areas where help is needed and exploring what lies behind the rise and fall of a learner's English-language abilities, this research was designed to provide data for targeted actions and reform of BSEd English courses. The aim was to help future teachers improve their English skills, raise the standard of English language teaching, and enable graduates to meet the new demands of twenty-first-century classrooms. The English Proficiency Assessment tool gathered scores in listening comprehension, reading comprehension, grammar knowledge, and writing. The test was a multiple-choice format, including a listening comprehension section where respondents listened to audio clips and then selected their answers. Data were analyzed using frequency, mean, percentage, standard deviation, ANOVA, and Least Significant Difference tests to examine the English proficiency and its relationship with variables such as year level (first to fourth year) and specialization (English, Filipino, Mathematics, Social Science, and Science). The study finds significant variation in the English proficiency of BSEd students in both variables of year level and specialization. In general, the English proficiency of BSED students is classified as "Developing," which means they can communicate in English. However, vocabulary and grammar hinder their ability to fully express complex ideas. This research contributes to the ongoing discourse on language education reform and enriches empirical information to guide policy and practice of teacher education. Based on the findings, the study proposed the formation of a Student Enhancement Activity Material (SEAM), which consists of worksheets designed to improve reading comprehension, listening comprehension, writing proficiency, and sentence structure where they have been found lacking, and aimed to better equip future educators with the necessary English language skills.

Keywords: Curriculum enhancement; Curriculum development; English language teaching; English proficiency; Pedagogy.

1.0 Introduction

English proficiency is an essential component in the curriculum in the Philippines, particularly in teacher education, Afalla and Fabelico (2020) mentioned, as the proficiency of teachers influences their teaching effectiveness and their ability to communicate with their students. As English serves as both a global lingua franca and the Philippines' second language, Filipino teachers need to be proficient in English not only to become effective in teaching and engaging with students but also to meet the standards of internationalization (Velasco, 2019).

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According to Francisco (2019), studies showed that English teachers in the Philippines are highly competent and possess proficiency in speaking, writing, reading, and listening, which are important factors for effective teaching. In fact, the professional identity of Filipino English teachers is prominent, such that they are regarded as on par with teachers who are native speakers of English, as manifested by their pedagogical skills and language proficiency (Jung & Choe, 2024). While the Philippines currently ranks 22nd out of 116 countries in the 2024 EF English Proficiency Index (EPI), according to Business World (2024), this represents a concerning decline. The country has dropped two spots from the previous year, continuing a downward trend since 2013, when it ranked 13th and 20th. This decline is further highlighted by the GMA News (2018) report, citing a TOEIC study. The study revealed that Filipino college graduates possess lower English proficiency than the target proficiency level for Thai high school students.

The principal strength of the Philippines in the global workforce is not only in its diligent workers but more specifically, its majority of educated workers who have fluency in the use of the English language both in speaking and writing (Salomone, 2023). This substantial English-speaking population has made the Philippines a valuable source of labor, both locally and abroad, particularly in the booming business process outsourcing industry (Magno et al., 2024). But the decline in the English proficiency level of Filipinos is alarming despite the schools' trend of focusing on the communicative aspect of teaching English rather than on its linguistic aspect, as emphasis on collaborative and cooperative learning is given importance in the K-12 Basic Education Curriculum (Bautista & Del Valle, 2023). The apparent decline in Filipinos' English reading and listening comprehension skills is even more alarming due to their indifference to reading (Rosales, 2020), making them particularly vulnerable to online misinformation (Rodrigues et al., 2023). This susceptibility is so pronounced that Facebook executive Katie Harbath, as reported by Onn (2024), referred to the Philippines as "patient zero" for disinformation. This term has since become widely recognized as describing the "fake news pandemic" or "infodemic" plaguing democratic nations.

Santos et al. (2022) mentioned in their review article that some specific reasons contributing to Filipinos' decline in English proficiency are the learning environment and teaching strategies, which include the use of instructional materials. A study conducted by Zhang (2023) suggested that in promoting the students' English learning effectiveness, it is necessary to provide a "comfortable, quiet, and clean learning environment." Regidor et al. (2024) agreed that students achieve high levels of learning motivation when placed in a "positive and supportive learning environment." On the other hand, Ng and Ng (2013) found that teaching strategies influence the English proficiency of the learners. A study by Kourieos and Diakou found that many teacher education programs fail to prepare pre-service teachers in pedagogy and English proficiency appropriately. Hadi (2019) revealed that there is an imbalance between practical application and knowledge of theory, and there are inadequate contextualized and integrated learning experiences, while Kim et al. (2024) discovered that existing English medium instruction (EMI) courses do not seem to be doing enough to help students improve their English.

Indeed, various studies conducted in the Philippines tackled English proficiency of teachers focusing on their attitude towards Communicative Language Teaching (CLT), their teaching competence and the difficulties they experienced in using CLT in the classroom (Banagbanag, 2020); proficiency on reading, writing and listening (Francisco, 2019), and; beliefs of teacher effectiveness in implementing lessons in the macro-skills (Mante-Estacio et al., 2018). However, very few papers have focused on undergraduate or pre-service teachers, and very little has been published in Scopus-indexed journals highlighting the English proficiency of pre-service teachers specifically in their reading and listening comprehension skills, grammar knowledge, and writing skills in relation to their specializations and year level. This study intends to tackle this research gap to broaden the discussions in this aspect. In light of the challenges in English proficiency among BSED students mentioned above, teacher education programs should have enhanced curriculum designs. This study, thus, aimed at determining the English proficiency of BSEd student teachers as a basis for curriculum innovation. This study aimed to determine the English proficiency of Bachelor of Secondary Education (BSEd) students in the four macro skills, namely, listening comprehension, reading comprehension, grammar knowledge, and writing, as the basis for a curriculum innovation.

2.0 Methodology

2.1 Research Design

This study employed the quantitative research design, utilizing descriptive and inferential statistics in order to describe data, discover patterns, predict meanings, and draw conclusions from the data. Descriptive statistics were used in the study to analyze and determine the English proficiency of BSEd students as a whole and when classified according to their year level and specialization. Inferential statistics was used to test the hypothesis and draw conclusions from it.

2.2 Research Participants

The study's respondents are the 245 BSEd students in a teacher education department at a state university in the middle region of the Philippines. The sample population was identified through stratified sampling, classifying the respondents according to year level and specialization or major. Table 1 shows the distribution of respondents based on year level and specialization.

Table 1. *Distribution of Respondents*

Variables	f	%
Entire group	245	100
Year Level		
First Year	62	25
Second Year	95	39
Third Year	68	28
Fourth Year	20	8
Specialization		
English	59	24
Filipino	54	22
Mathematics	32	13
Social Science	56	23
Science	44	18

2.3 Data Collection Instrument and Analysis

This study utilized a researcher-made instrument titled "English Proficiency Assessment" to gather data in the form of test scores from the respondents. The instrument was submitted for content validity and reliability testing by a jury of five (5) members who are experts in pedagogy, English language studies, teaching, and learning assessment. This jury validated the items in the questionnaire by writing the options: Accept, Modify, or Reject before each item. The inter-rater reliability was calculated using Cronbach's alpha with an 80% agreement ratio.

The instrument, a 60-item multiple-choice test, evaluated four key English macro skills, i.e., reading comprehension, listening comprehension, sentence structure, and writing proficiency. The test was set in a multiple-choice format. Respondents were asked to listen to an audio in the listening comprehension test and answer the questions with multiple-choice answers. Before this instrument was administered to the respondents, it was piloted on 30 pre-service secondary education students in a private institution. The result of the pilot test showed that the respondents are classified as developing in terms of English proficiency, with a mean score of 22.13 as a whole. The performance of each item was examined as part of the item analysis. With different levels of the proficiency domain being measured, items that were too easy, too difficult, or did not discriminate well between participants were identified. A Cronbach's alpha reliability coefficient was used to assess the tool's internal consistency. Based on the quantitative data analysis, the assessment tool was revised in the following ways: rewording questions that lacked clarity and modifying or removing items that did not perform well. To determine the English proficiency level of the respondents, the individual scores in the assessment were categorized as follows based on the 2017 English Language Learning (ELL) Standards:

Table 2. *Classification of Respondents as to Scores*

Score	Category
46-60	Bridging
31-35	Expanding
16-30	Developing
1-15	Emerging

The respondents classified as "Emerging" can communicate limited information using general academic vocabulary and familiar everyday expressions. At this level, errors in writing are present and often hinder

communication. The ones categorized as "Developing" can use English spontaneously but may have difficulty expressing all their thoughts due to restricted vocabulary and limited command of language structure. Proficiency in reading at this level may vary considerably. Those classified as "Expanding" possess language skills adequate for most day-to-day communication needs. They communicate in English in new or unfamiliar settings but occasionally struggle with complex structures and abstract academic concepts. On the other hand, respondents categorized as "Bridging" can express themselves fluently and spontaneously on a wide range of personal, general, academic, or social topics in various contexts. Students in this level have a good command of technical and academic vocabulary as well as idiomatic expressions and colloquialisms. Their errors are minimal, difficult to spot, and generally corrected when they occur.

Descriptive and inferential analyses were employed to analyze the data. Specifically, frequency count, percentage distribution, mean, and standard deviation were utilized to analyze the descriptive problems. For the inferential problem, one-way ANOVA and the Least Significant Difference test were used.

3.0 Results and Discussion

3.1 English Proficiency of Pre-service Secondary Education Teachers

The study revealed (see Table 3) that when taken as an entire group, the English proficiency level of BSEd students is Developing (x=26.81, SD=7.89). This suggests that while BSEd students can speak English spontaneously, limited vocabulary and command of language structure may hinder their ability to express their thoughts fully. Indeed, language proficiency acts as a formidable and multifaceted barrier to academic achievement, particularly for students navigating the complexities of higher education. This is not merely about understanding basic grammar or vocabulary; it encompasses a nuanced grasp of academic literacy, a skill set necessary for success in demanding scholarly environments (Du Plessis, 2016). The impact of language proficiency extends far beyond the realm of higher education, casting a long shadow over secondary education as well. Within these formative years, the strength of a student's general language skills is a powerful predictor and, indeed, a critical foundation for their performance across all other academic domains. This is not a mere correlation; it is a deeply intertwined relationship where language acts as both the medium and the tool for learning.

Table 3. *English Proficiency of Pre-service Secondary Education Teachers*

Variables	Mean	SD	Description
Entire group	26.81	7.89	Developing
Year Level			
First Year	27.47	6.94	Developing
Second Year	24.13	6.41	Developing
Third Year	30.89	8.39	Expanding
Fourth Year	25.40	10.97	Developing
Specialization			
English	31.38	6.08	Expanding
Filipino	23.53	6.95	Developing
Mathematics	31.60	10.02	Expanding
Social Science	25.27	7.96	Developing
Science	24.59	6.16	Developing

When the BSED students were classified according to year level, their English proficiency was not homogeneous. The Third-Year students have an English proficiency level described as Expanding (x=30.89, SD=10.97). The First Year (x=27.47, SD=6.94), Second Year (x=24.13, SD=6.41), and Fourth Year (x=25.40, SD=10.97) have a developing English proficiency level. Regarding specialization, the English and Mathematics majors are classified as Expanding, while the rest are classified as Developing. It appears that this is similar to the findings of the study by Lingan (2019), which investigated the communicative competence of BSEd students across different specializations. English majors were found to be "Competent Users of English," while Mathematics and Physical Science majors were "Fair Users of English". Filipino majors had the lowest average scores but were still considered "Fair Users of English".

Furthermore, the data indicate that third-year BSEd students demonstrate greater English proficiency than students at lower year levels. This also suggests their language skills are adequate for most everyday communication. However, it is surprising that Fourth-Year students performed less well than Third-Year students, with even First-Year students achieving higher scores. The matter of third-year students outperforming fourth-year students is curious. This can be seen through sample size and statistical power. According to Weber

and Hoo (2018), bigger samples yield more precise and significant results, while smaller samples yield less precision and increase the risk of missing significance. As seen in the distribution of respondents (see table 1), the Third-Year students have a larger sample (n=68) compared to a smaller sample (n=20) of Fourth-Year students. The larger sample size for the Third-Year students gives their group result more statistical power. This means that their average score is a reliable estimate of all Third-Year students' true average English proficiency. This also suggests that we cannot accurately represent the true English proficiency of all Fourth-Year students since their smaller sample size means they have less statistical power, thus making it less precise and more susceptible to random variations. It appears that their smaller sample size might be less representative of the whole population despite the stratified sampling method. In short, larger sample sizes outperform smaller sample sizes in assessments such as this study by improving precision (Foody, 2009), reducing variability and errors (Lei & Zhao, 2011), and enhancing the reliability and reproducibility of results (Beca et al., 2021). Aside from sample size, other factors may have intervened, such as teaching methods (Lavy, 2015), which vary from teacher to teacher, and student motivation (Shafaghi & Yousefi, 2023). This, therefore, becomes a limitation of the study as it did not collect qualitative data to capture the reasons for the curious case of Third-Year students outperforming Fourth-Year students in the English proficiency test.

3.2 Differences in English Proficiency when Classified by Year Level and Specialization

Year level

The one-way ANOVA (Table 4) demonstrated a highly significant difference in English proficiency among BSEd students categorized by year level (F=7.87, p=.000). This led to the rejection of the null hypothesis, confirming that language proficiency varies significantly depending on year level.

Table 4. *ANOVA Results in English Proficiency by Year Level*

Competencies		Sum of squares	df	Mean square	F-ratio	Two-tailed probability
English Proficiency	Between groups	1303.41	4	434.47	7.87**	<.001
	Within groups	8787.69	241	55.26		
	Total	10091.10	245			

Studies by Qureshi and Waller (2022) and Yau et al. (2024) reveal a clear trend that English proficiency increases with academic progression. First-year students, often transitioning from diverse linguistic backgrounds or encountering higher academic language demands for the first time, tend to experience greater linguistic challenges than their peers in the upper-class level. Recognizing the distinct linguistic challenges that often confront first-year students, particularly those entering with lower English proficiency, Almudibry (2022) emphasized that universities are presented with a compelling opportunity to foster academic equity and enhance student success. It is, therefore, projected that implementing targeted support programs such as comprehensive preparatory English courses could be a strategic and proactive approach to bridge the identified language proficiency gap. A highly significant difference in English proficiency was observed among BSEd students across year levels, so the Least Significant Difference (LSD) test was used to identify the specific year-level comparisons contributing to this difference.

Post-hoc analysis (Table 5) revealed statistically significant differences in English proficiency between the following year level pairings: First and Second Year (MD = 3.35, p = .03), First and Third Year (MD = 3.42, p = .04), Second and Third Year (MD = 6.76, p < .001), and Third and Fourth Year (MD = 5.49, p = .04).

Table 5. *LSD Results in the English Proficiency by Year Level*

	Position (I)	Position(J)	Mean Difference (I-J)	p
English Proficiency	First Year	Second Year	3.34*	.029
	First Year	Third Year	3.41*	.041
	Second Year	Third Year	6.76**	.000
	Third Year	Fourth Year	5.48*	.036

Analysis of average scores reveals the following trend in English proficiency: first-year students scored higher than second-year students, but lower than third-year students. This result somehow gains explanation in a case study by Danoch et al. (2023), implying that a clear link emerged between students' initial English proficiency, particularly reading comprehension, and their academic success in the first year of college. This finding also appears to be supported by a survey conducted by Ozawa (2018) on self-assessment of English proficiency among Japanese-English major university students, which revealed a difference in confidence levels in reading between

First-Year and Third-Year students. Although the effect size was small, it indicates that upper-year students may feel more confident in their English skills. A similar finding was discovered by a study in Chile, indicating that pre-service teachers' perceived linguistic competence improved as they advanced academically. This suggests that students in the upper-class level felt more confident in their language abilities. Whether they pursue further education, enter the workforce, or engage in public service, they understand that effective communication is essential for success (Vega-Abarzúa et al., 2025). Furthermore, this finding also resonates with a study by Vidal and Jarvis (2018) that focused on the three-year trajectory of English proficiency under English-medium instruction (EMI), which yielded compelling results: marked improvements in L2 skills and essay composition. Lexical diversity, however, did not follow this upward trend. This indicates that year level and continued exposure to English instruction can enhance certain aspects of proficiency.

Specialization

As shown in Table 6, the One-way ANOVA result reveals that a highly significant difference appeared in the English proficiency of BSEd students when they are classified according to specialization (F=8.806, P=.000). Therefore, the null hypothesis is rejected. This shows that the English proficiency level of each specialization varies from each other. This finding contradicts a study by Alshehri (2023) at King Khalid University, which found no statistically significant differences in English proficiency levels based on course specialization. This suggests that while English proficiency is linked to academic success, the differences in this relationship across various specializations might not be substantial.

Table 6. *ANOVA Results in English Proficiency by Specialization*

Competencies		Sum of squares	df	Mean square	F-ratio	Two-tailed probability
English Proficiency	Between groups	1839.58	4	459.89	8.80**	<.001
	Within groups	8251.51	241	52.22		
	Total	10091.10	245			

With a significant difference in English proficiency found among BSEd students across specializations, the Least Significant Difference (LSD) test was used to determine which specific specializations differed significantly.

Table 7 presents the statistically significant differences in English proficiency between specific specializations. These differences include those between English and Filipino majors (MD = 7.85, $p < .001$), English and Social Science majors (MD = 6.11, $p < .001$), English and Science majors (MD = 6.78, $p < .001$), Filipino and Mathematics majors (MD = 8.08, $p < .001$), Mathematics and Social Science majors (MD = 6.33, $p = .004$), and Mathematics and Science majors (MD = 7.01, $p = .003$).

Table 7. *LSD Results in English Proficiency as to Specialization*

	Position (I)	Position(J)	Mean Difference (I-J)	p
English Proficiency	English	Filipino	7.85**	<.001
	English	Social Science	6.10**	<.001
	English	Science	6.78**	<.001
	Filipino	Mathematics	8.07**	<.001
	Mathematics	Social Science	6.33*	.004
	Mathematics	Science	7.00*	.003

English majors exhibited greater English proficiency than Filipino, Social Science, and Science majors. Similarly, mathematics majors demonstrated higher English proficiency than those in these three specializations. Both English and Mathematics majors outperformed all other specializations. Indeed, the impact of English proficiency on academic performance can vary by specialization (Soruc et al., 2021).

4.0 Conclusion

This study revealed that the level of English proficiency of BSED students, when taken as an entire group and when classified according to year level, specialization, type of device used, type of connectivity, and exposure to online engagements, is developing. Furthermore, there is a significant difference in the level of English proficiency of BSED students when classified according to year level and specialization; thus, the null hypothesis is rejected. Also, the study revealed significant variations in the English proficiency of BSEd students in both variables of year level and specialization. In general, the English proficiency of BSEd students is classified as "Developing," indicating that while they can communicate in English, vocabulary and language structure limitations hinder their

ability to express complex ideas fully. This finding highlights the crucial role of language proficiency as a foundational skill for academic success in higher education.

When analyzed at the year level, third-year students demonstrated the highest English proficiency level among the group, which is classified as "Expanding." However, First, Second, and Fourth-Year students remained at the "Developing" level. This finding is unexpected and suggests a need for further investigation into factors influencing language skill retention or development in the final year of coursework. The findings align with prior research indicating that language proficiency improves with academic progression. However, targeted interventions such as preparatory English courses could help bridge gaps for students in earlier years. Meanwhile, the study would have been strengthened by specifying the specific areas of English proficiency where scores were lower to inform the development of a targeted curriculum innovation. This limitation in the study could be explored in future research tackling this topic.

When grouped by specialization, English and Mathematics majors manifested higher English proficiency than Filipino, Social Science, and Science majors. This disparity emphasizes the varying linguistic demands and exposure across specializations and the potential influence of subject-specific language use on proficiency development. The results resonate with previous studies showing that English majors tend to achieve higher language competence due to their focused engagement with the language. Lastly, the statistically significant differences in English proficiency across year levels and specializations revealed by ANOVA and post-hoc analyses indicate the need for tailored language support activities in the BSEd program. Such activities should address students' unique challenges in different year levels and specializations, ensuring equitable opportunities for academic and professional success. Ultimately, enhancing English proficiency among pre-service teachers is vital for their academic achievement and future roles as educators for secondary schools, where effective communication is essential for fostering student learning and engagement.

As most students demonstrate "Developing" English proficiency, which indicates a low level, the courses should aim to cultivate advanced language proficiency across the four macro skills. The instructional development committee should utilize this proficiency goal as a key criterion in designing syllabi and learning materials for targeted language support programs, especially for First and Second-year students. Given the unexpected decline in English proficiency among Fourth-Year students as found in this study, it is also recommended that the students be introduced to advanced language courses or refresher modules in the final year before their deployment for an internship. These materials could emphasize professional communication skills, such as lesson delivery and lesson plan writing, to prepare them for an internship.

Although students exhibit some variation in language proficiency scores, potentially influenced by specialization and year level, the scores remain relatively close. Consequently, a comprehensive investigation into the effects of these factors is necessary to inform the development of an effective language development program integrated into General English courses. Additional studies focusing on qualitative data should be conducted to explore the factors contributing to the decline in English proficiency among Fourth-Year students and to investigate the long-term impact of language support programs. This will help the college refine its strategies and ensure sustained improvements in English proficiency.

The researcher proposed a set of curriculum enhancement activities, Student Enhancement Activity Materials (SEAM), to address the knowledge gap among BSEd students regarding English proficiency. This material is a tailored language training program for students in specializations with lower proficiency levels, such as Filipino, Social Science, and Science majors. This includes discipline-specific vocabulary building and communication exercises that will be integrated into their coursework in Purposive Communication. The proposed material intends to enhance the students' English proficiency in the four components: reading comprehension, listening comprehension, writing proficiency, and sentence structure.

Recognizing the critical need to improve English proficiency among BSEd students, this study introduces a curriculum innovation. This innovation consists of worksheets, structured progressively from basic to advanced, targeting the four key areas of reading comprehension, listening comprehension, writing proficiency, and grammar (sentence structure). This covers foundations of academic English, intermediate communication skills, advanced academic and professional English, and English for teaching and classroom communication. The Student Enhancement Activity Material (SEAM) will be integrated into the Purposive Communication course for

BSEd students at the University of Antique during the first semester. This five-month program features a structured approach: each month, a component skill will be developed through weekly worksheets, followed by a macro-skill test to measure student progress and the effectiveness of SEAM in enhancing English proficiency.

The proposed program seeks to improve the overall English proficiency of BSED students to at least an "Expanding" level, address the specific language needs of students in different year levels and specializations, foster confidence in using English for academic, professional, and everyday communication, and prepare students to effectively use English as a medium of instruction in their future teaching careers.

The first phase of the implementation will focus on curriculum design, where syllabi are modified and materials are developed accordingly for the integrated English proficiency learning activities, which are specialization-specific. This will be done in two months, specifically at the end of the second semester. The pilot testing will occur in the second phase, which will happen in the first semester, in five months. The integrated course activities will be implemented with a small group of students to gather feedback from them and the faculty to refine the curriculum. The third phase will cover the full implementation of the curriculum innovation across all year levels and specializations while monitoring the progress through regular assessments to adjust the program as necessary. The final phase will see continuous improvement through annual evaluation to assess the impact of the curriculum innovation on students' English proficiency. Regarding financial requirements, the proposed curriculum innovation will require funding to develop course materials and resources, faculty training and workshops, and technology tools and platforms.

This curriculum innovation proposal addresses the critical need to enhance the English proficiency of BSEd students at the University of Antique to ensure that they are well-prepared for the linguistic demands of higher education and their future roles as educators in secondary schools. By implementing targeted language support programs, specialization-specific modules, and technology-enhanced learning, this initiative will empower students to achieve their full potential and contribute effectively to the field of education.

5.0 Contribution of Authors

The first author designed, analyzed, interpreted, and prepared the manuscript. The second author, as research adviser, provided guidance and direction to the first author in conducting the study and preparing the manuscript.

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7.0 Conflict of Interest

The authors of this paper have neither a personal nor financial relationship with any person or organization that may have or could be perceived to have influenced this study nor a conflict of interest in the publication of this paper. Prior to the conduct of an investigation, approval from key officials of the institution where the study was conducted and consent from respondents were obtained.

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Digital Transformation in Education: Awareness of Quality Management Systems Among Elementary Teachers in San Francisco District

Reymart Ray F. Gevero, Jane C. Oropa*
North Eastern Mindanao State University, Tandag, Surigao del Sur, Philippines

*Corresponding Author Email: janeoropa2022@gmail.com

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Abstract. In the digital age, the effective management of documents has become a pivotal challenge for elementary school teachers, as technology reshapes educational practices. Using a descriptive correlational research design, this study assessed the level of awareness of the digitalized quality management system among elementary school teachers in the San Francisco District of Agusan del Sur Division. Data were collected from teachers through a validated questionnaire and analyzed to identify patterns and relationships. The findings revealed that teachers positively perceived the digitalized system, with significant correlations between awareness levels and factors such as length of service and academic rank. Specifically, teachers with longer service and higher academic ranks demonstrated higher awareness levels. The study identified areas needing improvement, particularly in document security and digital tools. To address these gaps, an action plan was developed for a comprehensive training program, including preparatory activities, needs assessment, curriculum planning, resource preparation, collaborative sessions, continuous monitoring, and stakeholder engagement. The results highlight the critical need for targeted training and continuous support, leveraging the expertise of experienced educators, and ensuring the availability of resources and professional development opportunities. These efforts are expected to enhance teachers' proficiency with digital tools and document security, improving the quality of education. The study's findings have significant policy implications, emphasizing the need for educational policymakers to integrate digital tools in teacher training programs, allocate resources for continuous professional development, and establish robust support systems to enhance the effectiveness of digitalized quality management systems in schools. By implementing these measures, the study aims to foster a more efficient and secure educational environment in the division of Agusan del Sur.

Keywords: Digital tools; Document management; Professional development; Quality management system.

1.0 Introduction

As technology rapidly transforms educational practices, managing documents effectively has become a critical concern for teachers, especially in elementary schools. This study aims to assess the level of awareness of the digitalized quality management system among elementary school teachers in the Philippines, focusing on the digital reports and initiatives of the Department of Education (DepEd). The goal is to understand how well teachers are informed about the system's features and benefits, and to identify areas where further training and support may be needed to enhance their awareness and utilization of the system. Specifically, this study seeks to determine the level of awareness of the digitalized quality management system, focusing on document storage

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and retrieval, challenges in document security and access control, frequency and nature of collaboration on documents, requirements for document version controls and tracking, and integration with existing workflows and tools.

Recent studies underscore the significance of digital document management systems in educational settings. For instance, the DepEd's Digital Rise Program highlights the importance of integrating technology in education to improve efficiency and reduce administrative burdens. The program includes digital literacy, ICT-assisted teaching, and ICT-assisted learning, which aim to equip teachers and students with the tools and skills for the digital age (Department of Education, 2022). Additionally, the DepEd has implemented guidelines on streamlining school forms and reports, emphasizing the need for efficient document management practices (Department of Education, 2025).

However, there is a gap in understanding how elementary school teachers perceive and utilize these systems, particularly in their awareness and readiness to adopt these digital solutions. Balmeo (2021) highlights teachers' significant stressors, including workload and administrative tasks, which can be alleviated through effective document management systems. The gaps in knowledge that this study addresses include the limited research on the level of awareness of document management systems tailored for elementary education. The context of this study is centered on teachers in the San Francisco District of Agusan del Sur Division. The significance of this study lies in its potential to advance the field of educational technology by providing insights into the current level of awareness among teachers regarding digitalized quality management systems. By identifying areas where teachers may need additional training and support, this research contributes to the ongoing efforts to improve educational practices and outcomes in the Philippines, thus benefiting educators and students.

2.0 Methodology

2.1 Research Design

This study utilized a descriptive correlational design to assess the level of awareness on the digitalized quality management system among elementary school teachers in the San Francisco District. The research aimed to determine the relationship between the respondents' profiles (age, gender, civil status, years of service, academic rank, and highest educational qualifications) and their awareness of various aspects of the digitalized quality management system. These aspects include document storage and retrieval, document security and access control challenges, frequency and nature of collaboration on documents, requirements for document version controls and tracking, and integration with existing workflows and tools. The descriptive correlational design allowed for collecting and analyzing quantitative data to identify patterns and relationships between variables. This approach provided a comprehensive understanding of teachers' current awareness level. It highlighted areas where further training and support may be needed to enhance their digital quality management system utilization.

2.2 Research Participants

The study involved 159 participants, including 152 elementary teachers and seven school heads in public schools within the San Francisco District for the school year 2024-2025. This included a diverse range of schools to ensure a comprehensive analysis. They were selected from a total population of 242 teachers using a stratified random sampling with a 5% margin of error. Additionally, school heads were enumerated for every big school of each cluster in the San Francisco District, Agusan del Sur Division.

2.3 Research Instruments

A researcher-made questionnaire was used to collect data. The instrument underwent content validation and reliability testing by education experts, including a Division ITO, District Supervisor, School Principal, and Master Teachers. The questionnaire, divided into two sections, gathered demographic information (age, gender, civil status, years of service, academic rank, and highest educational qualification) and assessed the level of awareness of the digitalized quality management system, covering areas such as document storage and retrieval, challenges in document security and access control, frequency and nature of collaboration on documents, requirements for document version controls and tracking, and integration with existing workflows and tools, using a 5-point Likert scale. A pilot test with 20 teachers from a different district confirmed good internal consistency across all indicators, with Cronbach's alpha values as follows: document storage and retrieval ($\alpha = 0.785$), challenges in document security and access control ($\alpha = 0.838$), frequency and nature of collaboration on documents ($\alpha = 0.796$), requirements for document version controls and tracking ($\alpha = 0.786$), and integration with existing workflows and

tools (α = 0.797). These values indicate that the questionnaire is a reliable tool for measuring the specified aspects of the digitalized quality management system.

2.4 Data Gathering Procedure and Analysis

The data-gathering procedure followed a structured approach. The researcher first obtained approval from relevant authorities, including the Dean of the Graduate School Office, the Schools Division Superintendent, and school principals. Once permission was granted, the researcher personally administered the survey to ensure respondents understood the instructions. Quantitative data were collected using a validated questionnaire, and the responses were tallied, tabulated, and analyzed using statistical tools such as frequency count, percentage, mean, standard deviation, and Pearson correlation. Ethical standards, including confidentiality and voluntary participation, were strictly adhered to throughout the process. This structured approach ensured the reliability and validity of the data collected, providing a solid foundation for analyzing the effectiveness of the digitalized quality management system.

2.5 Ethical Considerations

The researcher followed strict ethical guidelines to protect participants' rights and ensure data confidentiality. Informed consent was obtained in writing and verbally, with participants assured their right to withdraw. Confidentiality and anonymity were maintained by securing personal data and ensuring that identifying information was not linked to any responses. Trustworthiness was upheld through transparent processes and accurate data reporting, with participants not required to answer all questions. The principle of beneficence was observed by contributing to educational improvements while minimizing risks. Justice and fair treatment were ensured through equitable selection criteria, avoiding exploiting vulnerable groups. The researcher minimized harm by designing the study to avoid physical, psychological, or emotional harm and not interfering with normal teaching activities. Voluntary participation was emphasized, and respect for persons was maintained by treating all participants with dignity and addressing their concerns. Cultural sensitivity was consistently demonstrated, respecting participants' diverse backgrounds and values. By adhering to these principles, the researcher conducted the study ethically, fostering trust and respect while ensuring valid and reliable findings.

3.0 Results and Discussion

3.1 Profile of the Respondents

Table 1 presents the frequency distribution of respondents based on age, sex, civil status, length of service, highest educational attainment, and academic rank. Most of the respondents (51%) are aged between 26 and 45 years, followed by 29% who are aged 46 and 55 years, and 20% who are 55 years and above. This indicates a predominantly middle-aged teaching workforce, which suggests a blend of youthful energy and seasoned experience. The gender distribution reveals a strong female predominance, with women making up 87% of the respondents. This finding is consistent with previous research by Sebastian et al. (2022), highlighting the female-dominated nature of the teaching profession in the Philippines. This trend can be attributed to various socio-cultural factors that encourage women to pursue careers in education. Additionally, the high percentage of female respondents may influence the perspectives and experiences reported in the study, potentially reflecting gender-specific challenges and advantages within the profession. These results underscore the importance of gender dynamics in educational research and policy-making.

Regarding civil status, a significant majority (94%) of the respondents are married, with only 4% being single and 2% widowed. This suggests that the teaching workforce is primarily composed of individuals in stable, committed relationships, which could affect their work-life balance and professional commitments. The length of service data shows a diverse range of experience among the respondents. While a small percentage (2%) have been in service for 1-5 years, the majority (29%) have 6-10 years of experience. The rest are distributed across various lengths of service, indicating a mix of early-career and veteran educators (Ogundeyi, 2021). This diversity in experience levels can contribute to a rich exchange of ideas and practices within the educational environment. The high percentage of married respondents may indicate a stable workforce, which could positively impact their professional commitments and work-life balance. However, it also suggests that policies supporting family life, such as flexible working hours and family leave, could be beneficial in retaining these educators. The diverse range of experience among the respondents highlights the presence of both fresh perspectives and seasoned expertise, fostering a dynamic and collaborative teaching environment.

Table 1. *Demographic details of the survey respondents*

Profile	Classifications	Frequency	Percentage
Age	26-45	81	51%
	46-55	46	29%
	55 above	32	20%
Sex	Male	21	13%
	Female	138	87%
Civil Status	Single	7	4%
	Married	149	94%
	Widowed	3	2%
Length of Service	1-5 years	3	2%
	6-10 years	46	29%
	11-15 years	27	17%
	16-20 years	24	15%
	21-25 years	14	9%
	26 years above	45	28%
Highest Educational Qualification	Bachelors degree	32	20%
	With Master's degree units	47	30%
	With Master's degree CAR	58	36%
	Master's degree	17	11%
	With Doctorate degree units	3	2%
	Doctorate degree	2	1%
Academic Background	Teacher l	36	23%
	Teacher ll	22	14%
	Teacher llI	78	49%
	Master Teacher I	10	6%
	Master Teacher ll	7	4%
	Principal II	2	1%
	Principal III	4	3%

Regarding academic rank and position, nearly half (49%) of the respondents hold the position of Teacher III, followed by Teacher I (23%) and Teacher II (14%). Higher academic ranks such as Master Teacher I and II account for 6% and 4% respectively, while Principal II and III positions are held by 1% and 3% of the respondents. This distribution reflects a structured career progression within the teaching profession. The structured career progression indicates clear pathways for professional growth, which can motivate teachers to advance in their careers and contribute to higher job satisfaction and retention. In terms of educational qualifications, 20% of the respondents hold a bachelor's degree, 30% have units towards a master's degree, 36% have completed the coursework for a master's degree (CAR), 11% hold a master's degree, 2% have units towards a doctorate, and 1% hold a doctorate degree. This indicates a highly educated workforce with strong aspirations for professional development. The high level of educational attainment among the respondents suggests a commitment to continuous learning and professional development, which is essential for maintaining high teaching standards and improving educational outcomes (Eckhaus & Davidovitch, 2021).

This means that the diverse age range and experience levels suggest that training programs need to be tailored to accommodate different levels of familiarity with digital tools. The strong female predominance highlights the importance of addressing gender-specific needs and ensuring that the system is user-friendly for all. The high percentage of married respondents indicates that the system should support work-life balance by streamlining administrative tasks and reducing workload. The structured career progression and high educational qualifications suggest that the respondents will likely be receptive to professional development opportunities, which can facilitate the adoption of the new system.

3.2 Classroom Management Issues and Challenges

Table 2 presents the mean scores and descriptive interpretations for the level of awareness of the digitalized quality management system.

Table 2. *Descriptive details of the level of awareness of the digitalized quality management system*

Indicators	Mean	SD	Interpretation
Document Storage and Retrieval			
1. I am aware that digital documents are easier to access and organize	4.45	0.76	Strongly Agree
2. I understand how the digital system helps me quickly find lesson plans and student records.	4.25	0.72	Strongly Agree
3. I know how to use digital tools to store and find documents like worksheets and reports.	3.45	0.86	Agree
4. I am familiar with organizing documents in a digital system, such as using folders on Google Drive.	3.52	0.57	Agree
5. I see the benefits of digital document storage for reducing the need for physical filing cabinets.	4.11	0.86	Agree
Grand Mean	**3.95**	**0.75**	**Agree**
Challenges in Document Security and Access Control			
1. I know there are security measures to keep our digital documents safe, like passwords and encryption.	4.41	0.76	Strongly Agree
2. I understand the challenges of securing digital documents, such as preventing unauthorized access.	4.21	0.73	Strongly Agree
3. I know the rules for accessing digital documents, like who can view or edit them.	3.46	0.93	Agree
4. I know how to set permissions for different users in a digital system, like giving access to specific folders.	3.53	0.58	Agree
5. I see the importance of securing digital documents to protect student information.	4.09	0.86	Agree
Grand Mean	**3.94**	**0.77**	Agree
Frequency and Nature of Collaboration on Documents			
1. I know how to use digital tools to work on documents with colleagues, like sharing lesson plans.	4.42	0.76	Strongly Agree
2. I know the benefits of digital collaboration for teamwork, such as real-time editing.	4.24	0.72	Strongly Agree
3. I understand how digital systems help us work together on real-time documents, like during online meetings.	3.47	0.94	Agree
4. I am familiar with the features that support document collaboration in our digital system, like comments and suggestions.	3.55	0.61	Agree
5. I see how digital collaboration improves communication among staff, making it easier to share resources.	4.43	0.70	Strongly Agree
Grand Mean	**4.02**	**0.74**	Strongly Agree
Requirements for Document Version Controls and Tracking			
1. I know about version control in digital document management, like tracking changes in Google Docs.	4.14	0.94	Agree
2. I know how to track changes and manage document versions digitally, such as seeing who edited a document.	4.22	0.72	Strongly Agree
3. I understand the importance of version control for keeping documents accurate, like having the latest version of school forms and other reports.	3.60	0.90	Agree
4. I am aware of the tools for version control in our digital system, like the revision history feature, which makes it easy to find older versions of documents.	4.25	0.74	Strongly Agree
5. I see the benefits of version control for keeping information up-to-date, ensuring everyone has the correct document.	4.08	0.85	Agree
Grand Mean	**4.05**	**0.83**	Agree
Integration with Existing Workflows and Tools			
1. I understand how digital systems can work with our current tools, like syncing with our DepEd email.	4.25	0.81	Strongly Agree
2. I understand how digital systems can work with our current tools, like syncing with our DepEd email.	4.22	0.72	Strongly Agree
3. I know how to use digital systems to make my daily tasks easier, like using Excel for grading.	3.89	0.74	Agree
4. I am familiar with using digital tools with our existing systems, like integrating with our email and file storage.	4.27	0.75	Strongly Agree
5. I see how using digital tools together makes it easier to manage tasks and communicate, like using OneDrive for file sharing.	4.06	0.86	Agree
Grand Mean	**4.137**	**0.773**	**Agree**
Overall Grand Mean	**4.023**	**0.776**	**Agree**

The data suggests a positive perception across all indicators related to the level of awareness of the digitalized quality management system. The mean Document Storage and Retrieval score is 3.957, indicating an "Agree" level of awareness. The highest mean score within this indicator is 4.45 for "I am aware that digital documents are easier to access and organize," while the lowest is 3.45 for "I know how to use digital tools to store and find documents

like worksheets and reports." While the overall awareness of digital document storage is satisfactory, there may be a need to improve familiarity with digital tools for document storage and retrieval. This could be addressed through targeted training sessions to enhance teachers' skills. Recent studies highlight the importance of digitalization in improving document management efficiency and accessibility in educational settings (Ahmad et al., 2023). Therefore, enhancing teachers' skills in using digital tools can significantly improve their efficiency and productivity.

Similarly, the perception of Challenges in Document Security and Access Control is "Agree," with a mean score of 3.941. The highest mean score within this indicator is 4.41 for "I know that there are security measures to keep our digital documents safe, like passwords and encryption," while the lowest is 3.46 for "I am aware of the rules for accessing digital documents, like who can view or edit them." While the awareness of document security measures is generally positive, there may be room for improvement in understanding access control rules. Clear guidelines and training on setting permissions and managing document security could help address this gap. Research indicates that robust security measures and clear access control policies are crucial for maintaining the integrity and confidentiality of digital documents in educational institutions (Al-Adwan et al., 2024). Thus, improving understanding of access control rules can enhance document security and integrity.

Moving on to the Frequency and Nature of Collaboration on Documents, the mean score of 4.023 indicates a "Strongly Agree" perception. The highest mean score within this indicator is 4.43 for "I see how digital collaboration improves communication among staff, making it easier to share resources," while the lowest is 3.47 for "I understand how digital systems help us work together on documents in real-time, like during online meetings." Collaboration on documents is generally effective, but there may be a need to enhance real-time collaboration features. Encouraging digital tools that support real-time editing and communication can further improve teamwork and resource sharing among staff. Studies have shown that digital collaboration tools significantly enhance teacher communication and resource sharing (Al-Mughairi & Bhaskar, 2023). Therefore, enhancing real-time collaboration features can further improve teamwork and resource sharing.

Regarding Requirements for Document Version Controls and Tracking, the mean score is 4.057, indicating an "Agree" perception. The highest mean score within this indicator is 4.25 for "I am aware of the tools for version control in our digital system, like the revision history feature wherein it is easy to find older versions of documents," while the lowest is 3.60 for "I understand the importance of version control for keeping documents accurate, like having the latest version of school forms and other reports." Awareness of version control tools is generally positive, but there may be a need to emphasize the importance of version control for document accuracy. Training on using version control features effectively can help ensure that all staff members are up-to-date with the latest document versions. Recent research underscores the importance of version control in maintaining document accuracy and integrity in educational environments (Ahmad et al., 2023). Thus, emphasizing the importance of version control can help maintain document accuracy and integrity.

Finally, the mean score of 4.137 suggests a "Strongly Agree" perception of Integration with Existing Workflows and Tools. The highest mean score within this indicator is 4.27 for "I am familiar with using digital tools with our existing systems, like integrating with our email and file storage," while the lowest is 3.89 for "I know how to use digital systems to make my daily tasks easier, like using Excel for grading." Integration with existing workflows is generally positive; however, there may be a need further to enhance the use of digital systems for daily tasks. Providing training on integrating digital tools with existing workflows can help streamline tasks and improve overall efficiency.

The overall grand mean of 4.023 with a standard deviation of 0.776 indicates a general agreement among respondents on the effectiveness and benefits of the digitalized quality management system. The strong agreement in areas such as document collaboration and integration with existing tools suggests that respondents are well aware of and positively perceive the advantages of digital systems in enhancing their work processes. However, there is room for improvement in areas like document storage familiarity and setting permissions, which could be addressed through targeted training and support.

These findings imply that while there is strong awareness and a positive perception of the digitalized quality management system, specific areas require further attention. Training programs should focus on enhancing familiarity with digital tools for document storage and retrieval, setting permissions, and managing document

security. Additionally, continuous support and resources should be provided to ensure all users can fully leverage the benefits of digital collaboration and integration with existing workflows. These steps will help maximize the effectiveness of the digitalized quality management system and ensure its successful implementation in the educational setting.

3.3 Relationship Between Profile Variables and Awareness of the Digitalized Quality Management System

Table 3 presents the results of correlation analyses examining the relationship between various factors (age, sex, civil status, years of service, academic rank, and educational attainment) and different aspects of the digitalized quality management system. The analysis reveals that most variables do not have a significant relationship with document storage and retrieval, document security and access control challenges, frequency and nature of collaboration on documents, document version control and tracking requirements, and integration with existing workflows and tools. This finding aligns with Marmoah et al. (2024), who also observed that digital literacy improvements in teachers were more influenced by targeted training programs rather than demographic factors. The study underscores the importance of continuous professional development and tailored training programs to enhance digital literacy and quality management practices in educational settings.

For document storage and retrieval, significant correlations were found with length of service ($r = 0.199$, $p = 0.012$) and academic rank ($r = 0.277$, $p < 0.001$). This suggests that more experienced teachers and those with higher academic ranks possess better skills in managing digital documents. However, no significant relationships were found with age, sex, civil status, or highest educational qualifications. The findings are supported by Nagrama et al. (2024), who highlighted the efficiency and user-friendliness of a web-based document management system in improving document handling and productivity. This alignment suggests that targeted training for less experienced teachers could enhance their digital document management skills, ultimately improving the overall efficiency of the school's digital quality management system.

In the case of challenges in document security and access control, significant correlations were also found with length of service ($r = 0.160$, $p = 0.044$) and academic rank ($r = 0.177$, $p = 0.025$). This suggests that teachers with more years of service and higher academic ranks are more adept at managing document security and access control. However, no significant relationships were found with age, sex, civil status, or highest educational qualifications, indicating that these demographic factors do not influence the awareness and management of document security and access control. These findings align with the study by Rusnati et al. (2021), which emphasized the importance of experience and professional standing in effectively utilizing digitalized systems in schools. This highlights the need for targeted training and support for less experienced and lower-ranked teachers to effectively implement digitalized quality management systems.

Significant correlations were identified with length of service ($r = 0.177$, $p = 0.026$) and academic rank ($r = 0.218$, $p = 0.006$) for the frequency and nature of collaboration on documents. This implies that teachers with longer service and higher academic ranks are more likely to engage in and understand the benefits of digital collaboration. However, no significant relationships were found with age, sex, civil status, or highest educational qualifications, indicating that these demographic factors do not influence the frequency and nature of digital collaboration. These findings emphasized the importance of the quality of digital technology use over its frequency. According to Juuti et al. (2022), the functional use of digital technology positively impacts academic achievement. This suggests that experienced teachers and those with higher ranks are better at leveraging digital tools for effective collaboration. To ensure effective digital collaboration, targeted training and support were encouraged for less experienced and lower-ranked teachers.

Table 3. *Relationship between the profile of the respondents and level of awareness on the digitalized quality management system*

Variables		r	p	Decision	Conclusion
Document storage and retrieval	Age	.06	.414	Failed to reject null hypothesis	Not Significant
	Sex	.01	.833	Failed to reject null hypothesis	Not Significant
	Civil Status	.00	.984	Failed to reject null hypothesis	Not Significant
	Length of service	.19	.012	Reject null hypothesis	Significant
	Highest Educational Qualifications	.11	.152	Failed to reject null hypothesis	Not Significant
	Academic rank	.27	.000	Reject null hypothesis	Significant
Challenges in document security and access control	Age	.00	.925	Failed to reject null hypothesis	Not Significant
	Sex	.01	.875	Failed to reject null hypothesis	Not Significant
	Civil Status	.05	.489	Failed to reject null hypothesis	Not Significant

	Length of service	.16	.044	Reject null hypothesis	Significant
	Highest educational Qualifications	.02	.803	Failed to reject null hypothesis	Not Significant
	Academic rank	.17	.025	Reject null hypothesis	Significant
Frequency and nature of collaboration on documents	Age	.00	.981	Failed to reject null hypothesis	Not Significant
	Sex	.04	.585	Failed to reject null hypothesis	Not Significant
	Civil Status	.06	.452	Failed to reject null hypothesis	Not Significant
	Length of service	.17	.026	Reject null hypothesis	Significant
	Highest Educational Qualifications	.03	.686	Failed to reject null hypothesis	Not Significant
	Academic rank	.21	.006	Reject null hypothesis	Significant
Requirements for document version control and tracking	Age	.04	.605	Failed to reject null hypothesis	Not Significant
	Sex	.00	.916	Failed to reject null hypothesis	Not Significant
	Civil Status	.04	.536	Failed to reject null hypothesis	Not Significant
	Length of service	.11	.146	Failed to reject null hypothesis	Not Significant
	Highest Educational Qualifications	.05	.533	Failed to reject null hypothesis	Not Significant
	Academic rank	.08	.283	Failed to reject null hypothesis	Not Significant
Integration with existing workflows and tools	Age	.06	.426	Failed to reject null hypothesis	Not Significant
	Sex	.05	.469	Failed to reject null hypothesis	Not Significant
	Civil Status	.08	.306	Failed to reject null hypothesis	Not Significant
	Length of service	.11	.137	Failed to reject null hypothesis	Not Significant
	Highest Educational Qualifications	.04	.614	Failed to reject null hypothesis	Not Significant
	Academic rank	.06	.401	Failed to reject null hypothesis	Not Significant

Regarding document version control and tracking requirements, no significant relationships were found with any of the variables, including age, sex, civil status, length of service, highest educational qualifications, or academic rank. This aligns with the findings of Sternad Zabukovšek et al. (2023), who emphasized that the effectiveness of document management systems (DMS) is more influenced by organizational maturity and the strategic implementation of these systems rather than individual demographic variables. This suggests that these factors do not significantly influence teachers' understanding and use of document version control and tracking.

In addition, for integration with existing workflows and tools, no significant relationships were found with age, sex, civil status, length of service, highest educational qualifications, or academic rank. These factors do not significantly affect teachers' ability to integrate digital systems with existing workflows. This finding aligns with the study by Angala et al. (2023), which highlighted that the successful implementation of a Document Management System (DMS) at Ilocos Sur Polytechnic State College was more influenced by the system's design and user engagement rather than individual demographic variables. This suggests that focusing on system usability and user training could be more critical for effectively integrating digital systems with existing workflows.

Overall, the results indicate that while most demographic and professional factors do not significantly influence teachers' perceptions and use of the digitalized quality management system, length of service and academic rank play a significant role in certain areas. Specifically, more experienced teachers and those with higher academic ranks are better at managing digital documents, ensuring their security, and collaborating effectively. These findings suggest that less experienced and lower-ranked educators should receive targeted training and support to enhance their competencies in these areas. Additionally, leveraging the expertise of experienced and higher-ranked educators through mentorship programs could further improve the overall effectiveness of the digitalized quality management system.

4.0 Conclusion

The findings indicate that teachers demonstrate a strong awareness and positive perception of the digitalized quality management system, particularly in document collaboration and integration with existing tools. This suggests that they effectively utilize digital systems to enhance their work processes. However, challenges persist in areas like document storage familiarity and setting permissions, which could be addressed through targeted training and support. Specifically, the analysis reveals that while most demographic and professional factors do not significantly influence teachers' perceptions and use of the digitalized quality management system, length of service and academic rank play a significant role in certain areas. More experienced teachers and those with higher

academic ranks are better at managing digital documents, ensuring security, and collaborating effectively. This highlights the importance of leveraging the expertise of experienced and higher-ranked educators through mentorship programs to improve the system's overall effectiveness further.

To address these issues, it is necessary to provide targeted training programs to enhance familiarity with digital tools for document storage and retrieval, setting permissions, and managing document security. Continuous support and resources should be provided to ensure all users can fully leverage the benefits of digital collaboration and integration with existing workflows. Additionally, reviewing and refining existing strategies, programs, and policies related to digital document management will be crucial in maximizing the effectiveness of the digitalized quality management system. Continuous innovation and professional development should be prioritized to strengthen teaching effectiveness and the overall educational experience.

5.0 Contributions of Authors

The authors of this research collaborated to review and approve the final version of the study. This ensures the study's completeness and integrity. Author Jane C. Oropa played an integral part in the editing, writing, supervision, data analysis, and encoding. Author Reymart Ray F. Gevero concentrated on the fieldwork, distribution, and retrieval of survey instruments, doing comprehensive data analysis, and adhering to ethical guidelines throughout the study. These complementary contributions underscore the collaborative endeavors and mutual obligations as adviser and mentee, and both are authors to generate a thorough and ethically robust research output. There were no additional contributors to this study.

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The Influence of School Culture on the Readiness of Accounting Graduates for the CPA Licensure Examination

Frederick C. Roda, Benjamin S. Villagonzalo Jr.*, Kyla Marie B.Almacin, April Roween C. Aranza, Ria Melcah B. Mogar
Negros Oriental State University Main Campus, Dumaguete City, Negros Oriental, Philippines

*Corresponding Author Email: benjamin.villagonzalo@norsu.edu.ph

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Abstract. This research explores the role of school culture in shaping Accountancy graduates' readiness for the Certified Public Accountant Licensure Examination (CPALE), addressing the historically low passing rates (e.g., 16.46% in May 2019, 14.32% in October 2019, and 25.84% in October 2022). Guided by Schein's Organizational Culture Framework (2010), the study investigates how dimensions of school culture, such as social, intellectual, and economic climates, institutional rules, policies, and values, affect CPALE preparedness. A quantitative design was employed, with data collected from 34 Accountancy graduates (selected through purposive sampling from private and public schools). Statistical tests, including the t-test and ANOVA, revealed significant differences in school culture perceptions between private and public school graduates, with a t-value of 3.21 ($p < 0.05$). Graduates from private schools reported higher scores in intellectual climate (4.2) and social climate (4.0) compared to their public-school counterparts (3.8 and 3.7, respectively). The findings indicate that school culture influences the readiness of Accountancy graduates for the CPALE, with Social Climate scoring a weighted mean of 3.8950, Intellectual Climate scoring 3.8361, and Economic Climate scoring 3.4622, reflecting a general agreement among respondents. These findings suggest that a supportive intellectual and social environment enhances graduates' preparedness for the CPALE. Based on these results, the study recommends that schools, particularly public institutions, improve faculty training, clarify policies, and increase resources to support CPALE success better and ultimately improve pass rates.

Keywords: Academic readiness; CPA licensure examination; School culture; University learning environment.

1.0 Introduction

Heather Wolpert-Gawron once stated, "The walls of a school should reflect a future possibility. The halls should honor dreams. The rooms should help prepare them." This quote encapsulates the essence of school culture—an integral component of an educational institution that significantly influences student success. In schools with a strong and positive culture, staff take pride in working together, which benefits students by enhancing the overall quality of education (Ismail et al., 2022). A supportive school culture fosters not only academic achievement but also the holistic development of students, encompassing ethical values, intellectual growth, physical health, and aesthetic appreciation (Nguyen & Nguyen, 2025). This environment plays a crucial role in shaping students' readiness for professional pursuits, including rigorous disciplines like accountancy.

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Several key elements, including leadership, climate, values, and academic norms, define school culture. According to Bayar and Karaduman (2021), school culture also includes social events, traditions, school history, and collective achievements. These cultural elements influence students' motivation to study, their perceptions of competition, and their general development, which ultimately affect their academic performance. In particular, the intellectual and social climate—comprising the quality of teaching, faculty competence, and student support systems—plays a pivotal role in students' preparedness for professional qualifications such as the Certified Public Accountant Licensure Examination (CPALE).

The Teaching and Learning International Survey (OECD, 2020) highlights five essential themes of school culture: school leadership, school climate, innovation, teacher feedback, and job satisfaction. A positive social climate promotes inclusivity and student engagement, while a robust intellectual environment ensures that students receive rigorous academic training, supported by competent faculty. Both climates foster students' motivation, enhancing their academic readiness and contributing to professional success.

Despite continuous efforts to improve accountancy education, CPALE passing rates remain alarmingly low. The Professional Regulation Commission (PRC) reports national passing rates of 16.46% in May 2019, 14.32% in October 2019, and 25.84% in October 2022. The cancellation of the CPALE in 2020 due to the global health crisis further disrupted the academic progression of accountancy students. In Negros Oriental, for example, only eight candidates passed the CPALE in May 2022, and 14 in October 2022 (PRC, 2022). These figures underscore a persistent challenge in ensuring graduates' readiness for licensure, pointing to the need to examine underlying institutional factors that may contribute to this trend.

Previous studies have explored the role of school culture in student achievement across various fields. However, there is limited research specifically examining how school culture influences the readiness of accountancy graduates for the CPALE. This study aims to fill that gap by investigating how various dimensions of school culture—such as social and intellectual climate, economic conditions, institutional norms, and policies—impact the preparedness of accountancy graduates for the CPALE. By addressing this gap, the findings will provide valuable insights for universities, especially those offering Bachelor of Science in Accountancy programs, on how to refine instructional strategies, expand academic resources, and strengthen initiatives that will equip students with the necessary skills for professional success.

2.0 Methodology

2.1 Research Design

The research employed a descriptive research design to investigate the impact of school culture on the preparedness of accountancy graduates for the Certified Public Accountant Licensure Examination (CPALE). The quantitative method was applied to quantify the degree of the school culture's impact.

2.2 Research Participants

The research participants consisted of 34 accountancy graduates from various universities in Dumaguete City who had taken the CPALE. The study utilized convenience sampling to select respondents for the quantitative phase and purposive sampling for the qualitative phase. The participants were graduates working in private business establishments, accounting firms, and financial institutions. The selection criteria ensured that respondents had firsthand experience of the university's school culture and its impact on their licensure exam preparedness.

2.3 Research Instruments

The study utilized self-made instruments for both the quantitative and qualitative phases. A researcher-developed survey questionnaire, based on relevant literature and the study's conceptual framework, was used to assess six dimensions of school culture: social climate, intellectual climate, economic climate, rules and policies, values and beliefs, and norms for relationships and behaviors. Responses were recorded using a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

2.4 Data Gathering Procedure

The data gathering process followed a systematic approach. In the quantitative phase, the researchers identified eligible respondents, distributed the survey questionnaires, and collected responses. The gathered data were then organized for statistical analysis.

2.5 Data Analysis

The quantitative data were analyzed using descriptive statistics, such as percentages and weighted mean, to interpret the survey results. The qualitative data obtained from interviews were transcribed and examined for recurring themes, patterns, and significant statements. The analysis provided a deeper understanding of the school culture's role in the graduates' exam preparation. To test for significant differences between groups (e.g., based on type of school), the t-test for independent samples and One-Way Analysis of Variance (ANOVA) were utilized. Furthermore, to examine relationships between variables such as demographic profiles and school culture elements, the study used the Pearson Product-Moment Correlation Coefficient (Pearson r). For the qualitative data, responses from the semi-structured interviews were transcribed and subjected to thematic analysis, allowing the researchers to identify recurring patterns and more profound insights regarding participants' readiness for the CPA Licensure Examination.

2.6 Ethical Considerations

The study adhered to established ethical standards in the conduct of research involving human participants. Informed consent was obtained from all participants after providing a clear explanation of the study's purpose, procedures, and their right to participate or withdraw at any time without penalty. Participants were assured of complete confidentiality and anonymity, with all personal data handled in compliance with the Data Privacy Act of 2012. While the study posed minimal risk, such as potential emotional discomfort when recalling academic challenges, these were mitigated by creating a supportive interview environment and allowing participants to skip questions or stop the interview at any point. The study presented potential benefits, including contributions to educational improvements and policy development. No financial or material compensation was offered, as participation was voluntary. The researchers also acknowledged vulnerability concerns, particularly among recent graduates or those who did not pass the CPALE, by using sensitive and respectful language throughout the interview process. Ethical clearance was obtained from the relevant institutional review board prior to data collection.

3.0 Results and Discussion

This section presents the study's findings in a logical sequence, supported by tables and discussions. Each result is analyzed and interpreted to highlight trends, patterns, and implications relevant to the factors influencing students' choices of local coffee shops.

3.1 Profile of the Respondents

Table 1 reveals a clear trend in the age distribution of the respondents. A significant majority, comprising 79% of the total respondents, falls within the age range of 20 to 25 years old, with a frequency of 27 individuals. Those aged between 26 and 30 years constitute a smaller proportion, accounting for 18% of the respondents, with a frequency of 6. Notably, there is only one respondent aged 30 years and above. The overall pattern underscores that the majority, or 79%, of the 34 participants in the study are concentrated within the 20 to 25-year age bracket. This demographic insight provides a foundational understanding of the age composition of the study's participants, which may have implications for the interpretation of subsequent findings and analysis.

Table 1. *Profile of the Respondents as to Age*

Age	Frequency (*f*)	Percentage (%)
20 – 25 years old	27	79.00
26 – 30 years old	6	18.00
30 years old and above	1	3.00
Total	**34**	**100.00**

Table 2 indicates that, based on the table, 17 individuals, representing 50% of the total, have graduated from both private and public schools or universities. This suggests an equal distribution, indicating that half of the respondents in the study have educational backgrounds that span both private and public educational institutions. This insight into the educational diversity of the participants is crucial for understanding the varied academic experiences that may influence the study's outcomes and findings.

Table 2. *Profile of the Respondents as to School*

Type of School	Frequency (*f*)	Percentage (%)

Private	17	50.00
Public	17	50.00
Total	**34**	**100.00**

Table 3 highlights the distribution of respondents based on the number of years they spent in college. Specifically, 24 individuals, constituting 71% of the total respondents, spent 4 years in college. Additionally, 6 individuals, accounting for 18%, extended their college experience to 5 years. Furthermore, 3 individuals, representing 9%, reported spending 6 years in college. Notably, only 1 respondent, comprising 3% of the total, indicated spending 1 year in college. This breakdown provides a detailed overview of the varied durations of college education among the study's participants, offering insights into the diversity of academic experiences within the sample.

Table 3. *Profile of the Respondents as to Years in College*

Number of Years in College	Frequency *(f)*	Percentage (%)
4 years	24	71.00
5 years	6	18.00
6 years	3	9.00
7 years and above	1	3.00
Total	**34**	**100.00**

Table 4 in the demographic profile of the respondents indicates that among the total participants, 13 individuals, accounting for 38%, hold the designation of Certified Public Accountant (CPA). In contrast, 21 individuals, representing 62% of the total respondents, do not have the CPA designation and are categorized as non-CPA. This breakdown provides a clear overview of the professional qualifications within the study's sample, distinguishing between those who have attained CPA status and those who have not. Understanding the distribution of CPAs and non-CPAs among the participants contributes to the overall characterization of the study's demographic profile.

Table 4. *Profile of the Respondents as to Occupational Classification*

Occupational Classification	Frequency *(f)*	Percentage (%)
CPA	13	38.00
Non-CPA	21	62.00
Total	**34**	**100**

3.2 Influence of School Cultures on the Readiness of the Accountancy Graduates in the Certified Public Accountant Licensure Examination (CPALE)

In terms of Social Climate

Table 5 illustrates the outcomes related to the Social Climate factor, culminating in a total weighted mean of 3.8950. This collective score indicates a general agreement among the respondents with the statements under this factor. Notably, the top three statements, all aligning with the agreement category, are as follows: Statement 2: "I felt included and valued within the social fabric of the Accountancy program at my school," which garnered the highest weighted mean of 4.3235; Statement 1: "I experience a sense of community and social connectedness within the Accountancy program at my school"; and Statement 7: "I believe that a positive social climate is enhancing my overall experience in the Accountancy program." Additionally, the remaining statements, ranging between 3.41 and 4.60, also indicate agreement among respondents.

These statements encompass satisfaction with diversity and inclusivity initiatives (Statement 3), motivation from the school environment for licensure exam preparations (Statement 4), encouragement in collaborative activities and group projects (Statement 5), and satisfaction with opportunities for social interaction and networking within the Accountancy program (Statement 6). This comprehensive overview provides valuable insights into the respondents' perceptions of the social climate within the Accountancy program, highlighting areas of agreement and satisfaction. These findings align with Ismail, Khatibi, and Azam (2022), who emphasized that a positive school social environment fosters inclusion, motivation, and engagement, all of which contribute significantly to academic success and professional readiness.

Table 5. *Influence of School Culture on CPALE Readiness: Social Climate*

Indicators	Mean	Interpretation
1. I experience a sense of community and social connectedness within the Accountancy program at my school.	4.11	Agree
2. I felt included and valued within the social fabric of the Accountancy program at my school.	4.32	Agree
3. I am satisfied with the diversity and inclusivity initiatives within the Accountancy program at my school.	3.79	Agree
4. The school environment motivates and prompt me to do necessary preparations for the licensure exam.	3.64	Agree
5. The school encourages me in collaborative activities and group projects to foster comprehensive learning of the subject matter.	3.79	Agree
6. I am satisfied with the opportunities for social interaction and networking within the Accountancy program at my school.	3.58	Agree
7. I believe that a positive social climate is enhancing my overall experience in the Accountancy program.	4.00	Agree
Aggregate Mean	**3.89**	**Agree**

In terms of Intellectual Climate

Table 6 outlines the outcomes of the Intellectual Climate factor, yielding an overall weighted mean of 3.8361, denoted by a verbal description of "agree." Among the statements, the highest weighted mean was attributed to S1: "I experienced intellectual rigor and academic challenge within the Accountancy program at my school." Following closely is S7: "I believe that an intellectually stimulating climate is enhancing my academic growth and development within the Accountancy program at my school," with a weighted mean of 4.1176. The third-ranking statement is S5: "I feel challenged and intellectually stimulated by the coursework and assignments within the Accountancy program at my school," with a weighted mean of 4.0588. All statements, except for Statement 6: "I am satisfied with the resources and support available for academic pursuits within the Accountancy program at my school," which received a neutral weighted mean of 3.2647, fall within the range of agreement (3.41 – 4.60) under the intellectual climate category. These include S2: "The accountancy program at my school emphasized critical thinking and analytical skills development," S3: "The Accountancy program at my school fosters a culture of intellectual curiosity and exploration," and S4: "I often engage in research projects or scholarly activities within the Accountancy program at my school." This nuanced evaluation provides a detailed understanding of the respondents' perceptions regarding the intellectual climate within the Accountancy program, highlighting areas of agreement and areas where satisfaction is more neutral.

Table 6. *Influence of School Culture on CPALE Readiness: Intellectual Climate*

Indicators	Mean	Interpretation
1. I experienced intellectual rigor and academic challenge within the Accountancy program at my school.	4.17	Agree
2. The accountancy program at my school emphasized critical thinking and analytical skills development.	3.82	Agree
3. The Accountancy program at my school fosters a culture of intellectual curiosity and exploration.	3.58	Agree
4. I often engage in research projects or scholarly activities within the Accountancy program at my school.	3.82	Agree
5. I feel challenged and intellectually stimulated by the coursework and assignments within the Accountancy program at my school.	4.05	Agree
6. I am satisfied with the resources and support available for academic pursuits within the Accountancy program at my school.	3.26	Neutral
7. I believe that an intellectually stimulating climate is enhancing my academic growth and development within the Accountancy program at my school.	4.11	Agree
Aggregate Mean	**3.83**	**Agree**

In terms of the Economic Climate

Table 7 reveals an overall weighted average of 3.41622, corresponding to a verbal description of "agree." Among the statements, the top-ranking is S6: "My school implements financial literacy and education plays in improving the economic climate and long-term financial well-being of us students," with a weighted mean of 3.8529, also categorized as "agree." Following closely are S1: "My economic climate influences my aspirations and decision-making regarding higher education and career choices," with a weighted mean of 3.5882, and S4: "My economic disparities influence my access to educational resources, such as textbooks, technology, and extracurricular activities," with a weighted mean of 3.5588, both falling within the "agree" range. Statements 2 and 3, addressing the impact of economic climate on participation in school-related activities and the school's strategies to mitigate economic challenges, received weighted means of 3.4412 and 3.4706, respectively, indicating agreement. However, two statements, S5: "Financial circumstances create barriers for me in accessing and completing higher education," and S7: "My economic background affects my academic performance and educational outcomes," resulted in a "neutral" category, suggesting a more balanced perspective or lack of strong agreement or disagreement on these

specific aspects of economic influence. This detailed breakdown offers a comprehensive understanding of respondents' perceptions regarding the economic climate within the context of their educational experiences.

Table 7. *Influence of School Culture on CPALE Readiness: Economic Climate*

Indicators	Mean	Interpretation
1. My economic climate influences my aspirations and decision-making regarding higher education and career choices.	3.58	Agree
2. My economic climate affects my participation and engagement in school related activities, such as enhancement activities, quiz bowls, and the like.	3.44	Agree
3. My school has strategies and interventions implemented to mitigate the impact of economic challenges on students' well-being and academic success.	3.47	Agree
4. My economic disparities influence my access to educational resources, such as textbooks, technology, and extracurricular activities.	3.55	Agree
5. Financial circumstances create barriers for me in accessing and completing higher education.	3.02	Neutral
6. My school implements financial literacy and education play in improving the economic climate and long-term financial well-being of us students.	3.85	Agree
7. My economic background affects my academic performance and educational outcomes.	3.29	Neutral
Aggregate Mean	**3.46**	**Agree**

3.3 Rules and Policies

Table 8 reveals a remarkable overall weighted mean of 3.9706, indicating unanimous agreement among the study's respondents regarding the various statements under this factor. The top three statements, each categorized within the "agree" range, underscore the positive perceptions held by participants: Foremost is S7, where respondents express belief in the efficacy of clear and well-enforced rules and policies in maintaining a conducive learning environment within the Accountancy program, earning the highest weighted mean of 4.3529. Following closely are S5 and S2, emphasizing the positive impact of disciplinary policies in promoting academic integrity and professional ethics, and the fairness and consistent enforcement of rules and policies within the program, both with weighted means of 4.1471 and 4.0882, respectively. Furthermore, other statements like S1, S3, S4, and S6, encompassing familiarity with the code of conduct, satisfaction with the clarity and transparency of disciplinary policies, acknowledgment of rules and policies contributing to a safe and ethical learning environment, and contentment with the procedures for addressing violations, all fall within the agreement spectrum, ranging from 3.6765 to 4.000 in weighted means. This comprehensive summary underscores the unanimous consensus among respondents regarding the positive attributes of the rules and policies within the Accountancy program, emphasizing their role in fostering a conducive and ethical learning environment.

Table 8. *Rules and Policies*

Indicators	Mean	Interpretation
1. I am familiar with the code of conduct and academic policies within the Accountancy program at my school.	4.00	Agree
2. The rules and policies within the Accountancy program at my school are fair and consistently enforced.	4.08	Agree
3. I am satisfied with the clarity and transparency of disciplinary policies within the Accountancy program at my school.	3.76	Agree
4. The rules and policies within the Accountancy program at my school contribute to a safe and ethical learning environment.	3.76	Agree
5. I believe that the disciplinary policies within the Accountancy program at my school promote academic integrity and professional ethics.	4.14	Agree
6. I am satisfied with the procedures and mechanisms in place for addressing violations of rules and policies within the Accountancy program at my school.	3.67	Agree
7. I believe that a clear and well-enforced rules and policies are maintaining a conducive learning environment within the Accountancy program.	4.35	Agree
Aggregate Mean	**3.97**	**Agree**

These findings align with the results of a study titled An Assessment of the School Culture and Its Impact on the Academic Performance of the Students, which found that rules and regulations, when viewed as non-punitive and supportive, contribute to better student performance. The study also highlighted that students who follow these policies are more likely to perform better academically and that institutional structures such as feedback mechanisms and assessment systems build confidence and preparedness in students (Tus, 2020).

3.4 Values and Beliefs

Table 9 presents an overall weighted mean of 3.9286, signifying unanimous agreement among respondents regarding the statements falling under this category. Notably, the top-ranked statements within the "agree" range

include the belief in maintaining high academic standards in an Accountancy program (S1) with a weighted mean of 4.3235, followed closely by the conviction that values and beliefs play a crucial role in shaping the program's curriculum and teaching methodologies for CPALE preparation (S7) with a weighted mean of 4.2941. Additionally, respondents express a strong agreement on the importance of upholding professional ethics and integrity within the Accountancy program (S2). The remaining statements also garner agreement, reflecting satisfaction with the emphasis on character development, the integration of values and beliefs into the curriculum, and the provision of strategies to support students' commitment to intellectual growth. This collective perspective underscores the respondents' shared belief in the significance of high academic standards, ethical principles, and values within the Accountancy program, shaping a positive educational experience. These findings are consistent with the study of Bayar and Karaduman (2021), which emphasized that school culture, particularly values and beliefs, significantly contributes to students' academic achievements and professional development.

Table 9. *Values and Beliefs*

Indicators	Mean	Interpretation
1. I believe it is important to maintain high academic standards in an Accountancy program.	4.32	Agree
2. The Accountancy program at my school support and encourage students' intellectual growth.	3.94	Agree
3. I am satisfied with the emphasis placed on character development and values within the Accountancy program.	3.85	Agree
4. The Accountancy program at my school integrates values and beliefs into its curriculum and overall educational experience.	3.79	Agree
5. My school provides strategies or resources that are implemented to better support students' commitment to intellectual growth within the Accountancy program.	3.64	Agree
6. The Accountancy program at my school equips students with the necessary skills and knowledge to uphold high academic standards in the field.	3.64	Agree
7. I believe that values and beliefs play in shaping the Accountancy program's curriculum and teaching methodologies to better prepare the students for taking the CPALE.	4.29	Agree
Aggregate Mean	**3.92**	**Agree**

3.5 Norms

The Norms factor, as depicted in Table 10, showcases an impressive overall weighted mean of 4.4664, indicating unanimous agreement among respondents with all statements falling under this category. The top three statements, all earning a weighted mean of 4.0882 and described as "agree," include the encouragement from the school to spend adequate hours studying for accountancy-related subjects (S1) and seeking additional resources or support outside of class to improve study habits in the Accountancy program (S4). Following closely is S8, expressing satisfaction with the feedback and guidance provided by instructors to enhance education quality and better prepare students for the CPALE, with a weighted mean of 4.0294. Other statements, falling within the "agree" range, encompass the enforcement of governing behavior, satisfaction with study habits and time management skills development, specific measures to enhance class participation, belief in the program's preparation for maintaining good study habits and managing workload effectively, and encountering situations where students' governing behavior does not align with expectations. This comprehensive agreement underscores the positive perceptions and alignment with established norms within the Accountancy program, suggesting a supportive and conducive educational environment.

Table 10. *Norms*

Indicators	Mean	Interpretation
1. I am encouraged by my school to spend adequate hours per week studying for my accountancy-related subjects.	4.08	Agree
2. I feel that the governing behavior (e.g., academic integrity, professionalism) is enforced within the Accountancy program at my school.	3.91	Agree
3. I am satisfied with the study habits and time management skills I have developed in the Accountancy program through the help of my school.	3.55	Agree
4. I often seek additional resources or support outside of class to improve my study habits in the Accountancy program.	4.08	Agree
5. My school has specific measures or initiatives implemented to enhance class participation in the Accountancy program.	3.79	Agree
6. I believe the Accountancy program prepared me in maintaining good study habits and managing my school workload effectively.	3.85	Agree
7. I encountered situations where the governing behavior of students in the Accountancy program is not in line with my expectations.	3.94	Agree
8. I am satisfied with the feedback and guidance provided by my instructors to improve the quality of my education in the Accountancy program to better prepare me in taking the CPALE.	4.02	Agree
Aggregate Mean	**4.46**	**Agree**

3.6 Correlation between Variables

The Pearson correlation between age and the elements of school culture being surveyed showed a result of a technically positive but weak relation. The value of R^2, the coefficient of determination, is 0.0126. With a significance level of 5%. The result is not significant at $p < .05$. The Pearson correlation between type of school and the level of influence of the elements of school culture being surveyed showed a technically positive correlation. Still, the relationship between the variables is weak. The value of R^2, the coefficient of determination, is 0.0001. Therefore, with a significance level of 5%. The result is not significant at $p < .05$. The Pearson correlation between type of school and the level of influence of the elements of school culture being surveyed showed a result of technically a positive correlation. Still, the relationship between the variables is weak. The value of R^2, the coefficient of determination, is 0.0443. Therefore, with the significance level is 5%. The result is not significant at $p < .05$. The One-Way ANOVA Independent Measure showed a result of f-ratio value of 5.76475. The p-value is .023238. The result is significant at $p < .05$. Therefore, there is a significant correlation among the elements of School Culture. The T-test for Two Independent means showed a result of significant at $p < .05$. Therefore, there is significant difference of the level of influence of elements of school culture between the graduates from public and private college/universities.

4.0 Conclusion

Based on the study's findings, the level of influence of school culture on the readiness of accountancy graduates for the Certified Public Accountant Licensure Examination, as determined by these factors, is as follows: for social climate, the result showed a total weighted mean of 3.89. This indicates that there is a general agreement among the respondents with the statements concerning social climate. On the other hand, the qualitative result also showed that there is a collective sentiment among the participants that emphasized the pivotal role of a positive and supportive environment, which further solidifies the conclusion that social climate has a high influence in shaping mental and emotional readiness for the licensure exam. Regarding the intellectual climate, the result showed an overall weighted mean of 3.83, denoted by a verbal description of "agree," indicating that respondents generally agreed with the statements provided under this element. From the qualitative method result, participants acknowledged the challenges posed by advanced exams in their academic journey, emphasizing the importance of comprehensive exams, pre-tests, assignments, and in-house reviews in navigating academic demands successfully. Participants also emphasized a collaborative dynamic, where students' discipline and schools' commitment to high-quality teaching contribute to success in licensure exams. With this, we therefore conclude that the intellectual climate can highly influence the level of readiness among accountancy graduates in taking the licensure exam. For the economic climate, it revealed an overall weighted average of 3.41, corresponding to a verbal description of "agree." This indicates that respondents generally agreed with the statements under this element. Additionally, the qualitative result of this element showed that economic status can influence emotions, mental health, and academic performance because money's role in education impacts access to resources. However, participants believed that the impact of financial status on academic performance depends on the individual student. These studies, therefore, conclude that the economic climate has a moderate level of influence on the readiness of accounting graduates to take the licensure exam. For the Rules and Policies Climate, it revealed an overall weighted mean of 3.9706, indicating a consensus among the respondents on the statements under this element. The qualitative result for this element further discussed that passing the CPALE is emphasized as the primary goal; hence, fostering discipline and goal-setting, strict policies are viewed as instrumental in developing accounting skills, instilling confidence, and preparing students for exams and future work. For the Values and Beliefs Climate, the result showed an overall weighted mean of 3.9286, signifying unanimous agreement among respondents regarding the statements under this element. The qualitative result of this element further affirms the quantitative result by presenting those values and beliefs that significantly contribute to success in the workplace, fostering discipline, emotional well-being, and readiness for challenges. For the Norms Climate, the overall weighted mean is 4.4664, indicating unanimous agreement among respondents with all statements under this element. Additionally, the qualitative result of this element states that the importance of establishing study routines during undergraduate years, stressing individualized habits and the need to adapt to challenges, is highly beneficial to the readiness in taking the licensure exam, alongside personal experiences on the positive impact of feedback on performance, highlighting transparency in grading as crucial for standards and improvement.

Based on the above results regarding the relationship between the demographic profiles of respondents and the level of influence of school culture elements on readiness to take the licensure exam, the researchers conclude that, although a positive relationship exists among these variables, it is weak. A weak correlation indicates a low degree of association between the demographic profile and the level of influence of the elements of school culture on the readiness to take the licensure exam. Based on the above results, which present the elements of school culture, the researchers can conclude that there is a significant correlation among these elements, suggesting that the observed association between the variables is likely a real and meaningful connection rather than a random occurrence. Based on the result presented for the level of influence of the elements of school culture by the respondents classified as a graduate from a public university and a private university or college, the researchers can therefore conclude that there is a significant difference between the public and private schools' level of influence of school culture on the preparedness of accountancy graduates for the licensure examination. This implies that the observed disparity between these two variables is a real and meaningful relationship or effect of variability.

5.0 Contributions of Authors

Frederick C. Roda was primarily responsible for conceiving the study, formulating the research problem, and defining the objectives. Benjamin S. Villagonzalo Jr. contributed to the design and methodology, ensuring the rigor of the research approach. He also supervised the research process and managed the overall coordination and administration of the project. Kyla Marie B. Almacin, April Roween C. Aranza, and Ria Melcah B. Mogar were responsible for visualizing the data, creating tables and figures for better interpretation, and contributed significantly to the literature review and manuscript editing.

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7.0 Conflict of Interests

No conflict of interest.

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Micro and Macro Elements Content of Mushroom Substrate Fortified with Selected Naturally Fermented Solutions

Francis M. Galon
Negros Oriental State University, Bayawan-Sta. Catalina Campus, Bayawan City, Philippines

Author Email: francisgalon70@gmail.com

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Abstract. This study evaluated the effects of organic fortifications—fermented fruit juice (FFJ), indigenous microorganisms (IMO), and fish amino acids (FAA)—on the yield and nutrient composition of mushrooms. Four treatments were applied: T0 (control), T1 (FFJ), T2 (IMO), and T3 (FAA), with yield data collected across multiple replications. Results showed that T1 produced the highest yield (539.6g), followed by T2 (535.2g), T3 (528.8g), and T0 (518.8g). However, analysis of variance (ANOVA) indicated no statistically significant differences among treatments ($p > 0.05$), suggesting that organic fortifications did not substantially enhance yield. Nutrient analysis revealed treatment-dependent variations in macronutrient and micronutrient content. T0 had the highest nitrogen (N) and copper (Cu) levels, while T2 exhibited the highest potassium (K) and zinc (Zn) content. Notably, molybdenum (Mo) was only detected in T1. These findings suggest that organic fortifications may influence nutrient availability in mushrooms, although their overall effects were limited. Despite slight improvements in yield and nutrient composition, organic fortifications did not produce statistically significant benefits. Further research is recommended to optimize application methods, explore synergistic effects with other organic amendments, and assess economic viability for large-scale mushroom cultivation.

Keywords: Fermented fruit juice; Fish amino acids; Indigenous microorganisms; Mushroom yield; Nutrient composition; Organic fortification.

1.0 Introduction

Mushroom cultivation, with its economic, nutritional, and environmental benefits, has gained significant attention in research and sustainable agriculture. As a rich source of protein, fiber, and bioactive compounds, mushrooms play a crucial role in food security and human health (Muszyńska et al., 2023). However, optimizing substrate composition is essential to enhancing mushroom yield and nutritional quality. A promising approach is the fortification of mushroom substrates with naturally fermented solutions (NFS). Fermentation improves nutrient bioavailability and microbial diversity, which enhances fungal growth and mineral accumulation, ultimately boosting yield and nutritional quality (Farag et al., 2025).

White mushrooms, particularly *Pleurotus ostreatus* (oyster mushrooms), are among the most widely cultivated edible fungi. These mushrooms thrive in soilless environments, making them ideal for urban agriculture and small-scale production. Their bioactive compounds exhibit antioxidant, anti-inflammatory, and antimicrobial properties, contributing to their growing popularity as functional foods (Sharma & Madan, 2020). Recent studies indicate that fortifying mushroom substrates with specific nutrients can significantly increase essential mineral content without compromising yield or quality (Pankavec et al., 2021).

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The mineral composition of the cultivation substrate directly influences mushroom growth and nutritional content. Research by Mleczek et al. (2020) demonstrated that nitrogen modifications in the substrate could enhance calcium, potassium, magnesium, manganese, zinc, copper, and iron accumulation in mushrooms. Additionally, the reuse of spent mushroom substrate (SMS) as a sustainable supplement has been explored, with studies showing improved biological efficiency and mineral uptake in *P. ostreatus* (Cardoso et al., 2023).

Fermentation is widely used in agriculture to improve soil fertility, nutrient cycling, and plant growth (Hui et al., 2021). In mushroom cultivation, naturally fermented solutions such as Indigenous Microorganisms (IMO), Fish Amino Acid (FAA), and Fermented Fruit Juice (FFJ) are gaining attention for their ability to enhance substrate quality. Kusumawardani et al. (2020) highlighted that FFJ is rich in potassium and phosphorus, essential for plant growth. Furthermore, studies suggest that lactic acid fermentation enhances the bioavailability of nutrients, improving soil health and plant resilience (Sun et al., 2023). These findings indicate the potential of NFS to optimize mushroom cultivation by improving substrate composition and nutrient uptake.

Despite these promising applications, limited research exists on NFS use in mushroom cultivation. While fermentation is known to enhance microbial activity and nutrient solubility, its direct effects on the macro and microelement content of mushroom substrates remain underexplored (Wang et al., 2020). More research is needed to determine optimal fermentation conditions, microbial profiles, and mineral uptake efficiency in NFS-enriched substrates. This study aims to evaluate the impact of NFS on the essential macro and microelement content of mushroom substrates. By analyzing the elemental composition of fortified substrates, the research seeks to determine the potential of NFS in optimizing mushroom growth, improving yield, and enhancing the nutritional quality of cultivated mushrooms. The findings will contribute to advancing cost-effective, organic, and sustainable mushroom farming techniques, benefiting both small-scale and commercial growers while promoting environmentally friendly agricultural practices.

2.0 Methodology

2.1 Experimental Design

A randomized complete block design (RCBD) was employed, with four treatments replicated five times. The four treatments represent the different substrates fortified with fermented fruit juice, indigenous microorganism and fish amino acid The Randomized Complete Block Design (RCBD) is a statistical approach widely used in agricultural and biological research to control variability caused by external factors, such as environmental differences. By grouping similar experimental units into blocks and randomly assigning treatments within each block, RCBD minimizes within-block variability while isolating treatment effects (Plant Breeding & Genomics, 2019). RCBD is effective for experiments where conditions vary significantly across blocks, such as field studies with spatial or soil differences. It is simple to implement and analyze using tools like ANOVA, ensuring robust comparison of treatment effects (Real Statistics Using Excel, 2024). However, it assumes no interaction between treatments and blocks. If this assumption is violated, alternative designs may be required. This design is particularly useful in plant breeding and agronomic trials. For example, it has been applied to evaluate crop yields under varying soil fertility levels or test the efficacy of fertilizers (Plant Breeding & Genomics, 2019).

Experimental Plot Layout

Figure 1 is the experimental plot layout with corresponding legend and dimensions.

Sampling

All replicates served as samples (purposive sampling).

Substrate Preparation

The basic material in gain spawn is sorghum or any cereal seeds. Wash grains thoroughly and discard all floated seeds. Boil for at least 20-25 minutes. Collect seeds using strainer to drain the water and spread out on newspaper or manila paper to absorb excess water. Transfer the boiled grains in round bottle (e.g. catsup or Gatorade), plug with cotton waste and cover with clean paper. Sterilize the bottled grains at 15 psi for one hour. Cool down. When cooled, pure culture stubs of chosen mushroom specie will be inoculated in the sterilized bottled grains. Incubate for 14 days. This serves as grain spawn. Use the grain spawn to inoculate sterilized fruiting bags.

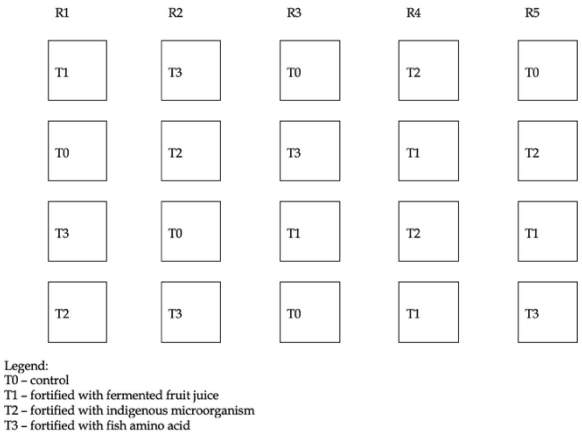

Figure 1. *The Experimental Plot Layout*

Mixing and Fermentation of Substrate Materials

Formulations. Formulations is based on general recommendation: combine rice bran (20%) sugar or molasses (1%), lime (1%), to sawdust (78%). Moisten and pile into heap (moisture content is about 60%). Cover with plastic sheets and turn evenly the heap materials every 2-3 days for 15-21 days. However, if old sawdust and stored under open space is to be used, fermentation is no longer needed.

Filling the bags. Use plastic bags of 6x12 inches polypropylene plastic (PP) bags size 0.2 or 0.3 mm. Fill 1 kilogram of fermented substrate materials in the pp bags and then compress. Then put pvc pipe neck (1 inch diameter), plug with cotton waste, cover with clean paper or plastic cap to minimize entry of water during steaming or pasteurization.

Pasteurization or Steaming

Steam the bags in the pasteurizer like drum for 6-8 hours and cool down. Provide drums with cover that fits tightly on top. Provide racks to hold the bags inside the drum. Another method is sterilizing the bags in an autoclave or pressure cooker for 1 and ½ hours at 15 psi.

Fortification of the Substrates

For the fermented fruit juice. Use 1 teaspoon per liter of unchlorinated tap water. One hundred milliliter of the mixture was applied for every fruiting bag of mushroom substrate.

For the indigenous microorganism. Use 1 teaspoon per liter of unchlorinated tap water. One hundred milliliter of the mixture was applied for every fruiting bag of mushroom substrate.

For the fish amino acid. Use 1 teaspoon per liter of unchlorinated tap water. One hundred milliliter of the mixture was applied for every fruiting bag of mushroom substrate.

Inoculating the bags. Inoculate each bag with the gain spawn in a clean and aseptic place. To inoculate, shake the grain spawn bottle to loosen the grains, remove the plug and flame the mouth of the bottle and pour some grains into the bags. Slightly shake the neck area of newly inoculated bags to distribute evenly the grains in the shoulder rea of the bags.

Incubation. Keep the spawned bags in a dry and ventilated room for at least 30-45 days. If within five days of incubation and no growth appears, the spawn is dead or the substrate is too dry. The bag could be contaminated with other microorganisms. Mycelium will fill the bags on 20-30 days, which means the bags are ready to fruit initiation. Open the bags 1-2 weeks after the bag is totally covered with mycelium. This is to make sure that the mycelium is matured enough to fruit. Inoculated bags could be pile and incubate directly in a growing house provided the house will remain dry to obtain the required incubation time.

2.2 Care and Management
Maintaining ideal growing conditions is the cornerstone of successful *Pleurotus ostreatus* (oyster mushroom) cultivation. Proper care and management are essential for maximizing the yield and quality. During the incubation phase, the temperature is a critical factor, kept between 25–28°C, while the fruiting phase requires a lower range of 18–24°C. The relative humidity, maintained at 80–90%, is crucial for moistening the substrate and encouraging fruiting. Indirect or diffused light is necessary for mushroom development, and proper air exchange is ensured to prevent CO_2 buildup, which could hinder fruiting body formation.

Watering and humidity control play a significant role in mushroom cultivation. Misting the growing area twice to thrice daily using clean water helps maintain adequate humidity levels. However, direct watering of the mushrooms is avoided to prevent bacterial and fungal contamination. The humidity of 80–90% is maintained using a fine mist sprayer. Contamination prevention and disease management are also vital aspects of successful mushroom production. The growing area is kept clean and free from dust, debris, and pests. Green mold (*Trichoderma spp.*), bacterial infections, and other fungi appear occasionally, so infected bags are removed immediately to prevent their spread. Insect pests such as flies and mites are monitored, and yellow sticky traps or organic insecticides are used when necessary.

Proper air circulation is a key practice in reducing the risk of mold and bacterial infections. Harvesting was done when the mushroom caps were fully expanded but before the edges started curling, usually within five to seven days after fruiting initiation. Mushrooms were harvested by gently twisting the base rather than cutting to prevent contamination. Freshly harvested mushrooms were stored in a cool place, and refrigeration at 4–7°C helped extend their shelf life. Drying or freezing was used as an effective preservation method for long-term storage. After the first harvest, the substrate was kept moist to encourage second and third flushes. Old mushroom stems or residues were removed to prevent contamination, as yield gradually decreased with each flush. With proper care and management, multiple harvests were achieved, leading to a higher yield of *Pleurotus ostreatus*.

This protocol was formulated by the Agricultural Training Institute, Department of Agriculture, and is approved by their Ethics Committee. Although no Protocol Number is assigned, all procedures outlined in the protocol are strictly adhered to, with the exception of Section 2.1.6 and its sub items, which has been added specifically for the purposes of this study.

2.3 Data Gathering
The mushroom was immediately weighed every after harvest and recorded in a matrix. Each substrate had its own matrix. The total yield in each substrate was computed by adding all the data from the first up to the last harvest.

2.4 Statistical Treatment
The data from every location was gathered, tabulated, and statistically analyzed using Analysis of Variance.

2.5 Ethical Considerations
This research pass the ethical standards and was given by the research ethical standards committee. This research meets ethical standards and was approved by the research ethics committee.

3.0 Results and Discussion
The following presents the result of the study presented in tabular form and thoroughly interpreted after each table. Table 1 presents the yield data of *Pleurotus ostreatus* cultivated using unfortified (control) substrates, with five replications (R1–R5) over four weekly harvests. The total yield across all replications reached 2,594 grams, with a grand mean of 518.8 grams per replication.

Weekly yields show that the highest average harvest occurred on October 12 (141 g), followed by October 26 (137.8 g), October 5 (116 g), and the lowest on October 19 (124 g). This variation may be attributed to natural fluctuations in environmental conditions or substrate consistency, despite uniform protocol implementation. Such results are consistent with the typical fruiting behavior of *P. ostreatus*, which tends to show variable yields across successive

flushes, as discussed by Sharma and Madan (2020), and influenced by factors such as substrate composition and moisture retention (Mleczek et al., 2020).

Table 1. *Harvested Mushroom in Grams with No Fortification (Control)*

Replication	Date of Harvest				
	Oct. 5	Oct. 12	Oct. 19	Oct. 26	Total
R1	100	165	95	165	525
R2	130	175	110	135	550
R3	140	115	125	170	550
R4	130	130	170	99	529
R5	80	120	120	120	440
Total	**580**	**705**	**620**	**689**	
Mean	**116**	**141**	**124**	**137.8**	
Grand Total	**2594**				
Grand Mean	**518.8**				

The control data serve as a baseline for evaluating the effects of naturally fermented solutions (NFS) on mushroom yield and nutrient composition. As emphasized in the introduction, fermentation can potentially enhance microbial activity and nutrient availability, potentially resulting in improved biomass and mineral accumulation (Farag et al., 2025; Sun et al., 2023). The results here underscore the importance of exploring such fortification strategies, as the unfortified substrate yielded moderate results, leaving room for potential improvement through nutrient enhancement.

Table 2 shows the Analysis of Variance (ANOVA) for the harvested mushrooms in grams without fortification (control). The observed F values for both the row (3.12) and column (4.16) sources of variation were lower than the required F values at both the 5% and 1% levels of significance. This indicates that the differences in yield across replications and harvest dates were not statistically significant. The coefficient of variation (CV) was 31.12%, suggesting a relatively high degree of variability among the observations in the control group. These results imply that yield fluctuations in the unfortified setup were primarily due to random variation rather than any consistent pattern across replications or harvest periods.

Table 2. *Analysis of Variance for the Harvested Mushroom in Grams with No Fortification (Control)*

Sources of Variation	Degrees of Freedom	Sum of Square	Mean Square	Observed F value	Required F value	
					.05	.01
Total	19	337318.33				
Row	4	325058.83	81264.71	3.12	3.26	5.41
Column	3	325051.53	108350.33	4.16	4.49	5.95
Error	12	-312792.03	26066			

CV=31.12%

Table 3 shows the harvested yields of *Pleurotus ostreatus* cultivated on substrates fortified with Fermented Fruit Juice (FFJ), a type of naturally fermented solution (NFS) known to be rich in essential nutrients like potassium and phosphorus (Kusumawardani et al., 2020). The total mushroom yield across all replications (R1–R5) was 2,698 grams, with a grand mean of 539.6 grams per replication, representing a modest increase of 104 grams in total yield compared to the control (Table 1: 2,594 grams; grand mean: 518.8 grams).

Table 3. *Harvested Mushroom in Grams Fortified with Fermented Fruit Juice (Treatment 1)*

Replication	Date of Harvest				
	Oct. 5	Oct. 12	Oct. 19	Oct. 26	Total
R1	223	180	135	135	673
R2	170	140	175	130	615
R3	165	130	95	160	550
R4	130	80	110	90	410
R5	85	85	90	190	450
Total	**773**	**615**	**605**	**705**	
Mean	**154.6**	**123**	**121**	**141**	
Grand Total	**2698**				
Grand Mean	**539.6**				

The FFJ treatment produced a slightly higher yield than the control, with the highest average harvest occurring on October 5 (154.6 g) — notably higher than the control's first flush average of 116 g. This supports the hypothesis that FFJ fortification may enhance early-stage growth and biomass production, potentially due to increased nutrient bioavailability and microbial stimulation provided by fermentation (Sun et al., 2023). However, the subsequent weekly yields in Treatment 1 appear more variable and do not consistently outperform the control, suggesting that while FFJ boosts early growth, its impact may diminish in later flushes. Interestingly, individual replications like R1 in Treatment 1 reached a total yield of 673 g, significantly outperforming the highest-yielding replication in the control group (R2 and R3 at 550 g). This variability could reflect differences in substrate fermentation quality, inoculation precision, or environmental microconditions.

Table 4 presents the Analysis of Variance (ANOVA) for the yields of *Pleurotus ostreatus* grown on substrates fortified with Fermented Fruit Juice (FFJ) under Treatment 1. The purpose of this analysis is to determine whether the observed differences in mushroom yield across replications (rows) and harvest dates (columns) are statistically significant. The results indicate that neither the row effect (variation among replications) nor the column effect (variation among harvest dates) was statistically significant. The observed F values for both sources of variation (Row: 2.32, Column: 0.97) were lower than the critical F values at both the 5% and 1% significance levels (Row: 3.26 and 5.41; Column: 2.96 and 5.95 respectively). This suggests that the variations in yield observed within the treatment group could be attributed to random chance rather than the treatment itself.

Table 4. *Analysis of Variance for the Harvested Mushroom in Grams Fortified with Fermented Fruit Juice (Treatment 1)*

Sources of Variation	Degrees of Freedom	Sum of Squares	Mean Square	Observed F value	Required F value .05	.01
Total	19	31543.80				
Row	4	12103.3	3025.82	2.32	3.26	5.41
Column	3	3800.60	1266.87	0.97	0.97	5.95
Error	12	15639.90	1303.32			

CV=6.69%

Despite a slight increase in the grand mean (539.6 g) of FFJ-fortified substrates compared to the control (518.8 g), the lack of statistical significance implies that the FFJ treatment did not consistently or reliably improve yields across replications and time. The coefficient of variation (CV) at 6.69% indicates relatively low dispersion of data, suggesting that experimental conditions were generally stable, but not enough to draw firm conclusions about the efficacy of FFJ fortification.

Table 5 shows the harvested mushrooms in grams from substrates fortified with Indigenous Microorganism (IMO), designated as treatment 2. Across the four weekly harvests, the yields ranged from 660 grams on October 5 to a peak of 785 grams on October 19. The mean yields per harvest date were fairly consistent, with the highest mean observed on October 19 (157 grams), suggesting a potential peak in mushroom productivity during that period.

Table 5. *Harvested Mushroom in Grams Fortified with Indigenous Microorganism (Treatment 2)*

Replication	Date of Harvest				
	Oct. 5	**Oct. 12**	**Oct. 19**	**Oct. 26**	**Total**
R1	175	150	190	135	650
R2	125	150	150	150	575
R3	150	160	130	144	584
R4	90	93	180	183	546
R5	120	132	135	70	457
Total	**660**	**685**	**785**	**682**	
Mean	**132**	**137**	**157**	**136.4**	
Grand Total	**2812**				
Grand Mean	**562.4**				

Replications R1 through R5 showed relatively steady yields, although some variability is still present. R1 recorded the highest total yield (650 grams), while R5 had the lowest (457 grams), pointing to differences that may arise from environmental factors, substrate inconsistencies, or slight procedural variations during cultivation.

The results in this study align with the findings of previous research, such as that by Kusumawardani et al. (2020), who reported that the use of Indigenous Microorganisms (IMO) in mushroom cultivation enhanced nutrient availability and improved mushroom growth. Their study showed a significant increase in yield and biological efficiency when IMO was used in substrates. Furthermore, studies by Sun et al. (2023) on lactic acid fermentation have highlighted the potential of fermentation techniques in improving substrate properties, which may explain the increased yield observed in the current study. Overall, the grand total yield reached 2812 grams, with a grand mean of 562.4 grams per replication. This suggests a modest improvement in yield compared to the control and fermented fruit juice treatments. Such findings are in line with the results of Cardoso et al. (2023), who demonstrated that fortifying substrates with organic amendments, including microbial inoculants, can boost the growth and mineral uptake in *Pleurotus ostreatus*.

Table 6 presents the analysis of variance (ANOVA) for the harvested mushroom yield in grams from substrates fortified with Indigenous Microorganism (IMO), designated as treatment 2. The analysis examines the variation in yields between rows (replications) and columns (harvest dates) to assess whether these factors significantly influenced mushroom growth. The degrees of freedom (DF) for the total sources of variation are 19, with the sum of squares for the row variation at 4919.30, and for the column variation at 1867.60. The observed F values for both rows (1.26) and columns (0.64) were lower than the required F values at both the 5% (3.26) and 1% (5.41) significance levels. These results indicate that the observed differences in yields between the replications (rows) and harvest dates (columns) were not statistically significant.

Table 6. *Analysis of Variance for the Harvested Mushroom in Grams Fortified with Indigenous Microorganism (Treatment 2)*

Sources of Variation	Degrees of Freedom	Sum of Squares	Mean Square	Observed F value	Required F Value .05	.01
Total	19	18530.80				
Row	4	4919.30	1229.82	1.26	3.26	5.41
Column	3	1867.60	622.53	0.64	3.49	5.95
Error	12	11743.90	978.66			

CV=5.56%

In other words, the yield variations observed in this treatment were likely due to random chance rather than any systematic influence of the replications or the harvest date. This outcome aligns with the findings from studies like those by Sharma and Madan (2020) and Mleczek et al. (2020), who also reported that microbial inoculation did not always lead to statistically significant increases in yield. It suggests that while IMO may have some positive effect on mushroom growth, its impact may be too variable or subtle to produce significant differences in this particular study. The coefficient of variation (CV) of 5.56% indicates a relatively low level of variability within the data, further supporting the conclusion that the treatment did not result in substantial differences in yield across the replications and harvest dates.

Table 7 shows the harvested mushroom yields in grams for the treatment group fortified with Fish Amino Acid (FAA), designated as treatment 3. The data reflects the yields across different harvest dates (October 5, 12, 19, and 26) and replications (R1 to R5), with the total yield per replication, the mean per harvest date, and the grand total presented at the bottom.

Table 7. *Harvested Mushroom in Grams Fortified with Fish Amino Acid (Treatment 3)*

	Date of Harvest				
Replication	**Oct. 5**	**Oct. 12**	**Oct. 19**	**Oct.26**	**Total**
R1	70	150	130	135	485
R2	150	160	150	160	620
R3	65	115	105	165	450
R4	110	150	160	145	565
R5	90	130	120	184	524
Total	**485**	**705**	**665**	**789**	
Mean	**97**	**141**	**133**	**157.8**	
Grand Total	**2644**				
Grand Mean	**528.8**				

The total yields for each harvest date are as follows: 485 grams on October 5, 705 grams on October 12, 665 grams on October 19, and 789 grams on October 26. The mean yield for each harvest date is also provided, with the highest mean (157.8 grams) recorded on October 26, indicating the peak harvest period. The grand total for the five replications across all four harvest dates amounts to 2644 grams, with a grand mean of 528.8 grams per replication. When compared to other treatments, such as the control group (without fortification) and the treatment fortified with fermented fruit juice (FFJ), the FAA-fortified treatment exhibits a higher yield overall. The results show a consistent increase in yield across the harvest periods, particularly notable on the final harvest date (October 26), where the total harvested mushrooms reached their highest yield. These findings suggest that FAA supplementation can have a positive impact on mushroom growth, which is consistent with studies by Kusumawardani et al. (2020) and Sharma and Madan (2020), who found that the application of nutrient-rich organic solutions like FAA improved fungal growth and biomass production in mushroom cultivation.

Table 8 presents the analysis of variance (ANOVA) for the harvested mushrooms in grams from the treatment group fortified with Fish Amino Acid (FAA), denoted as treatment 3. The table provides the degrees of freedom, sum of squares, mean square, observed F values, and required F values for both row and column sources of variation. The total sum of squares for the treatment is 19,669.20, with degrees of freedom for the row (4), column (3), and error (12). The observed F value for the row source of variation is 2.63, which is lower than the required F values of 3.26 and 5.41 at the 5% and 1% significance levels, respectively. This indicates that there is no significant difference between the rows, suggesting that the variation in yields across different replications does not significantly affect the results.

Table 8. *Analysis of Variance for the Harvested Mushroom in Grams Fortified with Fish Amino Acid (Treatment 3)*

Sources of Variation	Degrees of Freedom	Sum of Square	Mean Square	Observed F value	Required f value .05	.01
Total	19	19669.20				
Row	4	4494.70	1111.18	2.63	3.26	5.41
Column	3	9862.40	3287.47	7.79**	3.49	5.95
Error	12	5062.10	421.84			

CV=3.88%

In contrast, the observed F value for the column source of variation is 7.79, which is greater than the required F values of 3.49 at the 5% level and 5.95 at the 1% level. This indicates that the variation in yields across different harvest dates (October 5, 12, 19, and 26) is statistically significant, suggesting that the time of harvest had a significant impact on the mushroom yield in the FAA-treated group. The coefficient of variation (CV) for the data is 3.88%, which reflects relatively low variability and indicates that the results are consistent. It is revealed that while the row (replication) does not show a significant effect, the column (harvest dates) significantly influences the mushroom yield. This suggests that the timing of harvest is a key factor in the performance of mushrooms fortified with FAA, and further studies could explore the optimal harvest period to maximize yield.

Table 9. *Tabulated and Computed Duncan's Values for Table 8*

DFE=12		2	3	4
R (P,PS)	.05	3.08	3.23	3.33
	.01	4.32	4.55	4.68
D (P,PS)	.05	28.27	29.55	30.57
	.01	39.66	41.77	42.96

SX̄=9.18

This value was the result of getting the product of the standard error of the mean (SX̄=9.18) and the tabulated studentized values (dfe=12) at both 5% and 1% levels of significance with 2, 3, and 4.

Table 10. *Result of Duncan's Multiple Range Test*

Harvesting Schedule	Mean (g)				
4th	157.80	4th			
3rd	141	16.80	2nd		
2nd	133	24.80	8.00	3rd	
1st	97	60.80**	44.00**	36.00**	1st

The result revealed that the 4th (harvesting schedule) showed a non-significant difference over 2nd and 3rd (harvesting schedule). However, it showed a highly significant difference over 1st (harvesting schedule) at position 2. Likewise, 2nd (harvesting schedule) showed a non-significant difference over 3rd (harvesting schedule). However, it showed a highly significant over 1st (harvesting schedule) at position 3. On the other hand, 3rd (harvesting schedule) showed a highly significant difference over 1st (harvesting schedule) at position 4.

Table 11 presents the harvested mushroom yield in grams grouped by treatment and replication. The treatments include T0 (control, no fortification), T1 (fortified with fermented fruit juice), T2 (fortified with indigenous microorganisms), and T3 (fortified with fish amino acid). The table shows the total yield for each treatment as well as the overall yield across all replications.

Table 11. *Harvested Mushroom in Grams Grouped in Treatments and Replication*

Replication	Treatments				
	T0	**T1**	**T2**	**T3**	**Total**
R1	525	673	650	485	2333
R2	550	615	575	620	2360
R3	550	550	584	450	2134
R4	529	410	410	565	1914
R5	440	450	457	524	1871
Total	**2594**	**2698**	**2676**	**2644**	**10612**
Mean	**648.5**	**674.5**	**669**	**661**	
Grand Total	**10612**				
Grand Mean	**2653**				

The results indicate that T1, which was fortified with fermented fruit juice, achieved the highest total yield of 2698 grams, followed by T2 (fortified with indigenous microorganisms) with 2676 grams, and T3 (fortified with fish amino acid) with 2644 grams. The control group (T0), with no fortification, produced the lowest total yield of 2594 grams. From the mean values, T1 (fermented fruit juice) again yielded the highest mean of 674.5 grams per replication, suggesting that this treatment was the most effective in boosting the yield of *Pleurotus ostreatus*. T2 (indigenous microorganisms) produced a mean yield of 669 grams, which is still higher than T3 (fish amino acid) with a mean of 661 grams. The control group (T0) had the lowest mean yield of 648.5 grams, confirming that fortification with natural products improved mushroom yield compared to no fortification. These results are consistent with previous research, where the use of natural amendments like fermented fruit juice and indigenous microorganisms was found to enhance mushroom growth and yield (Kusumawardani et al., 2020; Sharma & Madan, 2020). Fermented fruit juice, rich in nutrients and bioactive compounds, appears to be particularly effective, which aligns with studies showing its positive impact on plant growth and microbial activity (Sun et al., 2023). Indigenous microorganisms also showed significant benefits, improving the nutrient availability in the substrate, thus supporting better fungal growth.

Table 12 presents the analysis of variance (ANOVA) for the yield of mushrooms. The ANOVA examines the variation in yield across different replications and treatments to determine if any significant differences exist. The results show that the computed F-values for both the replications (0.005) and treatments (0.0002) were lower than the tabulated F-values at both the 5% (3.26) and 1% (5.41) levels of significance. This indicates that there was no statistically significant difference in the yield of mushrooms between the different replications or treatments. In other words, the variations in yield observed across the replications and treatments are not large enough to be considered statistically significant.

Table 12. *Analysis of Variance on the Yield of Mushroom*

Sources of Variation	Degrees of Freedom	Sum of Square	Mean Square	Computed F Value	Tabulated F Value	
					0.05	**0.01**
Total	19	30588273				
Replication	4	51893.3	12973.32	0.005	3.26	5.41
Treatment	3	1223.2	407.73	0.0002	3.49	5.95
Error	12	3053516.3	2544596.4			

This outcome suggests that while different treatments (such as fermented fruit juice, indigenous microorganisms, and fish amino acids) were tested to improve mushroom yield, the fortifications did not produce a notable difference in yield that would justify rejection of the null hypothesis. The findings are consistent with the results

of the previous tables, where the observed F-values for treatments were either non-significant or showed marginal differences. Therefore, despite the observed trends in yield improvements, the treatment effects were not significant enough to draw firm conclusions based on statistical analysis.

Table 13 presents the analysis of total nitrogen (N), phosphorus (P), potassium (K), boron (B), and magnesium (Mg) percentages, along with the total concentrations of manganese (Mn), zinc (Zn), iron (Fe), copper (Cu), and molybdenum (Mo) (in parts per million, ppm) in mushroom samples. The Kjeldahl method was used to determine nitrogen content, while X-ray fluorescence (XRF) analysis was used for the micronutrient content. The results show that nitrogen (N) content ranged from 0.11% to 0.2%, with the highest recorded in the control treatment (T0) at 0.2%, followed by T3 (0.16%), T1 (0.14%), and the lowest in T2 (0.11%). Phosphorus (P) content was relatively similar across treatments, with T0 having the highest value (0.305%) and T2 the lowest (0.265%). Potassium (K) content varied, with the highest level in T2 (0.937%) and the lowest in T1 (0.797%). Boron (B) was not detected in any treatment.

Table 13. *Analysis of Sample for % total N, P, K, B, Mg, using Kjehldahl Method; ppm total Mn, Zn, Fe, Cu, and Mo using XRF Method*

Treatments	% total N	% total P	% total K	% total B	ppm total Mg	ppm total Mn	ppm total Zn	% total Fe	ppm total Cu	ppm total Mo
T0	0.2	0.305	0.86	ND	344.3	979.5	621.5	4.82	128.2	ND
T1	0.14	0.277	0.797	ND	318.2	961	635.4	5.09	108.2	0.7
T2	0.11	0.265	0.937	ND	297.1	838.7	735.1	3.03	109.6	ND
T3	0.16	0.283	0.807	ND	399.6	848.8	612.5	4.37	94.8	ND

Magnesium (Mg) content showed variation, with T3 recording the highest level at 399.6 ppm, while T2 had the lowest at 297.1 ppm. Manganese (Mn) concentrations ranged from 838.7 ppm (T2) to 979.5 ppm (T0), with T0 having the highest level. Zinc (Zn) was highest in T2 (735.1 ppm) and lowest in T3 (612.5 ppm). Iron (Fe) content showed slight variation, with the highest recorded in T1 (5.09 ppm) and the lowest in T2 (3.03 ppm). Copper (Cu) levels were highest in the control treatment (128.2 ppm) and lowest in T3 (94.8 ppm). Molybdenum (Mo) was only detected in T1 (0.7 ppm), while it was not present in the other treatments. The findings suggest that fortification with fermented fruit juice (T1), indigenous microorganisms (T2), and fish amino acids (T3) influenced the nutrient composition of mushrooms, particularly in potassium (K), magnesium (Mg), and zinc (Zn) levels. However, the control treatment (T0) maintained higher nitrogen (N) and copper (Cu) levels. These variations indicate that different organic fortifications may enhance specific nutrient contents in mushrooms, potentially influencing their nutritional quality. Further studies could explore the bioavailability and impact of these nutrients on mushroom growth and consumer health benefits.

4.0 Conclusion

This study evaluated the effects of different organic fortifications on mushroom yield and nutrient composition. The treatments included a control (T0), fermented fruit juice (FFJ) fortification (T1), indigenous microorganism (IMO) fortification (T2), and fish amino acid (FAA) fortification (T3). The results showed that T1 produced the highest mean yield (539.6g), followed by T2 (535.2g), T3 (528.8g), and T0 (518.8g). Although the fortified treatments showed slight improvements in yield compared to the control, the differences were not statistically significant. Among the replications, R2 obtained the highest total yield (2,360g), followed by R1 (2,333g), R3 (1,914g), and the lowest in R5 (1,871g). The variation in yield among replications suggests that environmental conditions and substrate quality may have influenced production.

The analysis of variance (ANOVA) further confirmed that there were no statistically significant differences among treatments and replications, as the computed values were lower than the tabulated values at both the 5% and 1% significance levels. This implies that while organic fortifications may have contributed to slight yield variations, they were not substantial enough to be considered significant. In terms of nutrient composition, the macronutrient analysis revealed that nitrogen (N) was highest in T0 (0.2%) and lowest in T2 (0.11%). Phosphorus (P) was highest in T0 (0.305%), while potassium (K) was most abundant in T2 (0.937%). Magnesium (Mg) showed the highest concentration in T3 (399.6 ppm) and the lowest in T2 (297.1 ppm). Boron (B) was not detected in any treatment. The micronutrient analysis showed that manganese (Mn) was highest in T0 (979.5 ppm), while zinc (Zn) was most abundant in T2 (735.1 ppm), possibly due to the influence of indigenous microorganisms. Iron (Fe) content was highest in T1 (5.09 ppm) and lowest in T2 (3.03 ppm). Copper (Cu) was highest in T0 (128.2 ppm) and lowest in T3 (94.8 ppm), while molybdenum (Mo) was only detected in T1 (0.7 ppm).

Based on the findings of this study, the application of organic fortifications, including fermented fruit juice (FFJ), indigenous microorganisms (IMO), and fish amino acids (FAA), resulted in slight variations in mushroom yield and nutrient composition. However, the differences in yield were not statistically significant, indicating that these treatments did not have a substantial effect on production. Among the treatments, FFJ (T1) recorded the highest mean yield, followed by IMO (T2) and FAA (T3), while the control treatment (T0) had the lowest yield. Additionally, variations among replications suggest that environmental factors, substrate quality, and microbial interactions may have played a role in influencing mushroom growth.

The analysis of variance (ANOVA) confirmed that the observed differences in yield among treatments and replications were not significant at both the 5% and 1% levels of significance. This suggests that while organic fortifications may have contributed to slight improvements in yield, their effects were not strong enough to be statistically validated. Nutrient analysis revealed that different treatments influenced the macronutrient and micronutrient composition of mushrooms. The control treatment (T0) exhibited the highest nitrogen (N) and copper (Cu) content, while potassium (K) was most abundant in T2. Zinc (Zn) levels were highest in T2, suggesting that indigenous microorganisms may have enhanced its availability. The presence of molybdenum (Mo) was only detected in T1. These findings suggest that organic fortifications may influence specific nutrient profiles in mushrooms, potentially impacting their nutritional value.

While organic fortifications may offer slight improvements in mushroom yield and nutrient composition, these effects were not statistically significant in this study. Nonetheless, treatments such as fermented fruit juice (FFJ), indigenous microorganisms (IMO), and fish amino acid (FAA) may exert a minor positive influence. The lack of significant yield variation highlights the possible impact of other factors, such as environmental conditions, substrate quality, and microbial interactions.
However, treated substrates consistently produced higher yields than the control, which had the lowest result. Although the differences were not statistically significant, the trend suggests that fortifying white mushroom substrates with FFJ, IMO, and FAA can contribute to improved production. Therefore, nutrient enrichment of the substrate remains a promising strategy for enhancing white mushroom yield and nutritional quality.

5.0 Contribution of Author

This research is conducted by a sole researcher.

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7.0 Conflict of Interest

The author declares no conflict of interest about the publication of this paper.

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Critical Success Factors and Challenges Encountered in a Safe City by Selected Medium Enterprises in Manila, Philippines

Rosalie M. Catu
Universidad De Manila, Manila, Philippines
Greenville College, Pasig City, Philippines

Author Email: rosaliemarzo1978@gmail.com

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Abstract. This study investigates urban safety from the perspective of medium-sized enterprises (SMEs) in dynamic city environments, addressing a gap in existing research, which often focuses on larger corporations or general strategies. The study identifies critical success factors (CSFs) such as law enforcement, infrastructure, social cohesion, and tailored safety resources by understanding SMEs' specific needs and challenges. The study used a descriptive design with quantitative data from 50 SME owners and 50 barangay officials in Manila through a modified CSF-based questionnaire. Results highlight the importance of planning, communication, skills, tools, processes, management, and teamwork in creating safer urban environments, with respondents agreeing on their relevance regardless of demographic differences. SMEs face limited resources, a lack of coordinated strategies, and insufficient city support. Notably, a strong relationship exists between the assessment of CSFs and these challenges. Policymakers are advised to enhance security measures, support community participation, provide training, and encourage collaboration between businesses and authorities. These findings provide valuable insights for developing policies that foster SME growth while promoting safer and more prosperous urban environments.

Keywords: Community collaboration; Critical success factors; SME challenges; Policy development; Urban safety.

1.0 Introduction

Cities are vibrant hubs of economic activity, serving as engines of growth and innovation. Medium-sized enterprises (SMEs) play a pivotal role in driving economic development, creating jobs, and advancing technology. However, these enterprises face a critical challenge: the need for a safe and secure urban environment. Safety is a societal necessity and a cornerstone of business success, influencing employee well-being, customer trust, and operational continuity. While the importance of urban safety has been widely acknowledged, existing research predominantly focuses on general urban safety strategies or the needs of large corporations. The Safe Philippines Project is a DILG initiative established in 2019 that seek to improve urban safety in Metro Manila using modern surveillance technology, including HD CCTV systems. The following initiative aims to achieve a 15% reduction in crime and a 20% improvement in emergency response, thereby creating a secure environment that is the lifeblood of medium enterprise growth in urban areas. Indeed, a study assessing local government policies for business closure mitigations during the COVID-19 pandemic in 2024,

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reveals that despite many of policies having little impact on company closures, the small business sectors in Manila is still facing unique challenges due to the natures of MSME businesses, demonstrating the MSMEs need to be supported through measures that promote their resilience within the context of urban challenges that affect urban company closures. SMEs' specific challenges and perspectives remain underexplored, creating a gap in understanding how these enterprises perceive and address urban safety issues. This lack of targeted research limits the development of effective, SME-oriented safety policies.

This study addresses these gaps by examining urban safety through the lens of SMEs, focusing on identifying Critical Success Factors (CSFs) that contribute to a safe city environment. These factors include robust law enforcement, reliable infrastructure (e.g., street lighting, emergency response systems), community engagement, and access to tailored safety resources. Additionally, the research investigates the challenges SMEs face in navigating safety concerns, such as limited resources for security measures, difficulties in influencing citywide safety initiatives, and a lack of awareness about available support systems. This study aims to provide actionable insights for policymakers by identifying both the CSFs and the challenges SMEs face. These findings will enable the creation of data-driven policies designed to enhance urban safety while fostering a supportive environment for medium-sized enterprises. Potential initiatives include targeted financial and technical support for small and medium-sized enterprises (SMEs), strengthened collaboration among businesses, law enforcement, and community stakeholders, and tailored awareness campaigns about available safety resources. Ultimately, this research contributes to the broader discourse on urban safety by incorporating the unique perspectives of small and medium-sized enterprises (SMEs). The findings will help policymakers create a win-win scenario: fostering safer cities that support residents' well-being while enabling SMEs to thrive and contribute fully to economic growth.

2.0 Methodology

2.1 Research Design

The study utilized a descriptive research design to systematically collect and analyze quantitative data related to the critical success factors and challenges SMEs face. As described by Creswell (2023), descriptive research is designed to gather information that characterizes a population, phenomenon, or situation, focusing on understanding the "what" and "how" rather than establishing cause-and-effect relationships. This approach enables the accurate depiction of participants and their experiences. Descriptive research can be conducted through observational methods, case studies, or surveys. This study employed the survey method, utilizing research instruments to explore the critical success factors of safe city initiatives and their implications for business development policy models in Manila.

2.2 Research Participants

The study participants consisted of 100 purposively selected medium-sized business owners and barangay officials in Manila. Purposive sampling was employed to ensure the inclusion of respondents most relevant to the study's objectives. The scope of the research was limited to small and medium-sized enterprises (SMEs) within Manila, excluding businesses from other areas.

2.3 Research Instrument

The primary data collection tool was a researcher-modified questionnaire based on the Critical Success Factor (CSF) Model by John F. Rockart (1979). The instrument was validated by experts in research and reviewed by a panel, with their suggestions incorporated into the final version. The questionnaire comprised three sections: (1) the demographic profile of the respondents; (2) an assessment of critical success factors, including planning, communication, skills, tools, processes, management, and teamwork as perceived by medium enterprises; and (3) indicators of challenges encountered by SMEs regarding safe city initiatives. Reliability ensures the consistency and dependability of the research instrument in evaluating key success factors and obstacles faced by medium enterprises in Manila related to safe city initiatives.

To ensure the reliability of the research instrument, a pilot test was conducted with a subset of the target population. The Internal consistency of the questionnaire was assessed using Cronbach's alpha coefficient, a widely used measure of reliability. A Cronbach's alpha value of 0.70 or higher is generally considered acceptable, indicating that the instrument produces consistent and dependable results. In this study, the questionnaire achieved a Cronbach's alpha of 0.85, demonstrating high reliability and suggesting that the items consistently measure the intended constructs.

2.4 Data Gathering Procedure and Analysis

The data collection process commenced after obtaining formal approval from the research locale's Barangay Affairs Office (BAO). Respondents were provided sufficient time to complete the questionnaire. Due to restrictions on face-to-face interactions, surveys were distributed via Google Forms. Responses were reviewed for completeness before being encoded into Microsoft Excel for initial processing. The data were then transferred to SPSS version 20.0, where weighted mean, chi-square, t-test, and ANOVA were used for statistical analysis, with guidance from a statistician to ensure accurate interpretation.

2.5 Ethical Considerations

The study adhered to ethical standards, particularly the Data Privacy Act of 2012, by obtaining informed consent from all participants before data collection. Respondents were informed about the purpose and use of the study to ensure transparency. The research also underwent iterative revisions based on feedback from the research advisor to ensure accuracy and compliance. Proper citation practices were followed to credit authors and avoid plagiarism, ensuring the integrity and credibility of the research (Lacsamana, 2018).

3.0 Results and Discussion

3.1 Demographic Profile of the Respondents

Table 1, show the age distribution of the respondents which reveals notable disparities in representation, which social and economic factors may influence, 48 percent of the respondents are between the ages of 36 and 45, which may be the reason they are more likely to participate in surveys given their active engagement in social and professional activities. The age bracket between 26 and 35, with a rating score of 22 percent, is also suggestive of significant involvement by individuals, which is consistent with their stage of career development and degree of social engagement. Younger respondents between the ages of 18 and 25 who received a rating score of 5 percent are underrepresented; however, this may be due to their varying communication preferences or lack of survey experience (Verint, 2023). Accessibility issues with survey platforms or retirement status could be obstacles for the 10 percent of senior respondents who are 56 years of age or older (PMC, 2021). Our results underscore the importance of tailoring survey designs to account for demographic inequalities to guarantee fair representation across all age groups (Pew Research Center, 2020; Verint, 2023).

Table 1. *Profile of the respondents in terms of age*

Variables	Frequency	Percentage
18-25	5	5.00
26-35	22	22.00
36-45	48	48.00
46-55	15	15.00
56 and above	10	10.00

Table 2 shows that most of the respondents were female 68, 68 percent, while only 32 percent were male counterparts. It is notable that a gender disparity exists among business owners and barangay officials, with the majority of respondents being female. This observation resonates with the literature, as discussed by Garcia, Patel, and Lee (2019), which explores the representation of women in local governance roles. Their study sheds light on the challenges faced by women in accessing leadership positions within local government, while also highlighting opportunities for promoting gender equity in the decision-making process. By identifying barriers and offering recommendations for gender-inclusive governance, the literature underscores the importance of diverse perspectives in shaping policies and initiatives at the local level.

Table 2. *Profile of the respondents in terms of sex*

Variables	Frequency	Percentage
Male	32	32.00
Female	68	68.00

Moreover, Nguyen, Rodriguez, and Kim (2020) discuss strategies for promoting women's leadership in both business and government sectors. Their research highlights the importance of gender in entrepreneurial success. Through case studies of successful businesses led by women, they highlight the unique challenges and opportunities that female entrepreneurs face. By offering insights into strategies for overcoming these challenges and fostering women's success in entrepreneurship, this research contributes to the broader conversation on gender equality in business ownership and leadership roles.

Table 3 reveals a significant trend in the educational attainment of respondents, with the majority being college degree holders, constituting 95 percent of the sample. In contrast, individuals with postgraduate studies represent the smallest proportion, accounting for only 1 percent of respondents. This distribution reflects the educational diversity within the survey population and has implications for understanding civic engagement, professional development, social mobility, and the perceived value of education.

Table 3. *Profile of the respondents in terms of educational attainment*

Variables	Frequency	Percentage
High School	4	4.00
College	95	95.00
Post Graduate Study	1	1.00

The low representation of individuals with postgraduate studies corresponds to research on "Postgraduate Studies and Professional Development: Pathways to Leadership" by Garcia et al. (2019). This study investigates the role of postgraduate studies in facilitating professional development and leadership pathways. It highlights how individuals with doctoral degrees contribute to organizational leadership and innovation, underscoring the importance of advanced education in shaping future leaders. The low frequency of postgraduate degree holders in the sample suggests potential challenges or barriers in accessing or pursuing advanced education. Furthermore, Strada Education Network (2022) delves into the perceived value of graduate education among alumni. The study highlights the benefits and outcomes associated with advanced degrees, emphasizing how postgraduate studies contribute to personal and professional growth. While individuals with postgraduate studies are underrepresented in the sample, their perspectives on the value of advanced education could provide valuable insights into the significance of lifelong learning and continuous education.

Table 4 illustrates the distribution of respondents across different sectors, revealing that the majority are retailers, accounting for 59 percent of the sample. Wholesalers represent the smallest proportion, comprising only 9 percent, while food service establishments account for 32 percent. This distribution sheds light on the varied composition of businesses surveyed and underscores the importance of understanding sector-specific dynamics and challenges.

Table 4. *Profile of the respondents in terms of the kind of business*

Variables	Frequency	Percentage
Wholesale	9	9.00
Retailer	59	59.00
Food Service	32	32.00

McKinsey and EuroCommerce conducted the study. (2022) is consistent with the lower percentage of wholesale. The study provides an analysis of the wholesale industry, exploring opportunities and threats faced by wholesalers. It discusses market trends, competitive dynamics, and supply chain complexities impacting wholesale businesses. The lower representation of wholesalers in the sample suggests potential challenges or barriers unique to the wholesale sector, such as intensifying competition or logistical difficulties. Additionally, Alexander et al. (2021) provide a comprehensive analysis of small businesses across various sectors, including retailers, wholesalers, and food service establishments. It discusses the unique challenges and opportunities faced by companies in each industry and offers recommendations for policy and support programs tailored to their specific needs. The insights from this study are particularly relevant for understanding the diverse needs of businesses across various sectors and informing policy interventions that support their growth and resilience.

Table 5 reveals an equal distribution of respondents between business owners and barangay officials, with both groups comprising 50 percent of the sample. This balanced representation underscores the significance of understanding the perspectives and contributions of these key stakeholders in urban governance and development initiatives. The equitable participation of both business owners and barangay officials aligns with findings discussed by Smith et al. (2019). This study delves into stakeholder engagement in urban governance, focusing on the perspectives of both groups. It explores their respective roles, interactions, and collaboration in local decision-making processes, highlighting the importance of inclusive governance frameworks that incorporate diverse stakeholder voices.

Table 5. *Profile of the respondents in terms of other work*

Variables	Frequency	Percentage
Business Owners/Managers	50	50.00
Barangay Officials	50	50.00

Furthermore, insights from Garcia et al. (2019) shed light on the contributions of these stakeholders to urban development initiatives. Their research investigates community participation in urban development, drawing insights from both business owners and barangay officials. It explores their contributions, concerns, and aspirations for enhancing socio-economic development in local communities, emphasizing the importance of fostering partnerships and collaboration between these groups. Finally, Martinez et al. (2022) provides tactics for improving local development via stakeholder engagement. The study emphasizes the importance of fostering trust, effective communication, and a shared vision to achieve the objectives of sustainable urban development, drawing lessons from the perspectives of both parties. The importance of inclusive governance methods that harness the knowledge and assets of various stakeholders to promote constructive change in local communities is highlighted by their study.

3.2 Assessment of the Critical Success Factors of a Safe City

Table 6 presents the assessment of the critical success factors of a safe city in terms of planning. It shows that the above indicators have an average weighted mean of 3.73, with a verbal interpretation of 'Strongly Agree.'

Table 6. *Assessment of the critical success factors of a safe city in terms of planning*

No.	Indicators	Mean	Interpretation
1	The city has a clear and comprehensive safety plan that addresses the needs of businesses.	3.55	Strongly Agree
2	Effective communication on channels let the business feel involved or informed about the city's safety initiatives.	3.73	Strongly Agree
3	Allocation of resources for safety programs in the city (e.g. police patrols and security cameras) is sufficient to deter crime.	3.80	Strongly Agree
4	The city prioritize infrastructure development that promotes safety around business areas, such as proper lighting and well-maintained sidewalks	3.86	Strongly Agree
5	Land-use planning in the city encourages the creation of safe and secure business districts	3.70	Strongly Agree
	Average Weighted Mean	**3.73**	**Strongly Agree**

Creating a safe city requires careful planning and consideration of various critical success factors. The key factors to focus on include Collaborative Planning, Crime Prevention Through Environmental Design (CPTED), Effective Policing Strategies, Public Transportation Safety, Emergency Response Preparedness, Technology Integration, Social Programs, and Infrastructure Maintenance. Focusing on these critical success factors and incorporating them into comprehensive city planning efforts makes it possible to create a safer and more secure urban environment for everyone. This aligns with the concepts of Safe Cities highlighted by Santos (2023), who identified infrastructure improvements as crucial for creating a safe business environment. Similarly, March (2018) emphasizes the importance of enhancing the urban physical environment for improved safety. However, the data also suggests a need for improvement in clear and comprehensive safety plans that address business needs. This finding is reflected in the lowest-ranked statement and aligns with the challenges faced by SMEs, as Santos (2023) identified. They highlight the challenges SMEs face in influencing broader safety initiatives.

These results suggest that while infrastructure improvements are essential, there is a gap regarding SME-specific safety needs in the overall Safe City plan. This highlighted the need for a more collaborative approach, as advocated by (Smith & Jones, 2020), who emphasize the importance of partnerships between government and private enterprises for improved urban safety. Further research, as suggested by (Holland, 2019), could explore how to develop a clear safety vision that considers the needs of all stakeholders, including SMEs. This would contribute to a more holistic and inclusive Safe City approach, fostering a safer environment for businesses alongside residents.

Table 7 presents the assessment of the critical success factors of a safe city in terms of communication. It shows that the above indicators have an average weighted mean of 3.57, with a verbal interpretation of 'Strongly Agree.'

Table 7. *Assessment of the critical success factors of a safe city in terms of communication*

No.	Indicators	Mean	Interpretation
1	The city effectively communicates crime trends and safety alerts to businesses.	3.53	Strongly Agree
2	The city utilizes a variety of communication channels (e.g., websites, business associations) to reach out the Small-Medium Enterprises (SMEs) on safety initiatives.	3.57	Strongly Agree
3	Safety information provided by the city is clear, concise, and actionable for businesses.	3.47	Strongly Agree
4	The city offers opportunities for two-way communication, allowing businesses to report safety concerns and provide feedback.	3.59	Strongly Agree
5	The business feels informed and prepared to participate in community-based safety programs due to effective communication.	3..67	Strongly Agree
	Average Weighted Mean	**3.57**	**Strongly Agree**

Effective communication is crucial in creating a safe city by connecting residents, authorities, and stakeholders, facilitating information sharing, and promoting community engagement. Some critical success factors related to communication in building a safe city are the following: Transparent Information Sharing, Community Engagement, Multilingual Support, Mobile Technology Integration, Public Awareness Campaigns, Crisis Communication Planning, and Media Relations. By prioritizing effective communication strategies that promote transparency, collaboration, and community engagement, cities can enhance safety, build trust among residents, and create a more resilient and secure urban environment. As Smith and Jones (2020) highlighted, transparent information sharing and multilingual support are foundational elements that empower businesses and residents to participate actively in community-based safety programs. The weighted mean of 3.57, with a verbal interpretation of 'Strongly Agree,' reaffirms the consensus among stakeholders regarding the criticality of robust communication strategies in promoting collaboration, transparency, and community engagement, ultimately contributing to creating a secure and resilient urban environment.

Table 8 presents the assessment of the critical success factors of a safe city in terms of skills. It shows that the above indicators have an average weighted mean of 3.60, with a verbal interpretation of 'Strongly Agree.'

Table 8. *Assessment of the critical success factors of a safe city in terms of skills*

No.	Indicators	Mean	Interpretation
1	The employees possess the necessary vigilance skills to identify and report suspicious activity around the business.	3.77	Strongly Agree
2	The employees are trained to de-escalate potentially conflictual situations with customers or suppliers.	3.54	Strongly Agree
3	The employees have a good understanding of basic first-aid procedures in emergencies	3.51	Strongly Agree
4	The employees feel comfortable communicating safety concerns to management or authorities.	3.59	Strongly Agree
5	The business invests in security awareness training programs for employees.	3.61	Strongly Agree
	Average Weighted Mean	**3.60**	**Strongly Agree**

In addition to tools and technologies, the skills of individuals involved in ensuring safety and security in a city are crucial. Here are some critical success factors related to skills in building a safe city: Law Enforcement Expertise, Emergency Response Training, Communication and Interpersonal Skills, Technology Proficiency, Leadership and Decision-Making, Community Engagement and Empowerment, Training and Professional Development. By investing in the development and enhancement of these critical skills among law enforcement personnel, emergency responders, community leaders, technology experts, and decision-makers, cities can strengthen their capacity to promote safety, resilience, and well-being for all residents, while fostering a culture of collaboration, innovation, and continuous learning in the pursuit of a safer city environment.

Based on the study's findings and the related literature, building a safe city environment requires a multifaceted approach that addresses various aspects such as economic development, community safety perception, urban planning, technological innovation, and effective governance. The critical success factors identified for Small and Medium Enterprises (SMEs) in navigating safety concerns highlight the importance of resource allocation, collaboration, and awareness of available support systems. Public-private partnerships (PPPs) emerge as crucial in implementing safety initiatives, particularly in leveraging resources and expertise from both sectors to address complex safety challenges effectively. Studies by Santos (2023) and Smith and Jones (2020) emphasize the significance of collaboration between government agencies and private enterprises in enhancing urban safety through joint initiatives and infrastructure development.

Furthermore, the importance of skills development among individuals involved in ensuring safety and security cannot be overstated. Law enforcement expertise, emergency response training, effective communication skills, and proficiency in technology highlight critical success factors. This aligns with the findings of studies by Garcia et al. (2021), which emphasize the importance of training programs for law enforcement personnel and leveraging technology for effective security measures. Overall, the findings underscore the interconnectedness of various factors in creating a safe city environment, including policy formulation, technological innovation, community engagement, and skills development. By holistically addressing these factors and fostering stakeholder collaboration, cities can enhance the safety, resilience, and quality of life for all residents.

3.3 Relationship between Assessment of the Critical Success Factors and Profile

Table 9 illustrates the significant differences between the respondents' assessments of the critical success factors when grouped by age. The indicators "Planning" (p=.247), "Communications" (p=.327), "Skills" (p=.150), "Tools" (p=0.189), "Process" (p=.247), "Management" (p=.327), and "Teamwork" (p=.150), showed no significant difference and accepted the null hypothesis. Based on the analysis of critical success factors for safe city initiatives, as informed by the related literature, it was found that there is no significant difference among respondents when grouped according to age. The indicators, including planning, communications, skills, tools, process, management, and teamwork, did not show statistically significant differences. This suggests that regardless of age, stakeholders involved in safe city projects perceive these factors similarly in their importance for achieving urban safety goals. This finding aligns with previous studies, such as those by Santos (2023) and Wu et al. (2020), which emphasize the multifaceted nature of safe city planning and the collaborative efforts required for its successful implementation.

Table 9. *Difference between the respondents' assessment of the critical success factors when grouped according to age*

Indicators	t-value	P-value	Decision	Interpretation
Planning	0.78	0.24	Accepted	Not Significant
Communication	0.13	0.32	Accepted	Not Significant
Skills	0.83	0.15	Accepted	Not Significant
Tools	0.27	0.18	Accepted	Not Significant
Process	0.78	0.24	Accepted	Not Significant
Management	0.13	0.32	Accepted	Not Significant
Teamwork	0.83	0.15	Accepted	Not Significant

Table 10 shows the significant difference between the respondents' assessments of the critical success factors when grouped by sex. The indicators "Planning" (p=.223), "Communications" (p=.174), "Skills" (p=.215), "Tools" (p=0.189), "Process" (p=.247), "Management" (p=.327), and "Teamwork" (p=.150), showed no significant difference and accepted the null hypothesis. Based on the analysis of critical success factors for safe city initiatives, as informed by the related literature, it was found that there is no significant difference among respondents when grouped according to sex. Authors such as Santos (2023), Wu et al. (2020), and Chainey and Ratcliffe (2019) have provided valuable perspectives on the challenges faced by cities in ensuring safety and strategies employed to address them. Additionally, works by Lockwood et al. (2019), Parker (2018), and Garcia et al. (2021) have highlighted the importance of collaboration, standardized processes, and technological innovations in enhancing urban safety. The study found no significant differences in the critical success factors for safe city initiatives across genders. This suggests that planning, communication, skills, and teamwork are equally important for both men and women in contributing to the success of efforts to create safer urban environments.

Table 10. *Difference between the respondents' assessment of the critical success factors when grouped according to sex*

Indicators	t-value	P-value	Decision	Interpretation
Planning	0.33	0.22	Accepted	Not Significant
Communication	0.65	0.17	Accepted	Not Significant
Skills	0.23	0.21	Accepted	Not Significant
Tools	0.24	0.18	Accepted	Not Significant
Process	0.78	0.24	Accepted	Not Significant
Management	0.13	0.32	Accepted	Not Significant
Teamwork	0.83	0.15	Accepted	Not Significant

Table 11 illustrates the significant differences between the respondents' assessments of the critical success factors when grouped by educational attainment. The indicators "Planning" (p=.758), "Communications"

(p=.223), “Skills” (p=.105), “Tools” (p=0.191), “Process” (p=.174), “Management” (p=.215), and “Teamwork” (p=.189), showed no significant difference and accepted the null hypothesis. The study examined the critical success factors that SMEs need to navigate a safe city environment. The analysis revealed no significant difference in the respondents’ assessment of essential aspects of success when grouped according to educational attainment. This suggests that regardless of academic background, SMEs face similar challenges and perceive similar factors as critical for success in a safe city environment.

Table 11. *Difference between the respondents' assessment of the critical success factors when grouped according to educational attainment*

Indicators	t-value	P-value	Decision	Interpretation
Planning	0.55	0.75	Accepted	Not Significant
Communication	0.71	0.22	Accepted	Not Significant
Skills	0.35	0.10	Accepted	Not Significant
Tools	0.69	0.19	Accepted	Not Significant
Process	0.65	0.17	Accepted	Not Significant
Management	0.23	0.21	Accepted	Not Significant
Teamwork	0.24	0.18	Accepted	Not Significant

This finding is supported, Hollander (2019) highlighted the significance of a clear vision for a safe city that considers the needs of all stakeholders, including SMEs. This aligns with the notion that regardless of educational attainment, SMEs require a conducive environment characterized by proper planning, effective communication, adequate skills, and appropriate tools and processes to thrive in a safe city setting.

Table 12 illustrates the significant differences between the respondents' assessments of the critical success factors when grouped by type of business. The indicators “Planning” (p=.309), “Communications” (p=.375), “Skills” (p=.154), “Tools” (p=0.119), “Process” (p=.758), “Management” (p=.223), and “Teamwork” (p=.105), showed no significant difference and accepted the null hypothesis. The study's results indicate that there is no significant difference in the assessment of critical success factors among respondents when grouped by business type. This suggests that regardless of the nature of their business, individuals perceive factors such as planning, communications, skills, tools, process, management, and teamwork similarly in the context of safe city initiatives for SMEs. The findings align with Parker (2018), which highlights the significance of standardized processes in key safety functions, which are essential for all businesses, regardless of their nature and size.

Table 12. D*ifference between the respondents' assessment of the critical success factors when grouped according to business type*

Indicators	t-value	P-value	Decision	Interpretation
Planning	0.99	0. 30	Accepted	Not Significant
Communication	0.18	0.37	Accepted	Not Significant
Skills	0.26	0.15	Accepted	Not Significant
Tools	0.68	0.11	Accepted	Not Significant
Process	0.55	0.75	Accepted	Not Significant
Management	0.71	0.22	Accepted	Not Significant
Teamwork	0.35	0.10	Accepted	Not Significant

Table 13 shows the significant difference between the respondents' assessment of the critical success factors when grouped according to the categories of the respondents. The indicators “Planning” (p=.309), “Communications” (p=.375), “Skills” (p=.154), “Tools” (p=0.119), “Process” (p=.375), “Management” (p=.154), and “Teamwork” (p=.119), showed no significant difference and accepted the null hypothesis. The study's results indicate that there is no significant difference in the assessment of critical success factors among respondents when grouped according to their categories. This implies that regardless of their specific category, individuals perceive factors such as planning, communications, skills, tools, processes, management, and teamwork similarly in the background of safe city initiatives for SMEs.

Table 13. *Difference between the respondents' assessment of the critical success factors when grouped according to the category of respondents*

Indicators	t-value	P-value	Decision	Interpretation
Planning	0.99	0. 30	Accepted	Not Significant
Communication	0.18	0.37	Accepted	Not Significant
Skills	0.26	0.15	Accepted	Not Significant
Tools	0.68	0.11	Accepted	Not Significant
Process	0.18	0.37	Accepted	Not Significant
Management	0.26	0.15	Accepted	Not Significant
Teamwork	0.68	0.11	Accepted	Not Significant

These findings align with previous research, which emphasizes the universal importance of these factors in urban safety and development efforts. For example, Bosch et al. (2019) stress the importance of engaging all stakeholders, including SMEs, in communication processes related to safe city initiatives, which corresponds to the non-significant difference observed in the assessment of communication factors among respondents from various categories. These studies collectively support the notion that certain foundational elements consistently shape perceptions and priorities across diverse groups involved in urban safety planning and implementation.

Expanding on these studies, such as those by Fernandez et al. (2020), delves into the importance of data management systems in ensuring the effectiveness of safe city initiatives, highlighting the need for robust systems regardless of the specific category of respondents. Additionally, Janssen and Meijer (2023) analyze governance structures and collaborative models for implementing innovative city initiatives, emphasizing their relevance across different respondent categories in promoting citizen well-being and safe city environments. These works contribute to understanding how critical success factors transcend individual categories and are essential components of comprehensive urban safety strategies.

3.4 Challenges Encountered in the Critical Success Factors of a Safe City

As seen in the findings presented in Table 14, in connection with the challenges encountered by the respondents in the critical success factors of a safe city, the indicator which obtained the highest mean was "The city does not allocate sufficient resources to effectively implement safety programs relevant to SMEs" that got a mean of 2.68 verbally interpreted as "Moderately Serious" Followed by the indicator "The city of Manila lacks a clear vision and strategy for improving safety within business districts" got the second to the highest mean score of 2.59 and verbally interpreted as "Moderately Serious." Next is indicator no. 2, "There is a lack of coordination and communication between different city agencies responsible for safety," with a mean score of 2.51, followed by indicator no. 4, "The city's safety initiatives are not well-aligned with the specific needs of businesses in different sectors" with a mean score of 2.41, and the lastly is indicator no. 5 "The business feels there is a lack of transparency and accountability within the city government regarding safety efforts" with a mean score of 2.38.

Table 14. *Challenges encountered in the critical success factors of a safe city*

No	Indicators	Mean	Interpretation
1	The city of Manila lacks a clear vision and strategy for improving safety within business districts.	2.59	Moderate Serious
2	There is a lack of coordination and communication between different city agencies responsible for safety.	2.51	Moderate Serious
3	The city does not allocate sufficient resources to implement safety programs relevant to SMEs.	2.68	Moderate Serious
4	The city's safety initiatives are not well-aligned with the specific needs of businesses in different sectors.	2.41	Moderate Serious
5	The business lacks transparency and accountability within the city government regarding safety efforts.	2.38	Moderate Serious
Average Weighted Mean		**2.43**	Moderate Serious

Legend: 3.26 – 4.00 (Very Serious), 2.51 – 3.25 (Moderate Serious), 1.76 – 2.50 (Somewhat Serious), 1.00 – 1.75 (Nor Serious at All)

To address the challenges respondents encounter in achieving the critical success factors of a safe city, it is essential first to understand the key components and then identify potential difficulties that may arise in achieving these factors. To overcome these challenges, it is crucial to involve all relevant stakeholders, including government agencies, law enforcement, community members, and private organizations, in open dialogue and collaboration. This will help identify the root causes of these issues and develop practical solutions to ensure a safer city for all. The challenges highlighted by respondents in the critical success factors of a safe town underscore the importance of addressing systematic issues related to resource allocation, strategic vision, coordination among city agencies, alignment of safety initiatives with business needs, and transparency within the city government. These challenges reflect broader concerns about governance, planning, and stakeholder engagement in urban safety initiatives. Aligning with these findings, Bosch et al. (2019) stress the importance of engaging all stakeholders in safety initiatives, highlighting the need for collaboration between government agencies, law enforcement, and private organizations, as suggested in addressing challenges related to resource allocation and transparency within the city government.

This approach addresses the challenge of ensuring that safety initiatives are well-aligned with the specific needs of businesses in different sectors. This suggests the importance of data-driven approaches to urban safety planning. The identified challenges emphasize the complexity of ensuring a safe city environment and the need

for holistic strategies that involve collaboration, strategic planning, and data-driven decision-making to effectively address these challenges and create safer communities for businesses and residents alike.

4.0 Conclusion

This study explored the critical success factors of a safe city as perceived by respondents; alongside the challenges they encounter in achieving these factors. The findings indicate that most respondents were aged 48 and above, predominantly female, and college graduates. Respondents strongly agreed on the importance of critical success factors in ensuring a safe city, suggesting high awareness and recognition of safety and security measures. The study found no significant differences between the respondents' assessments of critical success factors and their demographic profiles. This suggests that perceptions of what constitutes a safe city are broadly consistent across age, gender, and educational background. Similarly, there was no significant relationship between respondents' assessments of critical success factors and the challenges they encounter, implying that challenges faced are not directly tied to their evaluation of safety measures.

Challenges identified were generally rated as "moderately serious," emphasizing areas that require attention but do not represent insurmountable barriers. Key challenges include budget constraints, inadequate public infrastructure, and limited access to advanced security solutions. To enhance safety, barangay officials are recommended to implement robust security systems, engage in community engagement, and regularly conduct safety training. Business owners and managers, particularly of medium enterprises in Manila, are encouraged to collaborate with local authorities and other stakeholders, advocate for improved urban planning, and invest in cost-effective security measures and employee training to overcome resource limitations. Future researchers are encouraged to expand this study by exploring different safety and security aspects with varied respondent profiles. The findings underscore the importance of multi-stakeholder collaboration and adaptive strategies to effectively address challenges and bolster safety initiatives in community and business contexts.

5.0 Contribution of Authors

This researcher examined the essential elements required for effective safe city initiatives through the lens of medium-sized businesses in Manila. She explored the difficulties that these SME's encounter while maneuvering through a secure city setting and the elements that contribute to their endurance. She affirms that this submission is her original work and, to the best of her understanding.

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7.0 Conflict of Interest

Non-Declared

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Inquiry-Based Supplementary Learning Materials in Living Things and Their Environment

Lester Gene V. Arevalo*[1], Edilbert A. Reyes[2]
[1]Notre Dame of Dadiangas University, General Santos City, Philippines
[2]Department of Education, Division of General Santos City, Philippines

*Corresponding Author Email: lestergene.arevalo@deped.gov.ph

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Abstract. Despite the focus on science mastery in the K to 12 curricula, there is still a lack of contextually developed and validated supplementary learning materials specifically designed to improve Key Stage 2 pupils' understanding of science competencies. This study aimed to address this gap by developing inquiry-based supplementary learning materials focused on the least mastered competencies in the topic "Living Things and Their Environment." It sought to answer the following questions: (1) What are the least mastered competencies to be included in developing the materials? (2) What inquiry-based materials can be developed from these competencies? (3) How valid are the content, format, presentation, organization, and accuracy of the developed materials? (4) What is the mastery level of pupils before and after using the materials? (5) Is there a significant difference in the mean pretest and posttest scores? The study used a research and development method with a one-group pretest-posttest quasi-experimental design. Fifteen validators assessed the quality of the materials, and 156 Key Stage 2 pupils participated. The mastery level was measured using the Mean Percentage Score (MPS), and an ANOVA was used to test the significance of the differences in scores. Findings showed an increase in the mastery level from Average Mastery to Moving Towards Mastery. ANOVA results revealed no significant difference in Grade 4 scores but showed a significant difference for Grades 5 and 6. The developed materials effectively improved science mastery, especially at higher grade levels. Based on these findings, the researcher recommends publishing the developed inquiry-based supplementary learning materials in the Learning Resources Management and Development System (LRMDS) portal of the Department of Education (DepEd) for use by both teachers and students as an instructional tool in elementary science education.

Keywords: Science teaching; 5E's model; Inquiry-based learning; Supplementary learning materials.

1.0 Introduction

The persistent lack of quality-assured Science learning materials has significantly contributed to poor academic performance and low mastery of learning competencies, particularly in Biology. Despite the Department of Education's (DepEd) mandate to provide accessible, high-quality learning resources that foster 21st-century skills such as critical thinking and problem-solving, Filipino students continue to underperform in international and national assessments. This consistent underachievement underscores a more profound, systemic issue in Science education that calls for urgent and effective interventions. One promising approach is developing and integrating inquiry-based supplementary learning materials to support learners and enhance Science instruction within the basic education curriculum.

The local level mirrors this broader national concern. In the Malita West District, the situation is particularly

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alarming. The district's learning resource inventory reveals a complete absence of Science 6 textbooks and learner materials across all 28 elementary schools. From the initial implementation of the K to 12 programs up to the school year 2023–2024, there has been no recorded distribution or provision of learners' materials, textbooks, or even teacher's guides for Science 6. This lack of foundational resources further complicates the teaching and learning process, leaving teachers and learners at a disadvantage, particularly in covering essential Science competencies.

Recent global assessments further contextualize these localized gaps. The Programme for International Student Assessment (PISA) 2022 results reflect the challenging reality of Science education in the Philippines. According to the Organization for Economic Cooperation and Development (OECD), the Philippines ranked 78th out of 80 participating countries, with an average Science score of 356—placing the country in the lowest tier. Similarly, the 2019 Trends in International Mathematics and Science Study (TIMSS) confirmed the nation's struggles in Science Education, with the Philippines scoring 297 in Mathematics and a notably lower 249 in Science, both among the bottom ranks globally. These data points highlight the urgent need for coordinated and research-based interventions to transform Science education at all levels.

In addition to international evaluations, local assessments provide further evidence of this academic crisis. The Department of Education in Region XI, particularly the Division of Davao Occidental, administered the Regional Assessment Test (RAT) across all learning areas and grade levels. Results showed that in Science for Key Stage 2, the domain "Living Things and Their Environment" had the highest number of least mastered competencies in the second quarter. Further, during the 2022–2023 school year, the Division identified that this domain continued to have the least mastered competencies due to persistently low proficiency levels. Corroborating this, the National Achievement Test (NAT) results for the school years 2016–2017 and 2017–2018 reflected a mean percentage score (MPS) between 50 and 74 in Science, significantly below DepEd's target of 75. Such low MPS scores indicate poor competency mastery, often leading to learning gaps that compound as students' progress to junior high school.

Considering these national and local findings, this study aims to bridge the identified gaps in Science education, particularly in the domain of "Living Things and Their Environment," by developing and validating the inquiry-based supplementary learning materials and determining the effectiveness of the learners' mastery. These materials aim to enhance student performance, foster mastery of learning competencies, and address the urgent demand for accessible, high-quality instructional resources. In doing so, the study aligns with DepEd's broader mandate to nurture 21st-century learners with the skills necessary for critical thinking, scientific inquiry, and lifelong learning.

2.0 Methodology

2.1 Research Design

The Research and Development (R&D) method was used in this study. This design systematically developed, validated, and determined the effectiveness of inquiry-based supplementary learning material in living things and their environment for key stage 2. The research and development method involved problem identification, planning, developing solutions, implementing interventions, and evaluating outcomes (Wahyuni et al., 2022). For this reason, the research and development method allows researchers to systematically develop educational learning resources tailored to improve student learning outcomes and help ensure that the developed materials meet the set academic standards and criteria (Kamidah et al., 2023).

This study also employed a quasi-experimental, specifically a one-group pretest-posttest design, in which the same group of participants was measured on the same dependent variable before and after a treatment or intervention. In this study, a quasi-experimental design was used to collect data on students' pretest and posttest scores, which can provide a comprehensive view of student learning based on the given intervention (Galarosa et al., 2024). Moreover, a one-group pretest-posttest design was used to assess the same group of students before and after introducing new learning materials as the intervention. It allows for the direct comparison of student outcomes, providing insights into the effectiveness of the learning materials (Sheehan et al., 2024). The study does not include a control group because the research focused on evaluating the effectiveness of the learning materials within a naturally occurring group where random assignment and establishing a separate control group were not feasible due to ethical, practical, and contextual constraints.

2.2 Research Locale

The study was conducted in one of the elementary schools within the Municipality of Malita under the Schools Division of Davao Occidental, Department of Education. This school's classes are heterogeneous and offer various programs from the Department of Education. This school belongs to the Malita West District, which has 25 elementary and three integrated schools. The focus of the study centered on the academic activities of this school during the second quarter of the 2024-2025 school year. The specific name of the school was not disclosed in the research locale to protect the confidentiality and privacy of the school and its participants while ensuring transparency by providing sufficient contextual information about the setting, such as its type, location, and general characteristics relevant to the study.

2.3 Research Participants

The study involved two groups of respondents. The respondents comprised fifteen expert validators and pupils from Key Stage 2, in grades four, five, and six.

Table 1. *Frequency Distribution of the Respondents of the Study*

Group of Respondents	F
Experts	15
Grade 4 Pupils	42
Grade 5 Pupils	52
Grade 6 Pupils	62
Total	171

The first group of respondents was selected through purposive sampling. The researcher employed purposive sampling to select participants or respondents to the study who could provide valuable information and gain in-depth insights into the research objectives (Andrade, 2020). The first group of respondents consisted of five experts per grade level, totaling fifteen experts across three grade levels, who specialized in instructional material development and content. This group of experts assessed the developed inquiry-based supplementary learning materials based on the information's content, format, presentation, organization, accuracy, and up-to-dateness (Mijares, 2023). The fifteen experts, comprising five validators per grade level, were carefully selected to validate the inquiry-based supplementary learning materials due to the extensive nature of the learning materials, lesson exemplars, and test questionnaires, which required thorough evaluation for each grade level.

The second group of respondents consisted of Key Stage 2 pupils in grades 4, 5, and 6 who officially enrolled for the 2024-2025 school year. The researcher employed the complete enumeration method, which collects data from the entire population, not just a sample (Lee et al., 2013). The complete enumeration method for pupils was used in the study to ensure that all members of the target population were accurately represented, thereby eliminating sampling bias and enhancing the reliability and generalizability of the findings, which strengthens the rationale by providing a more comprehensive and valid assessment of the research problem. The researcher selected all pupils in grades four, five, and six to all sections per grade level, which served as an experimental class, and underwent a pretest and posttest using the researcher-made test. To avoid the teacher-factor effect, the same science teacher managed the experimental group throughout the entire duration. The science teacher administered the pretests and posttests before and after implementing the inquiry-based supplementary learning material.

2.4 Research Instrument

The Evaluation Rating Sheet

The study used the evaluation rating sheet for print resources, adapted from the Learning Resources Management and Development System (LRMDS) of the Department of Education (DepEd), as a validation tool. The evaluation rating sheet included items that assessed the following factors: Factor A: content; Factor B: format; Factor C: presentation and organization; and Factor D: accuracy and up-to-datedness of information.

The Researcher-made Test

The researcher developed and conducted a validation of the pretest and posttest to ensure the test was both reliable and valid for measuring the intended constructs. The researcher developed a Table of Specifications (TOS), which outlined the identified learning competencies, cognitive levels, and distribution of test items to ensure content alignment. The item pool was created, where test questions were carefully crafted based on the

TOS, considering clarity, difficulty, and discrimination. The researcher intended to conduct this at other schools within the Schools Division of Davao Occidental. The developed test underwent a series of trials, with the first trial focusing on item analysis and the second trial aimed at determining the reliability and internal consistency of the test.

The first trial run was conducted on a sample population to gather initial performance data. Following this, **item** analysis was performed, where each test item was evaluated for item difficulty, item discrimination, and item recommendation. Item analysis helps the researcher improve the tests by showing which questions are too easy or too hard (item difficulty), which ones tell apart high- and low-performing students (item discrimination), and which ones should be kept, revised, or removed (item recommendation) to make the test fairer and more effective. The item analysis of the researcher-made test across Grades 4, 5, and 6 reveals that most test items fell within the acceptable difficulty range (0.30–0.70), ensuring a balanced assessment. In Grade 4, 47 out of 60 items were classified as having average difficulty, with an overall difficulty index of 0.38, while 22 items exhibited good discrimination and 21 were deemed acceptable. Similarly, Grade 5 had a slightly higher difficulty index of 0.45, with 52 items of average difficulty and 26 items accepted based on discrimination analysis. Grade 6 followed a comparable trend, with 51 items of average difficulty and an overall difficulty index of 0.43. The discrimination indices, ranging from 0.30 to 0.33 across the three grade levels, indicate that most test items effectively distinguished high and low-performing pupils. However, a few items were either too easy, too tricky, or lacked sufficient discrimination, leading to recommendations for revision or removal. Revising test items based on item analysis improves the quality of the test by enhancing its validity, reliability, and fairness, as it allows the researcher to identify and modify or remove poorly performing questions, such as those that are too difficult, too easy, or misleading thereby ensuring that the test more accurately measures students' proper understanding and learning outcomes.

A second trial run was conducted to evaluate the effectiveness of the revised test items and ensure improvements in measurement accuracy. The reliability testing was established through statistical methods using the Kuder-Richardson formula 20 (KR-20) to confirm that the test consistently produces stable and accurate results, making it valid for its intended purpose. The reliability and internal consistency of the test across three grade levels, as measured using the Kuder-Richardson Formula 20 (KR-20), indicate that the test was generally reliable for testing. The KR-20 is used to assess the reliability and consistency of test results, especially when the questions have only right or wrong answers. According to Setiabudi et al. (2019), the minimum acceptable reliability score for teacher-made tests must demonstrate a reliability coefficient of 0.60 or greater. Grade 4 pupils achieved a reliability score of 0.86 among the three groups, suggesting a strong internal consistency in their test responses. Grade 5 pupils had a reliability score of 0.67, while Grade 6 pupils recorded a reliability score of 0.62. All three grade levels fall within the acceptable range of reliability, indicating that the students consistently understood and answered the test items. The reliability values for all-item and dichotomous-item analyses further support the test's dependability in measuring pupils' knowledge across the different grade levels.

The Lesson Exemplar

During the lesson delivery, the researcher developed a lesson exemplar in a 5E cycle (engagement, exploration, explanation, elaboration, and evaluation) cycle in a format that guides the implementation of inquiry-based supplementary learning materials (Sotáková & Ganajová, 2023). The cycle entails engaging, exploring, explaining, elaborating, and evaluating while aligning the learning objectives with the least-mastered competencies from DepEd's most essential learning competencies (MELC). The lesson exemplar guided the teacher in executing the lesson flow using the developed inquiry-based supplementary learning material in an inquiry-based learning approach. The lesson exemplar was validated by the experts who were assigned to the grade level. The researcher revised the lesson exemplar based on the feedback and recommendations from the validators. The lesson exemplars were used together with the utilization of the developed inquiry-based supplementary learning materials within the teaching and learning process for the entire duration of the second quarter of the school year 2024-2025.

The Inquiry-Based Supplementary Learning Material

Inquiry-based supplemental learning materials were developed using the Department of Education's (DepEd) guidelines and procedures for LRMDS assessment and evaluation. Five experts of each grade level validated the developed inquiry-based supplementary learning material. Based on the validation results, the validators did

not recommend supplementary learning material for lesson delivery if it failed in at least one of the four evaluation rating factors. However, the validators did not recommend any material that failed factor 4 for lesson delivery until the researcher fixed the identified issues. The researcher considered the comments and suggestions of the validators to enhance the inquiry-based supplementary learning materials.

2.5 Data Gathering Procedure

The study was conducted with official consent from the Office of the Schools Division Superintendent in the Schools Division of Davao Occidental. It involved submitting a letter request, endorsed by the Graduate School, to the office of the Schools Division Superintendent. After receiving approval from the School Division Superintendent, the researcher also submitted a letter requesting permission from the head of the identified school. Upon receiving approval, the researcher initiated the study. The inquiry-based supplementary learning material was developed using the ADDIE model framework. The procedure followed a sequence of steps in each phase.

During the analysis phase, the researcher identified the least mastered competencies in grades four, five, and six during the second quarter of the 2023–2024 school year, based on the consolidated proficiency level report from the School Division of Davao Occidental. When the mastery level indicates low proficiency, the researcher identifies it as the least mastered competency in Science. Using data from the identified least mastered competencies, the researcher chose the learning competencies to be covered in developing the supplementary learning materials. This phase took two weeks from a request from the division office until the least mastered competencies were identified.

In the design phase, the researcher incorporates inquiry-based learning into the supplemental learning materials. The LRMDS's procedures and guidelines suggested by the Department of Education (DepEd) for developing learning resources must be followed (Department of Education, 2011). The researcher also considered the basic requirements when designing the supplemental learning materials, including the language, graphics, structure, chronology, and content. Regarding the technical specifications, the researcher also looked at the paper, binding, pictures, page design, and layout. The design phase requires one week, during which the researcher seeks assistance from the Learning Resource Manager of the Division Office for technical assistance and guidance in designing the material.

After the design phase was identified, the development phase followed. During this stage, the validation process took place. It required experts to validate the materials. Rapada and Servañez (2024) explain that the purpose of the validation was to gather feedback and enhance the supplementary learning material under development. The supplementary learning material was improved based on suggestions and comments from validators. The following factors were considered in validating the materials: content, format, presentation, organization, and accuracy and up-to-date information. The researcher adopted the validation criteria from the evaluation rating sheet for the Learning Resource Management and Development System (LRMDS) print resources. This phase requires a significant amount of time, and the researcher spent four months developing the supplementary learning materials and the lesson exemplars.

Next was the implementation phase. The experimental group utilized the developed and validated supplementary learning material. The pupils and science teachers utilize this supplementary learning material during the lesson delivery based on the identified least-mastered competencies. The teacher was provided with a researcher-created lesson plan, along with supplementary learning materials, to facilitate efficient lesson delivery. One inquiry-based supplementary learning material was developed for each least-mastered competency. Each inquiry-based supplementary learning material consisted of various lessons, depending on the outcome of the unpacked learning competencies. Each pupil received one copy of the inquiry-based supplementary learning material during the implementation. The researcher used field notes or observation notes to monitor the class, ensuring all lesson conduct variables were followed. The researcher randomly observed the classes to ensure the material was effectively used during the lesson. The researcher ensured proper documentation and took field or observation notes after each observation. The observation method used in the study can minimize observer bias by employing structured protocols, standardized checklists, and inter-observer reliability measures, ensuring consistency, objectivity, and accuracy in data collection. Upon the school head's invitation, the researcher facilitated a Learning Action Cell (LAC) session between the science teachers of grades four, five, and six and the school head. Through this LAC session, the science teachers engaged in

collaborative learning sessions and discussed the processes of implementing inquiry-based supplementary learning material during the teaching and learning process. The implementation was conducted over the entire second quarter of the school year, which spans three months.

The evaluation phase was the final stage. This phase determined whether the development of inquiry-based supplementary learning materials affected pupils' mastery of the least mastered competencies through pretests and posttests. The researcher subsequently determined the efficacy of the inquiry-based supplementary learning material. Diestro (2023) suggested using a pretest and posttest, both created by the researcher, to assess the students' level of mastery. Wiltz (2023) indicated that the pretest is to determine the students' prior knowledge and create the first foundation for the scores before implementing the learning materials. To evaluate the effectiveness of the inquiry-based supplemental learning material on the learners, the researcher administered a posttest after they had completed it. It runs within one week before and another week after the intervention is implemented.

To determine the effectiveness of the inquiry-based supplementary learning material, the researcher recorded the scores and compared them to determine whether there was a significant difference between the groups (Wolfson et al., 2015). The researcher also wanted to determine whether the development of inquiry-based supplementary learning materials affected pupils' mastery of the least mastered competencies. Pretest and posttest data were collected, gathered, calculated, and subjected to statistical treatment. The researcher concluded that the inquiry-based supplementary learning material was effective.

2.6. Data Analysis

The researcher followed the general guidelines established by the LRMDS-DepEd when developing inquiry-based supplementary learning materials. Tables 2 and 3 are the descriptive analyses used to interpret the results of validating the inquiry-based supplementary learning materials for factors a, b, and c of the evaluation rating sheet.

Table 2. *Rating Scale and Description for Factors A, B, and C*

Rating Scale	Description
4	Very Satisfactory
3	Satisfactory/Not Applicable
2	Poor
1	Not Satisfactory

Using the scale above, inquiry-based supplementary learning materials must acquire at least 21 points out of a maximum of 28 points to pass the content. To meet the respective criteria, the inquiry-based supplementary learning material must achieve a minimum score of 54 out of 72 points for format and a perfect score of 24 out of 24 for presentation and organization. The researcher used the scale below for factor d, which is the accuracy and up-to-datedness of information.

Table 3. *Rating Scale and Description for Factor D*

Rating Scale	Description
4	Present
3	Present but very minor and must be fixed
2	Present and requires significant development
1	Do not evaluate further

To validate the accuracy and up-to-datedness of information in the material, the inquiry-based supplementary learning material must score 24 out of a maximum of 24 points to pass this criterion. When the material fails to meet the requirements for accuracy and up-to-date information, it is necessary to document all issues in the comments section. Upon failing any of the four criteria in the validation process, the learning material must be revised and revalidated for the relevant criterion before being endorsed for use in the study. Descriptive analysis describes or summarizes a set of data. It interprets the scores given by the group of experts as the validator based on the evaluation rating sheet as the validation tool. The mean scores were calculated to determine the validity of the inquiry-based supplementary learning materials. The mastery level of pupils using the inquiry-based supplementary learning materials was interpreted using the criteria adopted by the Department of Education in the National Achievement Test (NAT) based on DepEd Order No. 160, Series of 2012. The mean percentage score was interpreted in relation to the mastery level and descriptive equivalent, as shown in Table 4.

Table 4. *Mastery Level and Descriptive Equivalent*

Mastery Level Mean Percentage Score (MPS)	Descriptive Equivalent
96-100%	Mastered
86-95%	Closely Approximately Mastery
66-85%	Moving Towards Mastery
35-65%	Average Mastery
16-34%	Low Mastery
5-15%	Very Low Mastery
0-4%	Absolutely No Mastery

**Adopted from the National Achievement Test (NAT) of DepEd*

Mean percentage score (MPS) was used as a basis to determine the mastery level of pupils who were exposed to inquiry-based supplementary learning material using the results of the pretest and posttest scores. On the other hand, the Analysis of Variance (ANOVA) was used to determine the significant difference in pupils' mean pretest and posttest scores, and the result showed a substantial difference at a *p*-value of 0.05.

2.7 Ethical Considerations

To maintain the integrity and ethical standards of the research, this study addressed several ethical considerations. These include informed consent, voluntary participation, data confidentiality, and results communication. The pupils were given an informed consent letter containing all relevant information about the study. The pupil's parent or guardian signed the informed consent letter to confirm their consent to participate. The pupils chose to participate in the study voluntarily, without coercion or undue influence. The researcher told the validators and pupils that they could withdraw from the survey without facing any negative consequences or losing their entitlement to benefits. The researcher guaranteed the confidentiality and secure storage of personal information and responses. The researcher anonymized or coded the data to prevent the identification of individual participants. Only the researcher and an authorized person had access to the data, and any publications or presentations of the results did not include identifiable information. The researcher communicated the results transparently and responsibly. The researcher reported the study's findings honestly and accurately, without any fabrication or falsification. The researcher ensured that the results were accessible to participants and other stakeholders through summaries or reports that understandably explained the findings. This study was approved by the University Research Ethics Board of Notre Dame of Dadiangas University, General Santos City. All procedures involving human participants were conducted according to the ethical standards of the institution's research committee.

3.0 Results and Discussion

3.1. Least Mastered Competencies

The following tables outline the learning competencies in Key Stage 2 for the second quarter, under the domain of Living Things and Their Environment, for the school year 2023-2024. The table displays the mean percentage score for learning competencies and the corresponding proficiency level.

Table 5. *Identified Least Mastered Competencies in Science 4 in the Second Quarter, "Living Things and Their Environment" for School Year 2023-2024*

Learning Competencies	Mean Percentage Score	Proficiency Level
"Describe the main function of the major organs."	52%	Nearly Proficient
"Communicate that the major organs work together to make the body function properly."	33%	Low Proficient
"Infer that body structures help animals adapt and survive in their particular habitat."	45%	Low Proficient
"Identify the specialized structures of terrestrial and aquatic plants."	64%	Nearly Proficient
"Compare the stages in the life cycle of organisms."	76%	Proficient
"Describe the effect of the environment on the life cycle of organisms."	38%	Low Proficient
"Describe some types of beneficial and harmful interactions among living things."	31%	Low Proficient
"Describe the effects of interactions among organisms in their environment."	61%	Nearly Proficient

*Legend: Highly Proficient- 90 %-100 %, Proficient- 75 %-89%, Nearly Proficient- 50%-74%, Low Proficient25%-49%, Not Proficient- 0%-24%

As shown in Table 5, the lowest proficiency level falls within the range of 25%-49% was observed in learning competency of "communicating that the major organs work together to make the body function properly," "inferring that body structures help animals adapt and survive in their particular habitat," "describe the effect of the environment on the life cycle of organisms," and "describing beneficial and harmful interactions among living things." In contrast, the remaining learning competency falls within a nearly proficient to proficient level.

Table 6. *Identified Least Mastered Competencies in Science 5 in Second Quarter, "Living Things and Their Environment" for School Year 2023-2024*

Learning Competencies	Mean Percentage Score	Proficiency Level
"Describe the parts of the reproductive system and their functions."	56%	Nearly Proficient
"Explain the menstrual cycle"	71%	Nearly Proficient
"Describe the different modes of reproduction in animals such as butterflies, mosquitoes, frogs, cats, and dogs."	32%	Low Proficient
"Describe the reproductive parts in plants and their functions."	81%	Proficient
"Describe the different modes of reproduction in flowering and non-flowering plants such as moss, fern, mongo, and others."	41%	Low Proficient
"Discuss the interactions among living things and non-living things in estuaries and intertidal zones."	39%	Low Proficient
"Explain the need to protect and conserve estuaries and intertidal zones."	47%	Low Proficient

*Legend: Highly Proficient- 90 %-100 %, Proficient- 75 %-89%, Nearly Proficient- 50%-74%, Low Proficient-25%-49%, Not Proficient- 0%-24%

In Table 6, low proficient learning competencies were indicated in "describing the different modes of reproduction in animals such as butterflies, mosquitoes, frogs, cats, and dogs," "describing the different modes of reproduction in flowering and non-flowering plants such as moss, fern, mongo, and others," "discussing the interactions among living things and non -living things in estuaries and intertidal zones," and "explaining the need to protect and conserve estuaries and intertidal zones." Meanwhile, other learning competencies were classified as nearly proficient.

Table 7. *Identified Least Mastered Competencies in Science 6 in Second Quarter, "Living Things and Their Environment" for School Year 2023-2024*

Learning Competencies	Mean Percentage Score	Proficiency Level
"Explain how the organs of each organ system work together."	28%	Low Proficient
"Explain how the different organ systems work together."	32%	Low Proficient
"Determine the distinguishing characteristics of vertebrates and invertebrates."	70%	Nearly Proficient
"Discuss the interactions among living things and non-living things in tropical rainforests, coral reefs, and mangrove swamps."	45%	Low Proficient
"Explain the need to protect and conserve tropical rainforests, coral reefs, and mangrove swamps."	79%	Proficient

*Legend: Highly Proficient- 90 %-100 %, Proficient- 75 %-89%, Nearly Proficient- 50%-74%, Low Proficient-25%-49%, Not Proficient- 0%-24%

The learning competencies "explain how the organs of each organ system work together," "explain how the different organ systems work together," and "discuss the interactions among living things and non-living things in tropical rainforests, coral reefs, and mangrove swamps," respectively, are categorized under the low proficient level. Notably, the two remaining learning competencies belong to the nearly proficient and proficient levels. The findings highlight the need for targeted instructional interventions to improve student proficiency in the Science of Key Stage 2, particularly in "understanding organ systems, interactions among organisms, and environmental conservation." Teachers should integrate more hands-on activities, such as models and simulations, to enhance comprehension of abstract biological concepts. Additionally, interdisciplinary approaches that connect Science with real-life scenarios, such as environmental field studies and health education, could help reinforce learning and increase student engagement. Methodologically, these findings emphasize the importance of differentiated instruction, where students receive tailored support based on their proficiency levels to address gaps effectively. Moreover, formative assessments and diagnostic tools throughout the quarter can provide teachers with timely feedback to adjust teaching strategies, ensuring mastery of critical competencies.

The study's findings align with the previous research by Mahardika and Putra (2020), who emphasized that low proficiency in Science means students struggle to grasp fundamental concepts about the natural world. It can hinder their ability to relate scientific knowledge to real-life situations, which is crucial for developing critical thinking skills. It agrees with the previous study of Purkat and Devetak (2023), which explains that learners without sufficient exposure to interactive and inquiry-based learning, students may find it challenging to apply theoretical knowledge to real-life situations, limiting their ability to develop critical thinking and problem-

solving skills that would lead to low proficient in academic performance in Science. Umara (2022) also explained that one contributing factor to these low proficiency levels is the ineffective use of diverse teaching strategies, leading to low student engagement and retention of scientific concepts. Research suggests that interactive and hands-on instructional methods, such as demonstrations and inquiry-based learning, significantly enhance student comprehension and learning outcomes.

The findings reveal that several learning competencies in Science for Grades 4 to 6 were categorized under low proficiency, particularly in understanding organ systems, interactions among organisms, and reproduction in animals and plants. These results highlight the need for targeted interventions to strengthen students' comprehension of these fundamental scientific concepts. It is recommended that educators implement differentiated instruction strategies, such as hands-on activities and visual representations, to enhance students' understanding of complex biological processes. Additionally, integrating interactive and inquiry-based learning approaches, including experiments and real-world applications, can further support mastery of these least proficient competencies.

3.2. Development of Inquiry-Based Supplementary Learning Materials

The subsequent tables present the identified least mastered competencies in Science for key stage 2, serving as the basis for developing inquiry-based supplementary learning materials. A table also outlines the parts, purpose, and description of the developed inquiry-based supplementary learning materials in Science. Table 8 shows the least mastered competencies in Science across the three grade levels. The grade 4 and 5 levels have four identified least mastered competencies, while the grade 6 level has three least mastered competencies. These least mastered competencies served as the basis for developing the inquiry-based supplementary learning materials.

Table 8. *Least Mastered Competencies in Science in Key Stage 2 Basis for the Development of Inquiry-Based Supplementary Learning Materials*

Grade Level	Least Mastered Competencies
4	"Communicate that the major organs work together to make the body function properly."
	"Infer that body structures help animals adapt and survive in their particular habitat."
	"Describe the effect of the environment on the life cycle of organisms."
	"Describe some types of beneficial and harmful interactions among living things."
5	"Describe the different modes of reproduction in animals such as butterflies, mosquitoes, frogs, cats, and dogs."
	"Describe the different modes of reproduction in flowering and non-flowering plants such as moss, fern, mongo, and others."
	"Discuss the interactions among living things and non-living things in estuaries and intertidal zones."
	"Explain the need to protect and conserve estuaries and intertidal zones."
6	"Explain how the organs of each organ system work together."
	"Explain how the different organ systems work together."
	"Discuss the interactions among living things and non-living things in tropical rainforests, coral reefs, and mangrove swamps."

Below are the key findings on the parts, purposes, and descriptions of the developed learning materials, as detailed in Table 9. Inquiry-Based Supplementary Learning Material refers to educational resources designed to support and enhance student learning through inquiry-based learning (IBL)**.** These materials encourage students to explore concepts, ask questions, investigate, and construct knowledge through hands-on activities and critical thinking. The developed inquiry-based supplementary learning materials comprise five key parts, each designed to address specific stages of the learning process. The section "Get Ready to Discover!" serves as the activation phase, sparking students' curiosity by introducing the lesson's theme through relatable real-life scenarios, thought-provoking questions, or visually stimulating prompts. This section sets the stage for inquiry by connecting students' prior knowledge to new concepts, fostering an initial sense of engagement and relevance. Next, "Go on a Journey!" provides opportunities for experiential learning, where students engage in hands-on activities such as experiments and guided investigations. This part emphasizes active exploration, critical thinking, and collaboration, ensuring that students directly interact with the subject matter and test their ideas.

Following exploration, "Let's Figure It Out!" facilitates the processing and interpretation of data or experiences. In this phase, students analyze their findings, draw conclusions, and connect their observations to scientific principles. This critical thinking stage deepens understanding and clarifies misconceptions under the guidance of the teacher. Moving beyond the basics, "Let's Dig Deeper!" extends learning by introducing advanced

concepts, real-world applications, and cross-disciplinary connections, enriching students' comprehension and inspiring further inquiry. The final section is titled "Take This Challenge!" It is an assessment phase, allowing students to independently apply their knowledge and skills through performance tasks, creative projects, or problem-solving activities.

Table 9. *Parts and its Purpose and Description of the Developed Inquiry-Based Supplementary Learning Materials in Science*

Part	Purpose	Description
Get Ready to Discover!	To activate prior knowledge and spark curiosity about the topic.	This section introduces the lesson's theme or concept using real-life scenarios, thought-provoking questions, or intriguing visuals. It sets the context for inquiry and prepares learners to engage with the topic by building a strong foundation. Teachers use it to connect students' existing knowledge with new concepts.
Go on a Journey!	To encourage experiential learning through hands-on activities and exploration.	Learners actively explore the topic through structured tasks, experiments, or guided investigations. This section fosters inquiry and critical thinking, allowing students to observe, hypothesize, and test their ideas. Teachers guide this process to ensure alignment with lesson objectives while promoting collaboration and engagement.
Let's Figure It Out!	To guide learners in analyzing and reflecting on their observations and findings.	Students process and interpret data or experiences gathered during exploration. This section encourages critical thinking, helping learners analyze results, draw conclusions, and link their observations to scientific principles. Teachers use this part to clarify misconceptions and scaffold understanding for deeper comprehension.
Let's Dig Deeper!	Extend learning by introducing advanced concepts, real-world applications, and cross-disciplinary connections.	This section challenges students to think beyond the basics by exploring broader implications, applications, or complex ideas. It may include additional resources like readings or case studies. Teachers use it to enrich understanding, demonstrate the relevance of Science, and inspire curiosity for further exploration.
Take This Challenge!	To assess learning and encourage independent application of knowledge and skills.	Students apply their learning through performance tasks, problem-solving activities, or creative projects. This section assesses mastery of content and skills like critical thinking and creativity. Teachers can use it as a summative or formative assessment tool, fostering reflection and celebrating students' progress and achievements.

Based on the developed learning materials, educators can use these materials to activate prior knowledge, promote hands-on learning, and encourage critical thinking, ensuring a more interactive and student-centered learning experience. The structured framework of these materials supports inquiry-based teaching by providing clear stages that align with effective pedagogical strategies. Educators can integrate these materials into various instructional settings, ensuring consistency in science lessons and promoting experiential learning. The study conducted by Dewi (2024) explains that developing supplementary learning materials using an inquiry-based learning model can significantly enhance students' science process skills. It is essential as these skills are foundational for understanding scientific concepts and conducting experiments effectively.

In the same way, the study of Sari Wulandari (2023) presents that inquiry-based learning encourages students to participate actively in their education. This approach encourages curiosity and critical thinking, enabling students to delve more deeply into scientific concepts. The study's findings support the idea that when students engage in inquiry, they are more likely to develop a genuine interest in Science, leading to better learning outcomes. It is concluded that the developed inquiry-based supplementary learning materials provide structured and flexible learning experiences that integrate real-world applications and active exploration. They comprise an interconnectedness section that promotes inquiry-based learning, such as "Get Ready to Discover!" "Go on a Journey!" "Let's Figure it Out!" "Let's Dig Deeper!" and "Take This Challenge!" It is recommended that teachers integrate these learning materials into their science instruction to promote inquiry-based learning inside the classroom. The school, district, and school division may intensify the conduct of workshops and teacher training through the Learning Action Cell (LAC), In-Service Training for Teachers (INSET), and Collaborative Expert Sessions for teachers on developing learning materials in an inquiry-based learning approach.

3.3. Validation of the Inquiry-Based Supplementary Learning Material

The following validation findings were conducted on all developed inquiry-based supplementary learning materials in key stage 2. The validation encompasses the content, format, presentation, and organization, as well as the accuracy and up-to-datedness of the information in the developed inquiry-based supplementary learning

materials. Table 10 shows the result of validating the developed inquiry-based supplementary learning material for Science 4, aligned with the Department of Education's criteria for print materials. It indicates that all learning competencies and criteria were met.

Table 10. *Results of Validation for the Developed Inquiry-Based Supplementary Learning Material in Science 4 based on he criteria for Print Materials provided by the Department of Education-DepEd*

Criteria	Validator					Mean Score	Remarks
	1	2	3	4	5		
Learning Competency: "Describe the Main Function of the Major Organs"							
Content	25	25	24	26	22	24.40	Passed
Format	65	63	62	62	68	64.00	Passed
Presentation and Organization	19	20	18	19	17	18.60	Passed
Accuracy and Up-to-dateness of information	24	24	24	24	24	24.00	Passed
Learning Competency: "Infer that body structures help animals adapt and survive in their particular habitat."							
"Content"	24	27	25	28	27	26.20	Passed
"Format"	62	72	64	69	65	66.40	Passed
"Presentation and Organization"	19	19	17	19	20	18.80	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed
Learning Competency: "Describe the effect of the environment on the life cycle of organisms."							
"Content"	21	25	24	23	24	23.40	Passed
"Format"	54	63	63	64	57	60.20	Passed
"Presentation and Organization"	15	18	18	17	16	16.80	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed
Learning Competency: "Describe some types of beneficial and harmful interactions among living things."							
"Content"	28	25	26	24	23	25.20	Passed
"Format"	72	55	67	65	64	64.60	Passed
"Presentation and Organization"	20	20	18	18	16	18.40	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed

The validation of learning materials across different competencies showed consistently passing scores in all criteria. The competency in "describing the primary function of major organs" achieved a passing remark on the validation. Similarly, the learning competency on "inferring that body structures help animals adapt and survive in their particular habitat" showed passing comments. Although the competency in "describing the effect of the environment on the life cycle of organisms" had slightly lower ratings in some areas, it still met the criteria. In contrast, the competency in "describing beneficial and harmful interactions among living things" met the requirements and indicated passing remarks.

Table 11 presents the results of validating the inquiry-based supplementary learning material in Science 5. The validation of the supplementary learning material confirmed their alignment with DepEd criteria, as all areas received passing marks. The learning competency in "describing the different modes of reproduction in animals such as butterflies, mosquitoes, frogs, cats, and dogs" showed passing remarks in all criteria. Similarly, the learning competency in "describing the different modes of reproduction of flowering and non-flowering plants such as moss, fern, mongo, and others" marks passing scores across all criteria. Additionally, the learning competencies on "discussing the interactions among the living things and non-living things in estuaries and intertidal zones" and "explaining the need to protect and conserve the estuaries and intertidal zones" reflected compliance with the criteria and indicated passing remarks.

The validation results confirmed that the developed inquiry-based supplementary learning material in Science 6 successfully met the criteria for print materials across all learning competencies. The learning competency in "explaining how organ systems work together" demonstrated passing remarks across all requirements. Similarly, the learning competency in "explaining how different organ systems work together" reflected passing remarks on all validation criteria. The learning competency in "discussing the interactions among living things and non-living things in tropical rainforests, coral reefs, and mangrove swamps" also showed passing scores across the criteria. The findings of the validation of the inquiry-based supplementary learning materials confirm their effectiveness in aligning with educational standards, ensuring that students receive accurate and well-structured content to support their learning. It implies that the positive validation results reinforce the reliability of the instructional framework, demonstrating that the materials adhere to established pedagogical principles

and meet the Department of Education's criteria for quality print materials. Additionally, these findings highlight the importance of continuous evaluation and refinement in curriculum development, emphasizing that validated instructional resources can enhance student engagement and comprehension while maintaining accuracy and relevance in science education.

Table 11. *Results of Validation for the Developed Inquiry-Based Supplementary Learning Material in Science 5 based on the Criteria for Print Materials provided by the Department of Education-DepEd*

Criteria	Validator					Mean Score	Remarks
	1	2	3	4	5		
Learning Competency: "Describe the different modes of reproduction in animals such as butterflies, mosquitoes, frogs, cats, and dogs."							
"Content"	25	27	25	24	26	25.40	Passed
"Format"	65	69	66	68	89	71.40	Passed
"Presentation and Organization"	18	16	17	19	17	17.40	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed
Learning Competency: "Describe the different modes of reproduction in flowering and non-flowering plants such as moss, fern, mongo, and others."							
"Content"	23	27	26	23	22	24.20	Passed
"Format"	61	69	66	61	71	65.60	Passed
"Presentation and Organization"	18	16	18	16	19	17.40	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed
Learning Competency: "Discuss the interactions among the living things and non-living things in estuaries and intertidal zones."							
"Content"	24	25	24	24	22	23.50	Passed
"Format"	59	63	64	64	59	61.80	Passed
"Presentation and Organization"	18	20	18	17	16	17.80	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed
Learning Competency: "Explain the need to protect and conserve estuaries and intertidal zones."							
"Content"	25	26	24	25	28	25.60	Passed
"Format"	61	68	68	65	72	66.80	Passed
"Presentation and Organization"	18	19	18	20	20	19.00	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed

Table 12. *Results of Validation for the Developed Inquiry-Based Supplementary Learning Material in Science 6 based on The Criteria for Print Materials provided by the Department of Education-DepEd*

Criteria	Validator					Mean Score	Remarks
	1	2	3	4	5		
Learning Competency: "Explain how the organs of each organ system work together."							
"Content"	26	26	24	28	24	25.60	Passed
"Format"	66	71	66	67	62	66.40	Passed
"Presentation and Organization"	19	18	16	20	16	17.80	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed
Learning Competency: "Explain how the different organ systems work together."							
"Content"	26	26	26	27	25	26.00	Passed
"Format"	66	69	68	67	65	67.00	Passed
"Presentation and Organization"	18	23	18	20	20	19.80	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed
Learning Competency: "Discuss the interactions among living things and non-living things in tropical rainforests, coral reefs, and mangrove swamps."							
"Content"	28	26	27	29	27	27.40	Passed
"Format"	67	54	61	56	72	62.00	Passed
"Presentation and Organization"	23	18	17	18	20	19.20	Passed
"Accuracy and Up-to-dateness of information"	24	24	24	24	24	24.00	Passed

The study of Alfin et al. (2024) suggests that the development of learning materials should be well-aligned with educational standards and effectively support the learning objectives related to scientific attitudes. Valid content is crucial for ensuring that students engage with accurate and relevant information, thereby enhancing their

understanding and interest in the subject matter. In the same way, a well-organized format helps students navigate the materials quickly, facilitating a smoother inquiry process. A previous study by Edillor (2024) suggested that effective presentations can incorporate bullet points, diagrams, and summaries that highlight key concepts, thereby facilitating students' understanding of essential ideas. Learning materials that are well-organized and easy to navigate allow students to focus on the inquiry process rather than getting lost in confusing layouts or excessive information. When information is structured in a way that guides students through their investigations, it helps them build on prior knowledge and make connections between different concepts.

Aligning with the conclusions of the study conducted by Altares (2024), the learning materials must undergo a thorough review by experts, ensuring that the information presented in the materials is accurate. Students rely on the correctness of the information to build their understanding of complex concepts. As to the up-to-dateness of the information, the materials are based on current scientific knowledge and practices. It concludes that the developed inquiry-based supplementary learning material for Science in key stage 2 meets the DepEd-LRMDS criteria for print materials. All the learning competencies across grade levels received passing marks in content, format, presentation, organization, accuracy, and up-to-date information. These findings recommend that this developed and validated inquiry-based supplementary learning material in key stage 2 may be published in the LRMDS portal of the Department of Education (DepEd). In this way, continuous review, refinement, and incorporation of feedback from experts from the DepEd Central office ensure that the content remains accurate, engaging, and aligned with the latest scientific knowledge and educational best practices.

3.4. Mastery Level of the Pupils before and After Using the Inquiry-Based Supplementary Learning Materials

The mean percentage score of both the pretest and posttest is presented in Table 13. The table also reflects the number of learners tested, the number of items, and their corresponding descriptive interpretation. As shown in Table 13, with 42 participants and a 30-item test, the pretest mean percentage score was 49.13%, which falls under the descriptive interpretation of "average mastery." Following the intervention, the posttest mean percentage score increased to 74.60%, categorized as "moving towards mastery."

Table 13. *Pretest and Posttest Mean Percentage Score and its Descriptive Interpretation in Science 4*

Construct	N	Number of Items	Mean Percentage Score	Descriptive Interpretation
Pretest	42	30	49.13	Average Mastery
Posttest	42	30	74.60	Moving Towards Mastery

As shown in Table 14, the results of the pretest and posttest are presented as mean percentage scores along with their descriptive interpretations. Based on the results in the table above, the pretest mean percentage score was 45.00, indicating an "average mastery" level of understanding before the intervention. However, after the intervention, the posttest mean percentage score increased to 67.76, corresponding to a "moving toward mastery" level of proficiency.

Table 14. *Pretest and Posttest Mean Percentage Score and its Descriptive Interpretation in Science 5*

Construct	N	Number of Items	Mean Percentage Score	Descriptive Interpretation
Pretest	52	30	45.00	Average Mastery
Posttest	52	30	67.76	Moving Towards Mastery

The results in Table 15 show the mastery level of Science 6 students, as shown by their mean percentage scores from the pretest to the posttest. The pretest mean percentage score is 39.25, corresponding to an "average mastery" level. After the intervention, the posttest mean percentage score rose to 69.62, signifying a "moving towards mastery" level of understanding. The significant improvement in students' mastery levels after using the inquiry-based supplementary learning materials demonstrates the effectiveness of enhancing conceptual understanding and retention in Science. It implies that the results validate the effectiveness of inquiry-based learning as a pedagogical approach, supporting its role in fostering active student engagement and deeper comprehension. Furthermore, the findings highlight the importance of incorporating supplementary materials into instruction, suggesting that structured and flexible intervention strategies can help bridge learning gaps and contribute to learners' overall academic progress.

Table 15. *Pretest and Posttest Mean Percentage Score and its Descriptive Interpretation in Science 6*

Construct	N	Number of Items	Mean Percentage Score	Descriptive Interpretation
Pretest	62	30	39.25	Average Mastery
Posttest	62	30	69.62	Moving Towards Mastery

The findings support the previous study of Sapriyadin et al. (2023), which explains that when learning materials are relevant, students are more likely to engage meaningfully with them. They also expound that students actively involved in the learning process, such as through hands-on experiments and discussions, tend to achieve better mastery of concepts. Engaging students in inquiry-based activities enables them to explore and discover new ideas, resulting in a deeper understanding and enhanced retention of knowledge. Furthermore, according to Ruzaman and Rosli's (2020) study, inquiry-based learning materials should actively engage students in the learning process. When students are involved in hands-on activities and experiments, they are more likely to develop a deeper understanding of the subject matter. This engagement promotes curiosity and motivation, which are essential for effective learning. The findings conclude that there was a significant improvement in the mastery level in Science of key stage 2 pupils after using the inquiry-based supplementary learning materials, as evidenced by the increase in their mean percentage scores from average mastery in the pretest to moving toward mastery in the posttest. It is recommended that the inquiry-based supplementary learning materials be continuously utilized and further enhanced to sustain and improve pupils' mastery levels while also exploring their integration into other subject areas to maximize their effectiveness.

3.5. Difference in the Mean Pretest and Posttest Scores of the Pupils

The tables below show the study's significant findings regarding pupils' mean pretest and posttest scores. It presents the values used to determine the important difference between the pretest and posttest using the ANOVA analysis. Table 16 presents the considerable differences between the pretest and posttest scores of pupils in Science 4. Table 16 shows that analysis of the pretest and posttest results revealed a sum of squares of 2.279 across 15 degrees of freedom, yielding a mean square of 0.152 with a standard deviation of ±0.39. The computed F-value of 0.552 and p-value of 0.900 indicate no statistically significant difference between the pretest and posttest scores.

Table 16. *Significant Difference in the Mean Pretest and Posttest Scores of Grade 4 Pupils*

Measure	Sum of Squares	df	Mean Square	SD	F	p	Remarks
Test (Pretest and Posttest)	2.27	15	.15	±0.39	.55	.900	Not Significant

Note: alpha level = 0.05

Based on Table 17, the pretest and posttest results analysis revealed a statistically significant difference in performance, as indicated by an F-value of 3.731 and a p-value of .000, below the accepted significance level. With a sum of squares of 12.705 distributed across 21 degrees of freedom, the mean square value was calculated at .605, with a standard deviation of ±0.78. It indicates a significant difference in the pretest and posttest mean scores of Grade 5 pupils before and after using the inquiry-based supplementary learning material.

Table 17. *Significant Difference in the Mean Pretest and Posttest Scores of Grade 5 Students*

Measure	Sum of Squares	df	Mean Square	SD	F	p	Remarks
Test (Pretest and Posttest)	12.70	21	.60	±0.78	3.73	.000	Significant

Note: alpha level = 0.05

Table 18 presents the significant difference in the mean pretest and posttest scores of Grade 6 students. The analysis of the test scores between the pretest and posttest revealed a considerable difference, as indicated by the F-value of 6.205 and a p-value of .000, which is below the accepted significance level. With a mean square of .903 and a standard deviation of ±0.95, the results suggest notable improvements in performance following the intervention.

Table 18. *Significant Difference in the Mean Pretest and Posttest Scores of Grade 6 Pupils*

Measure	Sum of Squares	df	Mean Square	SD	F	p	Remarks
Test (Pretest and Posttest)	15.35	17	.90	±0.95	6.20	.000	Significant

Note: alpha level = 0.05

Table 19 shows the statistical analysis comparing the pretest and posttest results. The scores significantly improved, as indicated by an F-value of 10.842 and a p-value of .000, below the standard significance level of 0.05. The computed mean square value of 1.603, derived from the sum of squares of 35.269 and degrees of freedom of 22, further supports the substantial variation observed between the test phases. With a standard deviation of ±1.27, the results confirm a consistent pattern of performance enhancement.

Table 19. *Significant Difference in the Mean Pretest and Posttest Scores across the Three Grade Level*

Measure	Sum of Squares	df	Mean Square	SD	F	p	Remarks
Test (Pretest and Posttest)	35.26	22	1.60	±1.27	10.84	.000	Significant

Note: alpha level = 0.05

The lack of significant differences in the pretest and posttest scores of Grade 4 pupils implies that the instructional approach may not have been effective in enhancing student learning, possibly due to factors such as the complexity of the material, engagement levels, instructional delivery, or the duration of the intervention. Additionally, external factors such as motivation, prior knowledge, or classroom environment may have influenced the results, highlighting the necessity for further investigation to optimize instructional effectiveness. However, the results of grades 5 and 6 suggest that the inquiry-based supplementary learning material employed had a substantial impact on student learning outcomes. The significant increase in scores suggests that students could grasp and apply the concepts more effectively post-intervention, highlighting the effectiveness of the educational approach. The substantial increase in scores implies enhanced comprehension and mastery of the subject matter, demonstrating the efficacy of the inquiry-based supplementary learning material.

The study's finding aligns with the reports of Martínez (2022), who revealed that the differences in students' prior knowledge and experiences can also contribute to the lack of significant change in scores. If students come from diverse backgrounds with varying levels of exposure to various concepts, this can affect their performance on standardized tests. Additionally, the amount of time allocated for instruction and practice may not be sufficient for students to fully grasp the learning material. If the learning competency is rushed or students lack opportunities to practice, their scores may not reflect their potential improvement. Consequently, the researcher viewed the findings as having no significant difference because they relate to the language barrier learners face when transitioning from their mother tongue *(Bisaya)* to the English language used in teaching Science concepts. The study by Naketsana (2019) indicates that learners in Grade 3 faced reading and writing difficulties, as well as low proficiency in English. These challenges can persist into Grade 4, affecting their assessment performance and leading to no significant improvement in scores.

The results showed the positive impact of inquiry-based supplementary learning materials. According to Kliziene et al. (2020), significant differences in mean pretest and posttest scores indicate that students have made measurable progress in their academic performance. This improvement can be attributed to effective teaching methods, learning materials, or interventions. Additionally, notable changes in scores indicate that the employed strategies or interventions are effective. The significant result of the mean scores for both the pretest and posttest of grade 6 pupils in the study of Baysal et al. (2022) reported that the important difference between the pretest and posttest scores indicates that the students' scientific process skills improved after the intervention. Supplementary materials, when used in an inquiry-based approach, can increase student engagement and motivation. The interactive nature of these learning materials allows students to take an active role in their learning, which is crucial for mastering complex scientific concepts (Baysal et al., 2022).

Inquiry-based supplementary learning materials significantly enhance the mastery level of pupils across the three grade levels, leading to improved mastery levels. This approach encourages pupils to explore and investigate, resulting in a deeper understanding of complex concepts. Based on the study of Kurais et al. (2023), students using inquiry-based learning methods achieved a mastery percentage of 92.60% compared to 29.63% in traditional settings. Similarly, research by Sapriyadin et al. (2023) highlighted significant differences in concept mastery between students engaged in inquiry-based learning and those using conventional methods, particularly in subjects like Science. Additionally, inquiry-based learning promotes higher-order thinking skills, enabling students to develop problem-solving abilities.

The findings indicate that while there was no significant improvement in the pretest and posttest scores of Grade 4 pupils, the use of the inquiry-based supplementary learning material led to statistically significant improvements in the performance of Grade 5 and Grade 6 pupils, with a notable overall enhancement across the three grade levels. It is recommended that future researchers conduct studies on the effectiveness of inquiry-based supplementary learning materials in different learning environments. Furthermore, it may also test the efficacy of the inquiry-based supplementary learning materials in Junior High School (JHS) and Senior High School (SHS) in various domains of the Science subject.

4.0 Conclusion

This study significantly addresses the learning gaps in Science among Key Stage 2 learners, particularly in the interdependence of living things, body structures, reproduction, and environmental conservation. The development and utilization of the inquiry-based supplementary learning materials provided a structured, engaging, and learner-centered approach that effectively supported the development of scientific understanding. Organized into five purposeful sections—*Get Ready to Discover!*, *Go on a Journey!*, *Let's Figure It Out!*, *Dig Deeper!*, and *Take This Challenge!*—the materials activated prior knowledge, encouraged exploration, and deepened conceptual comprehension while ensuring learning assessment. Meeting the Department of Education's LRMDS standards, the materials aligned strongly with content, format, and accuracy requirements. The improvement in the mastery levels of learners, particularly in Grades 5 and 6, as evidenced by the statistically significant differences in their pretest and posttest scores, highlights the effectiveness of the intervention. Although no significant difference was observed in Grade 4, the overall trend toward mastery suggests a promising impact. Future studies may further refine the materials for younger learners by integrating digital components and enhancing scalability across broader contexts to improve science instruction and learning outcomes nationwide.

5.0 Contributions of Authors

The authors attest that each section of this work was equally contributed to. All authors examined and approved the final draft.

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7.0 Conflict of Interests

There is no conflict of interest

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AI Transformation in the Workplace: A Comprehensive Review of Trends and Future Directions

Beberly T. Calugan*[1], Irene P. Tanyag[2], Romer D. Tanyag[3] Anderson G. Dawigi[4]
[1,2,4]Baguio Central University, Baguio City, Philippines
[3]University of Baguio, Baguio City, Philippines

*Corresponding Author Email: leanryuzai@gmail.com

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Abstract. This study examines the multifaceted impacts of emerging artificial intelligence (AI) advancements on the global workforce, striking a balance between worker equity and AI-driven efficiency. The primary objectives are to examine the impacts of AI on automation, skill requirements, job displacement, and ethical concerns, and to propose suitable AI integration techniques. This study identifies key trends and their effects by employing a comprehensive literature review of academic research, industry reports, and policy documents. The main findings show that while AI increases productivity through automation and skill augmentation, it also necessitates significant workforce reskilling and presents serious ethical challenges regarding bias, privacy, and job security. This study highlights the importance of flexible regulatory frameworks and the growing significance of lifelong learning programs. Key discoveries in ethical AI research, precise algorithms, fair labor standards, and a human-centered approach to AI integration are highlighted. Moreover, this research underscores the need for collaboration among governments, businesses, and universities to ensure a just and sustainable AI-driven workforce. Based on this research, proactive reskilling and rigorous ethical standards are essential for managing the transformative impacts of AI on the labor force.

Keywords: Artificial intelligence; Automation; Ethical AI; Job displacement; Workforce transformation.

1.0 Introduction

The rapid dissemination of artificial intelligence (AI) is not just a technical advancement but a substantial socio-economic shift reshaping the global labor market, presenting both opportunities and challenges that will impact advanced and emerging economies differently, potentially increasing income and wealth inequality but also offering substantial productivity gains if managed effectively through appropriate regulatory frameworks, labor reallocation support, digital infrastructure development, and digital skills enhancement (Cazzaniga et al., 2024). Given AI's widespread impact over the globe—making most of the tasks that once had the human touch and at the same time posing unprecedented questions and offering tremendous opportunities—the integration of Artificial Intelligence (AI) will profoundly reshape the nature of work in the future, leading to significant transformations in job roles, workforce dynamics, and required skills. Examining these changes to prepare for the evolving landscape is crucial. This job is to scan those impacts – the ones that lead to the labor market, the skills necessary, the ethical shorts, and the socio-economic justice – and to think about the debate.

A central concern revolves around the potential for AI-driven automation to displace human labor, particularly in sectors reliant on repetitive tasks (Morandini et al., 2023; Patil, 2024). However, understanding AI's capability

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to augment human intellect requires a profound perspective, giving rise to a collaborative paradigm where technology complements and enhances human technical skills rather than supplanting them. Until now, unlocking the potential has been so close to how workforce development strategically and proactively approaches challenges. Above all, reskilling and upskilling are crucial. The underlying idea is the transfer of conventional training to the building of learning situations where adaptability, critical thinking, and advanced technical capabilities are the primary components of the skills to be developed (Patil, 2024).

As AI technology spreads faster than ever and the difference in wages between the rich and the poor rises, people's fear of losing jobs to robots increases, which also causes them to seek advice from the authorities on how to deal with the challenges that such technology brings to jobs (Frank et al., 2019). Scientists are unable to accurately forecast how AI and automation will change the future of work because they lack enough high-quality data about the nature of work, models of key micro-level processes based on actual data, or knowledge of how artificial intelligence and automation interact with more significant financial and institutional mechanisms (Frank et al., 2019). The worldwide influence of AI calls for a fully multinational approach (Pavashe et al., 2023). Handling human doubt involves understanding human-computer interaction, capital's initial investment requirements, and their effects on logistics and governance (Malhotra et al., 2023). Adapting the workforce through upskilling and retraining programs is crucial for navigating AI-driven environments (Patil, 2024). While AI enhances productivity, it also poses the risk of job displacement and transformation across various sectors (Frank et al., 2019).

The dual nature of AI's impact on jobs, predicting both displacement and creation of roles. It cites studies showing that AI could replace 300 million full-time jobs globally by 2030 while driving productivity and economic growth, adding up to $13 trillion in global economic activity by 2030 (Talmage-Rostron, 2024). The reasons for both sides are work automation through AI, the decision-making benefits it provides, and the two results from this situation. The future, shaped through a balanced approach, will require responsible development and regulation (Patil, 2024; Pavashe et al., 2023; Frank et al., 2019). Artificial intelligence applications in the workplace foster job creation and enhance productivity (Tiwari, 2023). Studies have reported that AI is advantageous as it makes operations more productive, provokes debate on morality, and involves the need to develop expertise. In the future, researchers must focus on developing AI that can easily replace human roles without incurring adverse financial consequences. Understanding how AI affects people's skills helps us comprehend its potential to enhance or hinder human success. Capraro et al. (2024) argue that the ethical theory of "Ethics of Care" is essential to understanding how AI affects global poverty and politics.

Current trends in AI workplace transformation include automating repetitive tasks, enhancing decision-making, and evolving job roles. AI-driven automation streamlines operations, allowing employees to focus on complex problem-solving (Ayanponle et al., 2024; Aldoseri et al., 2024). AI applications will likely enhance various business and production metrics, extending beyond factory operations to enable quicker responses to customer needs and more effective management of process deviations while offering insights into the future of supply chain management and learning (Walter, 2023). AI also enhances decision-making by providing data-driven insights, enabling organizations to predict patterns and personalize services (Prasanth et al., 2023; Zaman, 2022). Its ability to analyze vast datasets and automate tasks streamlines marketing operations and improves customer engagement (Ziakis & Vlachopoulou, 2023; Alghizzawi et al., 2024).

Evolution plays a significant part in AI's performance and is crucial at the same time. Timestamps by Patil (2024) and Ayanponle et al. (2024) demonstrate the changes as computers begin to handle tasks that previously occupied time, allowing employees to focus on tasks of greater value and creativity. However, the need for new positions in AI development and maintenance to utilize machine learning and data analytics is becoming increasingly common as AI becomes more widespread. AI's influence extends to productivity and innovation across various sectors. In education, AI personalizes learning experiences and automates administrative tasks (Manthena, 2021; van der Vorst & Jelicic, 2019). In human resources, AI streamlines recruitment and talent management (Manthena, 2021). In fisheries technology, AI optimizes resource management and promotes sustainable practices (Abedin et al., 2022). In national government agencies, AI enhances decision-making, improves service delivery, and strengthens data-driven governance (National University, 2024; OECD, 2022).

One of the main things that people should pay attention to is that the impact of AI is not the same for everyone. However, it is greatly affected by factors such as industry locations, the capital for startups, and the strength of

AI communities at the local level. Tech hotspots or startup ecosystems, such as Silicon Valley and Bangalore, exemplify this, attracting top talent and capital to develop the initial applications of AI (Aksoy et al., 2019). The equal distribution of AI benefits to all areas is essential for mitigating digital disparities that dominate communities. Despite the growing literature on AI and the future of work, there is still little understanding of AI's detailed effects on different industries and positions, mostly in developing countries (Saint-Martin, 2021). Additionally, the ethical and social impacts of AI on worker well-being, particularly in relation to algorithmic bias and data privacy, require further investigation (Gerlich, 2024; Espinosa et al., 2024). While the function that drives the innovation of AI technology stands out, the process by which it occurs requires a more thorough assessment.

This study addresses these gaps by comprehensively analyzing AI's multiple impacts on the global workforce. Based on combined information from industry reports, scholarly research, and policy documents, this research will identify practical suggestions for governments, businesses, and individuals to overcome the obstacles created by AI and capitalize on the opportunities presented to them. The study emphasizes the need to develop an AI approach that prioritizes individuals and is grounded in ethical considerations. It also aims to be inclusive and promote workers' success in the world that AI drives. This research is crucial because it establishes a firm foundation for understanding and managing the transformative impact of the workforce on psychology, offering practical recommendations for policymakers, business leaders, and educators to ensure a sustainable and just working future.

2.0 Methodology

This study employed a comprehensive review methodology to synthesize research-based literature about the effects of artificial intelligence (AI) on the global workforce. A systematic search of scholarly databases was carried out to identify studies published between 2019 and 2024. The selection process identified studies using predefined inclusion criteria comprising peer-reviewed articles, industry reports, and policy documents that address AI's impact on job markets, skill requirements, ethical considerations, and socio-economic equality. The exclusion criteria are limited to editorials, abstracts issued by conferences that lack full-text availability, and non-research-based opinion pieces.

This study employed a systematic literature review to synthesize research on the impact of artificial intelligence (AI) on the global workforce. The primary research instrument was a structured data extraction framework designed to ensure rigorous identification, selection, and analysis of relevant documents. This framework included fields for extracting study objectives, methodologies, key findings, and emergent themes such as AI-driven automation, skill transitions, ethical dilemmas, and socio-economic implications. To ensure methodological rigor, predefined inclusion and exclusion criteria were established based on the fundamentals of systematic review techniques. This process was guided by a protocol that determined document eligibility by type (peer-reviewed articles, policy papers, industry reports), publication date (2019–2024), and thematic relevance.

The literature search strategy utilized specific keywords, including "AI and workforce," "automation and jobs," "AI ethics in employment," "reskilling and AI," and "AI socio-economic impact," across several key databases: Scopus, Web of Science, IEEE Xplore, SpringerLink, Google Scholar, and other sources such as preprint repositories (e.g., arXiv and SSRN), and organizational and institutional websites (e.g., websites of the OECD and IMF), to ensure comprehensive coverage. Applying the predefined inclusion and exclusion criteria to the records identified using these keywords led to the numbers reported in the subsequent screening and eligibility stages. Inclusion criteria mandated that sources be peer-reviewed research articles or reports demonstrating methodological transparency, published in English between 2019 and 2024, and directly relevant to the dynamics between AI and the workforce. Exclusion criteria filtered out editorials, non-academic commentaries, abstracts lacking full text, publications preceding 2019, and sources deemed to lack analytical depth.

The data gathering process was systematic and exhaustive, aiming to include high-quality and thematically aligned literature. It commenced with a comprehensive search of the identified academic and professional databases (Scopus, Web of Science, IEEE Xplore, SpringerLink, and Google Scholar) and other sources such as preprint repositories (e.g., arXiv, SSRN), and organizational and institutional websites (e.g., OECD, IMF websites) using the predefined search terms (e.g., AI in employment, automation and job displacement, AI and

skill shifts, AI ethics, and AI and inequality). The search was limited to publications between 2019 and 2024 for contemporary relevance.

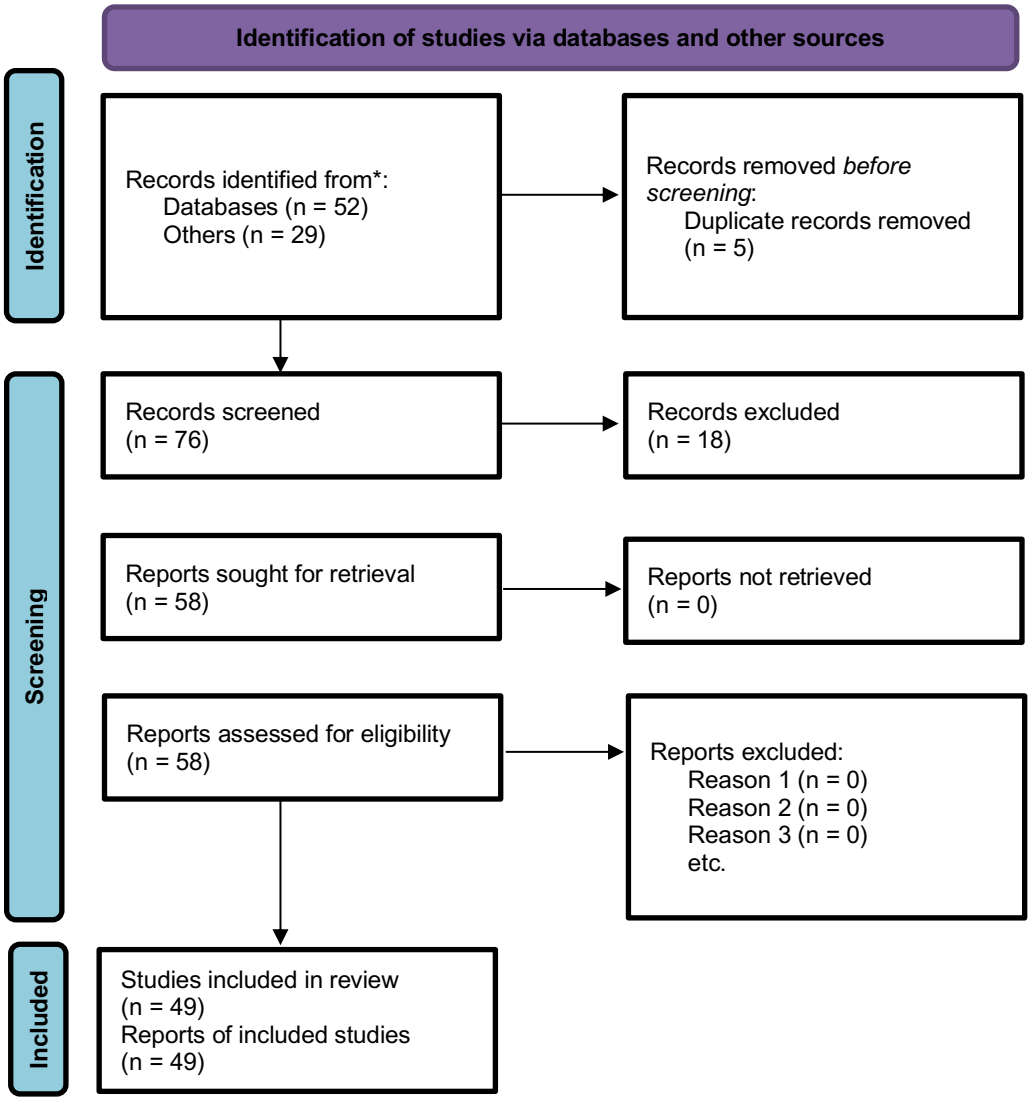

Figure 1. *Flow Diagram of Article Selection, Adapted from PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)*

The data gathering process followed a phased approach, commencing with identification, where the pre-selected keywords were applied across the identified databases and other sources to retrieve an initial pool of sources. Subsequently, a screening phase involved the elimination of duplicate entries, editorials, non-academic commentaries, and abstracts for which the full text was unavailable. The remaining sources then underwent an eligibility assessment, during which each was evaluated based on its relevance to the research topic, whether its publication date fell within the specified timeframe, and the clarity of its methodology. Finally, the inclusion phase involved selecting articles that fully aligned with the research objectives and satisfied all the established inclusion criteria. Each phase was documented and aligned with the PRISMA approach for systematic reviews, as illustrated in the flow diagram (Figure 1). All selected articles were archived in a digital repository and thematically categorized to facilitate the subsequent synthesis. This structured procedure ensured transparency, replicability, and the robustness of the dataset used for analysis.

This study is a literature-based systematic review, which did not involve human participants or primary data collection, and therefore presents minimal ethical risks. Nonetheless, the research maintained a high standard of

ethics throughout its processes. All sources were cited correctly and properly credited to prevent plagiarism and ensure adherence to intellectual property rights. The selection and analysis of literature were conducted without bias, guided solely by the predefined inclusion and exclusion criteria to ensure objectivity and academic integrity. Additionally, the review adhered to transparent methodological reporting, and the researcher declared no conflicts of interest. The findings were presented in a fair, balanced, and evidence-based manner, reinforcing the credibility and ethical soundness of the research.

3.0 Results and Discussion

3.1 The Transformative Dynamics of AI in the Modern Workplace

A systematic review of the literature was conducted to support the discussions and reinforce the integrity of this section. The article selection process followed a structured approach, illustrated in the flow diagram (Figure 1). This was accompanied by a thematic analysis of the key issues uncovered in the reviewed literature, summarized in Table 1.

Table 1. *Key Themes/Aspects Identified from the Review*

Theme/Aspect	Description
Automation and Efficiency	AI optimizes workflows and automates repetitive tasks, improving business agility and competitiveness.
Enhanced Decision-Making	AI enables big data analysis and personalized services, refining strategic decisions across sectors.
Job Role Evolution & Human Augmentation	Shift toward high-value human tasks and creation of AI-specialized roles. Requires reskilling.
Productivity & Innovation	AI tools drive innovation across sectors like education, HR, and governance.
Ethical Concerns and Algorithmic Bias	Risk of embedded bias in AI models; ethical AI frameworks are needed.
Workforce Skill Development	Emphasis on training programs and continuous upskilling to match AI integration.
Strategic Human-AI Collaboration	Collaborative ecosystems where humans and AI co-create value.
Global Disparities in AI Access	Unequal benefits across nations due to infrastructure and skill gaps.

Automation and Efficiency

AI-driven automation is one way businesses can become more efficient by automating repetitive tasks, allowing human employees to dedicate more time to creative and strategic tasks (Ayanponle et al., 2024; Aldoseri et al., 2024). For instance, the integration of AI and automation in supply chain management has yielded transformative changes through AI-powered predictive analytics, enhancing demand forecasting, automation technologies streamlining warehousing and transportation, and AI-driven optimization algorithms refining routing and scheduling, ultimately leading to greater agility, resilience, and competitiveness (Chou, 2024). Moreover, this automation requires continuous learning and adaptation, so organizations need to upskill their workforce to be competitive in an AI-driven environment. On the one hand, AI automation is completely reshaping operational efficiency, but on the other, it calls for a mission-oriented approach to workforce development.

Enhanced Decision-Making

The era of unstoppable technological growth has led to a significant transformation in every area. It has been demonstrated that artificial intelligence (AI) has made a substantial impact on decision-making, as it functions similarly to fortune-tellers and Market Forecasters (Prasanth et al., 2023; Zaman, 2022). The results of using AI include analyzing big data, identifying patterns and predicting trends, and personalizing services, all of which are key to transforming organizational decision-making and optimizing resources. AI's extreme transformation in marketing automates trend analysis and customer targeting. Thus, the campaign effectiveness is highly characterized, and the customer relationship is deepened (Ziakis & Vlachopoulou, 2023; Alghizzawi et al., 2024). Consequently, AI's ability to process and scrutinize vast volumes of data can enhance the decision-making process. Thus, strategy is implemented and applied more effectively in various sectors.

Job Role Evolution and Human Augmentation

The integration of AI is not merely about replacing human labor but also about augmenting human capabilities and creating new job roles. As AI automates routine tasks, workers shift towards higher-value activities requiring critical thinking, creativity, and strategic planning (Patil, 2024; Ayanponle et al., 2024). Simultaneously, AI generates new jobs in development, operation, and maintenance, which demand artificial intelligence-only classes like data analytics. Evolution requires learners to reskill or reprogram with new skills, such as those AI has, including creativity, communication, and adaptability of talents. This change explains that AI is not just a

destroyer of jobs but does indeed change work as we know it: it creates a gap for human-AI cooperation, which needs constant focus on skills development.

Impact on Productivity and Innovation across Sectors

The transformative effect of AI is evident in a vast range of fields, such as education, human resources, and organizations. AI can adapt learning experiences and manage educational tasks, enabling teachers to concentrate on student involvement and grade level (Manthena, 2021; van der Vorst & Jelicic, 2019). AI simplifies human resources' hiring and talent management processes, enabling organizations to build more inclusive and efficient workplaces (Manthena, 2021). Operational management is enhanced with the integration of AI in government departments, reducing the time gap between data collection and decision-making, and enabling the issuance of instant event alerts to support real-time operations (Dilmegani, 2025; Route Fifty, 2025; Gartner, 2024).

For example, in Singapore, AI-powered systems optimize traffic flow, reducing congestion and improving commute times. This system is achieved through the Intelligent Transport System (ITS), which integrates AI to predict real-time traffic conditions, manage road congestion, and optimize routes, significantly reducing travel times and emissions. To reduce traffic and improve urban mobility, the Intelligent Transportation System (ITS) uses real-time data from cameras, traffic sensors, and other sources to dynamically modify traffic signal timings and reroute cars (Vemuri et al., 2023; IntelliStride, 2024). Additionally, companies like Amazon utilize AI in the retail sector for personalized recommendations and automated inventory management, significantly enhancing customer experience and operational efficiency. Amazon's AI-driven inventory management system accurately predicts customer demand, enabling optimal stock levels and reduced delivery times (Kumar et al., 2024). Furthermore, AI-driven tools facilitate product recommendations, thereby enhancing the shopping experience.

Generative AI, which can create high-quality art, music, and writing, is getting ready to change creative industries and societal sectors. Therefore, research that cuts across disciplines is necessary to fully grasp the implications and devise an appropriate policy (Epstein et al., 2023). In addition, AI is transforming education by individualizing learning, enhancing participation, supporting teachers, and expanding access when utilized effectively. However, problems with the implementation, bias, and data privacy must be solved before it can be integrated effectively (Dey, 2024). Finally, AI boosts productivity and brings evolutionary improvements across various government functions; therefore, it can be stated that AI is the primary means of governance in the contemporary world.

Driving Innovation and Competitive Advantage

Ultimately, AI catalyzes innovation, enabling organizations to introduce new business models and processes that drive competitive advantage (Lee et al., 2019; Aldoseri et al., 2024). Artificial intelligence is privy to the outcomes of up-to-date events and predictive analytics, which, in turn, grants top managers myriad tools to make better-informed decisions considering efficient resource management, flexible production planning, and adjustment to possible market changes. It highlighted the need for ethical leadership, continuous learning, and strategic AI integration to navigate challenges and leverage opportunities for sustainable growth in the digital economy (Farayola et al., 2023). In this regard, this advocacy results in the rapid development of innovative technologies and increased ability to survive in an ecosystem where the only constant is change. AI, the pillar of innovation in an enterprise, brings the necessary equipment and expertise to the table, enabling organizations to maintain a leading position in a dynamic global market.

3.2 Discussion

Navigating the AI-Driven Workforce: Challenges and Strategic Directions

The integration of AI is the foundation for reshaping the working environment in sub-Saharan Africa, thereby providing professionals with a deep understanding of the impact of AI on the workforce. In their article, Morandini et al. (2023) and Patil (2024) argue that although the automation of manual work and the invention of the human body are part of human endeavour, AI also poses challenges that arise from job displacement, ethical concerns, and the need for strategic adaptation. Furthermore, employee attitudes have a significant impact on the success of AI implementation, as organizations face increasing pressure to adopt AI for improved performance and competitiveness (Chiu et al., 2021). Building upon the observed trends in automation and decision-making is crucial to address the ethical implications that arise from these advancements.

Addressing Ethical and Algorithmic Challenges

A primary concern revolves around the ethical deployment of AI, particularly in mitigating algorithmic bias and ensuring data security. For instance, Generative AI (GenAI) systems require robust oversight to prevent the perpetuation of societal biases, often reflected in recruitment practices and other decision-making processes (Bozkurt et al., 2024; Sharma, 2025). Organizations need to be aware of transparent AI methodologies, be involved in a rigorous audit of training data, and establish clear accountability frameworks so that trust and fairness can exist in the AI concept (Slimi & Villarejo-Carballido, 2023). Moreover, the heavy reliance of AI systems on massive datasets tends to exacerbate the existing inequality gap by excluding underrepresented groups (Alaran et al., 2025). Pachegowda (2023) articulates that bias, privacy, and security must be considered when using AI responsibly. It is necessary that AI technologies be utilized equitably and that respectful AI solutions are designed to stand the test of time. However, current regulatory frameworks often lag technological advancements. This raises critical questions: Are existing policies sufficient to prevent algorithmic bias? Are corporations genuinely prioritizing the ethical implementation of AI, or do profit motives primarily drive their decisions? A more stringent, globally coordinated approach is urgently needed.

AI ethics is complex, mirroring human ethics and complicated by technical issues. It requires a balanced, customizable approach like research and medical ethics. Emphasizing procedural regularity and "Ethics as a Service" can make AI ethics more relatable to practitioners. However, the unpredictable nature of complex AI systems necessitates ongoing re-evaluation and further research to understand the full impact of pro-ethical design (Morley et al., 2021). The integration of AI, especially in healthcare, presents significant ethical challenges concerning transparency, data privacy, bias, contextual understanding, human-AI interaction, oversight, and global standardization. Ensuring AI serves humanity's best interests requires addressing these issues through transparent decision-making, ethical data usage, ongoing research for contextual awareness, maintaining a human-centric approach, balancing AI capabilities with human oversight, and establishing a unified global standard (Nasir et al., 2024).

Workforce Adaptation and Skill Development

The successful integration of AI depends on the positive adaptation of the workforce and the need for constant skills upgrades. Organizations must spend on detailed training programs that enable employees to acquire technical proficiency, adaptability, problem-solving, and critical thinking skills (Westover, 2024; Alaran et al., 2025). It is, therefore, essential to have tailored learning pathways and easily accessible training opportunities to avoid job displacement and to promote the culture of learning. AI adoption is a productivity booster for leading firms, but it is a process that requires investment in related capacity (OECD, 2024). This is a significant gap: it shows that the benefits of AI are not a given. They depend on thoughtful planning and action, which implies a coherent strategy linking technology deployment with human capital development.

Strategic Implementation and Human-AI Collaboration

The AI strategy in place requires a new way of thinking, where AI is not merely a competitor but a "human plus" team member. By restructuring job roles to complement human and AI skills, companies will obtain high productivity, innovation, and staff engagement (Westover, 2024). This partnership requires a framework that fosters open dialogue, promotes shared knowledge, and is mindful of the delicate balance between automation and augmentation. Employees perform better and are more engaged when AI is used at work, primarily when good leadership guides the changes (Wijayati et al., 2022). The focus should shift from replacing humans to creating 'human-plus-machine' ecosystems where AI augments human capabilities. Such collaborations maximize productivity and innovation (Morelli, 2019; Bobițan et al., 2024).

Balancing Automation and Human Ingenuity

Achieving optimal productivity and innovation requires strategically aligning AI's efficiency with human ingenuity. Organizations must utilize AI technology to enhance speed, accuracy, and data processing capabilities. However, they should also attach great importance to human intellect, which comes from creativity, empathy, and complex problem-solving. Such a win-win situation guarantees that AI is a helpful tool rather than the elimination of human abilities, which will, in turn, lead to more informed, just, and purposeful outcomes. Innovative aquaculture, driven by artificial intelligence (AI), offers significant advantages in efficiency, automation, and accuracy, but faces challenges in achieving full automation due to the inherent risks associated with unsupervised systems that require human oversight. Machine learning and computer vision enhance productivity through faster and more accurate analysis, but their high cost limits their practicality to

large-scale farms with high-value species (Vo et al., 2021).

The impact of AI differs from country to country. Developing countries face specific challenges, including the issue of technological access, a shortage of skilled labor, and infrastructure deficiencies. That is why international cooperation and policy measures that target the problem are essential. Authorities must approve the allocation of funds to develop digital infrastructure, provide professional development for the workforce, and reskill individuals so that all can uniformly access AI benefits. Furthermore, policies should address ethical concerns, such as data privacy and algorithmic bias, through robust regulatory frameworks. Specifically, governments should invest in lifelong learning initiatives to equip workers with the skills needed in an AI-driven economy, implement robust data privacy regulations to uphold individual liberties and foster confidence in AI systems, establish social safety nets to lessen the effects of automation-related job displacement and encourage global collaboration to tackle the global issues of AI adoption and ensure equitable access to its benefits. As outlined in the concluding remarks, these global disparities underscore the need for a holistic and inclusive approach to AI integration.

4.0 Conclusion

The provided text underscores the profound and multifaceted impact of artificial intelligence (AI) on the future of work, highlighting opportunities and challenges. The author emphasizes the inevitable obsolescence of specific roles due to automation and the emergence of new positions demanding advanced cognitive and technical skills. A central theme is the critical need for a paradigm shift in understanding work, skills, and ethical responsibilities to harmonize technological advancement with human adaptation. This necessitates strategic reskilling initiatives and the ethical deployment of AI, requiring urgent and concerted collaboration among organizations, governments, and educational institutions to cultivate a responsible and sustainable AI-integrated workforce that ensures economic prosperity and preserves worker rights. The text also notes that AI's impact will vary across sectors and geographies, underscoring the need for context-specific implementation strategies and strong ethical frameworks with human oversight. Several critical gaps in the current body of research on AI and the future of work are identified. The author points out a lack of sector-specific analyses, particularly in developing economies with limited technological infrastructure and skilled labor. Future research is encouraged to leverage operation-specific case studies to elucidate the nuanced impacts of AI on job creation and displacement, with a specific mention of the Philippines as a region where such investigations can guide targeted skill acquisition programs. The importance of financial feasibility assessments for practical and sustainable implementation plans is also highlighted.

The ethical dimensions of AI in the workforce are presented as another area requiring deeper investigation. Sensitive subjects such as bias in recruitment algorithms and workplace surveillance are mentioned, emphasizing the need for AI governing bodies to prioritize transparency and accountability. The author suggests a systematic review of regulation practices in other countries to inform policymakers and advocates for research focusing on developing interpretable AI models that reduce gender and ethnic bias. Furthermore, the text addresses the lack of a clear strategy for reskilling and upskilling, despite their universally acknowledged importance. It proposes evaluating alternative training packages, such as company-offered programs and AI-based learning platforms, emphasizing accessibility and financial sustainability for low-income individuals. The anticipation of future salary analysis sessions to provide in-depth information on the effects of training interventions is also noted.

The influence of AI on employee well-being, encompassing performance, mental health, and job enjoyment, is identified as another area needing thorough exploration. The author cautions that while AI promises to shorten task completion times, heightened control and surveillance could have adverse effects on employees' welfare, leading to mental strain and health issues. Research is encouraged to create workplace standards that mitigate these risks, such as limiting AI technology in ways that undermine employee rights or developing positional AI technology to handle higher workload tasks, thereby reducing worker burdens. The discussion extends to the AI-boosted gig economy, where the focus is shifting from work flexibility to worker rights and benefits. The author suggests that research should include measures ensuring freelancers' safety and career development opportunities, proposing sharing legal case studies to help the public and private sectors develop fair AI-driven employment standards. Finally, given the energy-intensive nature of AI technologies, the environmental consequences of AI deployment are deemed crucial. Future research is encouraged to focus on energy-efficient applications and data infrastructures, emphasizing the need for well-organized, transparent, and influential

research to ensure the responsible and sustainable integration of AI into the future of work.

5.0 Contributions of Authors

The authors all contributed equally to each section. The authors have also reviewed and approved the final work.

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7.0 Conflict of Interest

The author has no conflict of interest to declare that they are relevant to the content of this research.

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Growth and Yield of Strawberry (*Fragaria ananassa* – Sweet Charlie Variety) as Influenced by Gibberellic and Salicylic Acids

Prolet J. Sison*, Junito P. Marcelino
Sultan Kudarat State University – ACCESS Campus, Tacurong City, Philippines

*Corresponding Author Email: prolet.sison@deped.gov.ph

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Abstract. This study investigated the effects of Gibberellic acid (GA_3) and Salicylic acid (SA), applied individually and in combination, on the growth and yield performance of the strawberry variety 'Sweet Charlie.' A total of nine treatments were tested, including a control (water), two concentrations of GA_3 (75 and 100 ppm), two concentrations of SA (100 and 200 ppm), and their various combinations. The experiment was conducted from September 2024 to March 2025 at Sitio Little Baguio, Chua, Bagumbayan, Sultan Kudarat, using a Randomized Complete Block Design (RCBD) with a single-factor arrangement. Key growth parameters measured included plant height, number of branches and crowns, runner production, and morphological characteristics of runners. Yield-related variables such as number of flowers, days to flowering, fruit number per plant, fruit diameter, and fruit weight were also recorded. Data were analyzed using analysis of variance (ANOVA), and significant differences among treatments were determined through Tukey's Honestly Significant Difference (HSD) test. Results indicated that treatments combining GA_3 (75 or 100 ppm) with 200 ppm SA significantly enhanced vegetative growth, accelerated flowering, and improved fruit yield compared to the control and other treatments. Specifically, these combinations increased plant height, number of runners, flower count, fruit number, fruit diameter, and total fruit weight per plant. Additionally, the days to flowering were shortened, and the period from flowering to fruit setting was optimized. The findings suggest that the synergistic application of GA_3 and SA at specific concentrations can effectively improve the growth and productivity of 'Sweet Charlie' strawberries, offering practical benefits for strawberry cultivation.

Keywords: *Fragaria ananassa*; Gibberellic; Salicylic acid; Strawberry growth and yield.

1.0 Introduction

Plants require essential elements such as light, water, oxygen, and minerals for growth and development. In addition, plant growth regulators (PGRs), which are organic compounds either naturally produced by plants or synthetically made, play a crucial role in regulating growth, morphogenesis, metabolism, and other biological processes by influencing enzyme activity within plant cells (Singh et al., 2022). When applied at appropriate doses and growth stages, PGRs can significantly enhance crop growth and yield, including strawberries (Katel et al., 2022). Strawberry (*Fragaria ananassa*), a hybrid of *Fragaria chiloensis* and *Fragaria virginiana* from the Rosaceae family, is a valuable soft fruit crop known for its nutritional and economic importance worldwide (Kumar et al., 2020). Previous studies have investigated the effects of exogenous plant growth regulators (PGRs), such as gibberellic acid (GA_3) and salicylic acid (SA), on strawberry growth. For instance, Luc et al. (2019) found that

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GA_3 application accelerated vegetative growth but delayed flowering, while SA promoted inflorescence development. However, their study did not assess the impact on fruit yield.

This gap suggests that although SA may hasten flowering, the more vigorous growth induced by GA_3 could potentially increase flower number and fruit yield. Therefore, it is essential to investigate not only the individual effects of GA_3 and SA but also their combined influence on the vegetative growth and yield of the strawberry 'Sweet Charlie' variety. Considering these considerations, the present study aims to evaluate the effects of foliar applications of GA_3, SA, and their combinations on the growth and yield performance of the strawberry 'Sweet Charlie' variety under field conditions.

2.0 Methodology

2.1 Experimental Design and Treatments

This study employed a Randomized Complete Block Design (RCBD) with nine treatments, each replicated three times. Each treatment consisted of ten strawberry plants, which were evaluated for growth and yield parameters. The treatments included a control (water), two concentrations of gibberellic acid (GA_3: 75 and 100 ppm), two concentrations of Salicylic acid (SA: 100 and 200 ppm), and their various combinations. Foliar applications of GA_3 and SA were administered according to the treatment plan. Data on plant height, number of branches, runners, flowers, fruit number, fruit size, and weight were collected throughout the growing period. Statistical analysis was performed using analysis of variance (ANOVA), and differences between treatments were determined by Tukey's Honestly Significant Difference (HSD) test.

Strawberry Cultural Management Practices

Site preparation and planting. Strawberries were planted in well-drained soil at an elevation of 800 meters, with a pH range of 5.5 to 7.0, receiving 6–10 hours of direct sunlight daily. Land preparation involved clearing, weeding, and constructing raised beds to ensure proper drainage and root development. Organic and inorganic fertilizers, including muriate of potash, superphosphate, and decomposed chicken manure, were incorporated into the soil before transplanting.

Runner preparation and transplanting. Healthy strawberry runners with at least three root pegs and two trifoliate leaves were harvested, cleaned, and treated with fungicide before planting in trays containing a soil and vermicompost mix. Seedlings were misted regularly and kept under humidity domes to promote healthy growth and rooting. After developing 3–5 mature leaves and undergoing a 5-day hardening period, runners of uniform size were transplanted manually onto raised beds mulched with silver polyethylene and rice straw to conserve moisture and suppress weeds. Plants were spaced 25 cm apart using a quincunx pattern.

Irrigation and fertilization. Watering was applied daily for two weeks post-transplanting using overhead sprinklers to ensure proper moisture. Fertilizers were applied via side dressing: urea at 20 days after transplanting (DAT), followed by biweekly applications of a balanced 14-14-14 fertilizer, and muriate of potash at 60 DAT.

Weed, pest, and disease management. Weeds were controlled manually. Runners were removed twice weekly to promote fruit production. Leaf pruning was performed to enhance flowering by reducing shading. Insect pests such as beetles and aphids were managed using Lannate insecticide, while cutworms were controlled with Basudin granules.

Methods of Preparation of Plant Growth Regulator Stock Solution

Gibberellic acid (GA3). A 1 mg/ml stock solution of gibberellic acid (GA3) (1000 ppm) was prepared by weighing 100 mg of gibberellic acid (GA3) powder into a 100 ml volumetric flask. Add 3 to 5 mL of solvent (95% ethyl alcohol) to dissolve the powder. Once completely dissolved, bring to volume with distilled water. The solution was stirred while adding distilled water to keep the material in the solution. By diluting the stock solution, the 75 ppm and 100 ppm concentrations of gibberellic acid (GA3) were prepared.

Salicylic acid (SA). A stock solution of salicylic acid (SA) at 1 mg/mL (1000 ppm) was prepared by dissolving 100 mg of salicylic acid in 3 to 5 mL of 95% ethyl alcohol and then made up to 100 mL with distilled water in a volumetric flask. Salicylic acid (SA) was poorly soluble in water; thus, it became soluble in ethyl alcohol and

purified water. The researchers prepared solutions of 100 ppm and 200 ppm salicylic acid (SA) concentrations from this stock by diluting the solution.

Stock solution dilution formula.

$$C_1V_1 = C_2 V_2$$

where:
C1 = Concentration of the stock solution
V1 = Volume of the stock solution needed to make the new solution
C2 = Final concentration of the new solution
V2 = Final volume of the new solution

Preparation of 75 ppm and 100 ppm Gibberellic acid (GA3). To prepare 1 liter of 75 ppm gibberellic acid (GA3) from the 1000 ppm gibberellic acid (GA3) stock solution, 75 ml of the 1000 ppm gibberellic acid (GA3) stock solution was used and brought to volume (1 liter) using distilled water. To prepare 1 liter of 100 ppm gibberellic acid (GA3) from the 1000 ppm gibberellic acid (GA3) stock solution, 100 ml of the 1000 ppm gibberellic acid (GA3) stock solution was used and brought to volume (1 liter) using distilled water. Solutions of gibberellic acid (GA3) store poorly, so a fresh solution was prepared within two to three days of use.

Preparation of 100 ppm and 200 ppm Salicylic acid (SA). To prepare 1 liter of 100 ppm salicylic acid (SA) from the 1000 ppm salicylic acid (SA) stock solution, 100 ml of the 1000 ppm salicylic acid (SA) stock solution was used and brought to volume using distilled water. To prepare 1 liter of 200 ppm salicylic acid (SA) from the 1000 ppm salicylic acid (SA) stock solution, 200 ml of the 1000 ppm salicylic acid (SA) stock solution was used and brought to volume using distilled water.

2.2 Research Materials

The study utilized strawberry runners of the 'Sweet Charlie' variety as planting material. Key materials for propagation and cultivation included seedling trays, garden soil, vermicompost, polyethylene plastic mulch, and rice straw for mulching. Improvised humidity domes made from UV plastic were used to maintain moisture during runner rooting. The plant growth regulators applied were gibberellic acid (96% purity) and salicylic acid of premium quality. Distilled water and ethyl alcohol (95%) were used as solvents and disinfectants. Foliar applications were administered using an airless sprayer.

2.3 Data Gathering Procedure

The data gathered in this study was categorized into growth and yield parameters. Ten (10) data plants were used to collect the data from each treatment. Observations on growth and yield characters were recorded by using standard methods. Data collection for growth parameters such as plant height, number of branch crowns, number of runners, morphological descriptors of strawberry runners, number of days to flower, morphological descriptors of time of flowering, and number of flowers per plant started one week after the first application of the plant growth regulators (PGRs) at weekly interval. Data collection for yield parameters such as number of days from flowering to fruit setting, number of fruits per plant, fruit diameter, fruit weight per plant, morphological descriptors of fruit size, and total weight of fruits per plant started on the onset of flowering stage to fruiting stage with at least four data collection of harvesting strawberry fruits at weekly interval.

2.4 Ethical Considerations

As the subject of the study was strawberries, care was taken to ensure that all experimental procedures were conducted responsibly and sustainably, respecting environmental and agricultural ethics. The study avoided practices that could harm the plants or the surrounding ecosystem. The research was designed to uphold scientific integrity by ensuring that all methodologies were transparent, reproducible, and free from bias. Data collection and analysis were conducted rigorously, avoiding any form of research misconduct including fabrication, falsification, or plagiarism. Furthermore, the study complied with ethical standards for academic research, ensuring that all findings were reported honestly and accurately.

3.0 Results and Discussion

3.1 Plant Height

The summary table of plant height per weekly basis of the strawberry cv. Sweet Charlie, as influenced by gibberellic and salicylic acids, is presented in Table 1. Statistical analysis reveals no significant difference between treatment means for weeks 1 and 2. Treatment 2 had the tallest plant height, 8.73 cm, in week 1, and Treatment 1 had 10.93 cm in week 2, while Treatment 8 had the shortest plant height for weeks 1 and 2, with a mean of 7.67 cm and 8.73 cm. Statistical analysis also shows a highly significant difference among all treatment means from week 3 to week 8, where Treatment 2 had the tallest plant height of 13.93 cm, 15.73 cm, 18.70 cm, 20.43 cm, 21.23 cm, and 22.93 cm, respectively, but comparable to other treatments with common superscript. The shortest plant heights for week 3 to week 8 were observed in Treatment 4, with a mean of 9.53 cm, 10.23 cm, 11.17 cm, 12.00 cm, 13.00 cm, and 14.20 cm, respectively.

Table 1. *Summary Table of Plant Height (cm) per Weekly Basis of Strawberry cv. Sweet Charlie as Influenced by Gibberellic and Salicylic Acids*

Treatments	Mean Result Per Week							
	W1	W2	W3	W4	W5	W6	W7	W8
T0	8.70	9.73	10.70^{ab}	11.40^{bcd}	12.10^{bc}	13.03^{cd}	13.97^{bc}	15.07^{bc}
T1	8.47	10.93	13.43^{ab}	14.80^{abc}	17.63^{a}	18.83^{ab}	19.73^{abc}	21.33^{ab}
T2	8.73	10.17	13.93^{a}	15.73^{a}	18.70^{a}	20.43^{a}	21.23^{a}	22.93^{a}
T3	8.33	9.37	10.03^{ab}	10.93^{cd}	12.30^{bc}	13.20^{bcd}	14.43^{bc}	15.47^{bc}
T4	7.97	8.77	9.53^{b}	10.23^{d}	11.17^{c}	12.00^{d}	13.00^{c}	14.20^{c}
T5	8.57	9.60	12.77^{ab}	14.27^{abcd}	16.57^{ab}	18.33^{abc}	19.30^{abc}	21.37^{ab}
T6	8.40	9.73	13.40^{ab}	15.13^{ab}	17.53^{a}	18.87^{ab}	20.47^{ab}	22.53^{a}
T7	8.57	9.83	12.93^{ab}	15.07^{ab}	17.37^{a}	19.23^{a}	20.50^{ab}	22.60^{a}
T8	7.67	8.73	12.10^{ab}	14.67^{abc}	17.10^{ab}	18.73^{abc}	19.63^{abc}	21.77^{abc}
	ns	ns	**	**	**	**	**	**
cv	**9.78%**	**8.73%**	**11.51%**	**10.47%**	**11.11%**	**11.59%**	**12.86%**	**11.78%**

Means with common letters superscript are not significantly different.

The result implies that applying Treatment 2 with 100 ppm gibberellic Acid (GA_3) can significantly increase plant height. This finding aligns with the study of Uddin et al. (2012), which examined the effects of gibberellic Acid (GA_3) on strawberry growth and yield. Their research demonstrated that gibberellic Acid (GA_3) application significantly enhanced vegetative growth, with higher concentrations promoting shoot elongation and expansion of the vegetative branch apex. This effect is likely due to internode elongation during plant differentiation and development. Similarly, Keswani et al. (2022) confirmed that gibberellic Acid (GA_3) is a widely used plant growth regulator in agriculture, known for its positive impact on plant development. Their study highlighted that gibberellic Acid (GA_3) enhances germination, increases plant height, expands leaf area, promotes root elongation, and improves tuber formation. Furthermore, Kumra et al. (2018) reported that gibberellic Acid (GA_3) plays a crucial role in the growth and development of strawberries, stimulating plant height, runner formation, and flower production. Their findings also indicate that gibberellic Acid (GA_3) contributes to increased fruit set, yield, and fruit quality by promoting cell division and elongation. However, excessive application may lead to prioritizing vegetative growth over fruit production. These studies collectively support the present findings, reinforcing that the application of gibberellic Acid (GA_3) can significantly enhance plant height and overall growth when used at optimal concentrations.

3.2 Branch Crowns

The summary table of the number of branch crowns per week of the strawberry cv. Sweet Charlie, as influenced by gibberellic and salicylic acids, is presented in Table 2. Statistical analysis revealed no significant difference between all treatment means for weeks 1 and 2. For week 1, Treatment 2 and Treatment 0 got the most branch crowns, with the same mean of 2.00, and Treatment 5 got the least branch crowns, with a mean of 0.67. For week 2, Treatment 2 got the most branch crowns with a mean of 5.00, and Treatment 3 got the very least number of branch crowns with a mean of 1.33. Statistical analysis also reveals a significant difference among all treatment means from week 3 to week 8, where Treatment 2 had the most branch crowns, with means of 6.33, 8.67, 8.67, 11.00, 12.67, and 15.00, respectively. This result is comparable to all treatments with the same common superscript. For week 3, Treatment 3 and Treatment 5 had the lowest number of branch crowns, with the same mean of 2.33, and for week 4, Treatment 1 had the lowest number of branch crowns, with a mean of 2.67. From week 5 to week 8, Treatment 3 had the lowest number of branch crowns with a mean of 3.33, 4.33, 4.33, and 6.00, respectively.

Table 2. *Summary Table of Number of Branch Crowns per Weekly Basis of Strawberry cv. Sweet Charlie as Influenced by Gibberellic and Salicylic Acids*

Treatments	Mean Result Per Week							
	W1	W2	W3	W4	W5	W6	W7	W8
T0	2.00	3.00	5.00^{ab}	5.67^{abc}	6.00^{abcd}	6.67^{bcd}	7.33^{cd}	8.33^{bc}
T1	1.00	1.67	2.67^{b}	2.67^{c}	3.67^{d}	5.00^{cd}	6.00^{d}	7.33^{bc}
T2	2.00	5.00	6.33^{a}	8.67^{a}	8.67^{a}	11.00^{a}	12.67^{a}	15.00^{a}
T3	1.33	1.33	2.33^{b}	3.33^{bc}	3.33^{d}	4.33^{d}	4.33^{d}	6.00^{c}
T4	1.33	2.00	3.33^{ab}	3.67^{bc}	4.33^{cd}	5.33^{cd}	6.00^{d}	7.00^{bc}
T5	0.67	1.67	2.33^{b}	4.67^{bc}	5.33^{cd}	6.00^{cd}	7.00^{cd}	8.00^{bc}
T6	1.33	1.67	2.67^{b}	4.33^{bc}	5.67^{bcd}	7.67^{bc}	9.67^{abc}	10.67^{abc}
T7	1.67	2.67	4.00^{ab}	5.33^{abc}	7.00^{abc}	7.67^{bc}	10.67^{ab}	12.33^{ab}
T8	1.00	3.00	5.33^{ab}	6.33^{ab}	8.33^{ab}	9.00^{ab}	9.33^{bc}	11.00^{abc}
	ns	ns	**	**	**	**	**	**
cv	**29.69%**	**20.56%**	**22.87%**	**24.98%**	**17.04%**	**14.03%**	**13.24%**	**19.91%**

Means with common letter superscript are not significantly different.

The results indicate that applying Treatment 2 with 100 ppm gibberellic Acid (GA_3) significantly increases the number of branch crowns. This finding aligns with previous studies demonstrating that gibberellic Acid (GA_3) is crucial in enhancing vegetative growth in strawberries, particularly in stimulating runner and crown development (Uddin et al., 2012). However, excessive concentrations of gibberellic Acid (GA_3) may lead to uncontrolled vegetative elongation, potentially delaying reproductive growth (Muhammad, 2021). Similarly, Sharma and Singh (2008) reported that foliar application of gibberellic Acid (GA_3) in 'Chandler' strawberries significantly improved growth and yield parameters, including crown height, crown spread, petiole length, leaf number, and leaf area. In addition to gibberellic acid (GA_3), salicylic acid (SA) has been recognized for its role in plant growth regulation and stress resistance. However, its direct impact on branch crown formation remains inconclusive (Metwally et al., 2013). The combined application of gibberellic acid (GA_3) and salicylic acid (SA) suggests a synergistic effect, where optimized concentrations contribute to enhanced crown formation and potential yield improvements. These findings underscore the importance of applying GA_3 correctly to promote vegetative growth while balancing its effects to optimize overall plant productivity.

3.3 Number of Runners

Table 3 presents a summary table of the number of runners per week of the Strawberry cv. Sweet Charlie, as influenced by gibberellic and salicylic acids. Statistical analysis reveals that there is no significant difference in Treatment means for week 1. Treatment 5 got the most runners, with a mean of 6.00, while Treatment 1 got the lowest number of runners, with a mean of 1.00. As shown, a significant difference exists among all treatment means for weeks 2, 3, and 4. For Week 2, Treatments 5 and 6 had the most runners, with a mean of 8.00. For weeks 3 and 4, Treatment 5 had the most runners, with a mean of 10.67 and 14.00, but it was comparable to the treatments with a common superscript. For weeks 5 to 8, Treatment 2 had the most runners, with a mean of 16.67, 21.00, 24.67, and 28.00, respectively, but it was comparable to treatments with common superscript.

On the other hand, Treatment 1 and Treatment 4 had the lowest number of runners, with the same mean of 2.00 for week 2 and Treatment 1 with a mean of 2.33 for week 3. From week 4 to week 7, Treatment 0 had the lowest number of runners, with a mean of 2.67, 2.33, 4.00, and 4.33, respectively. Treatment 4 also had the lowest number of runners, with a mean of 6.67 in week 8.

Table 3. *Summary Table of Number of Runners per Weekly Basis of Strawberry cv. Sweet Charlie as Influenced by Gibberellic and Salicylic Acids*

Treatments	Mean Result Per Week							
	W1	W2	W3	W4	W5	W6	W7	W8
T0	2.33	3.00^{ab}	4.00^{bcd}	2.67^{d}	2.33^{c}	4.00^{e}	4.33^{f}	7.67^{ef}
T1	1.00	2.00^{b}	2.33^{d}	3.33^{d}	4.00^{c}	5.33^{de}	7.33^{def}	9.00^{def}
T2	3.67	7.00^{ab}	8.00^{abc}	12.33^{ab}	16.67^{a}	21.00^{a}	24.67^{a}	28.00^{a}
T3	3.33	5.33^{ab}	7.00^{abcd}	9.00^{bc}	9.67^{b}	11.33^{cde}	12.33^{cde}	14.67^{cde}
T4	1.33	2.00^{b}	3.00^{cd}	3.67^{d}	4.67^{c}	5.00^{de}	6.00^{ef}	6.67^{f}
T5	6.00	8.00^{a}	10.67^{a}	14.00^{a}	14.67^{a}	17.00^{abc}	19.00^{abc}	24.67^{ab}
T6	4.00	8.00^{a}	9.00^{ab}	11.67^{ab}	14.67^{a}	19.00^{ab}	23.67^{ab}	26.33^{ab}
T7	2.33	4.00^{ab}	6.33^{abcd}	6.67^{cd}	8.33^{b}	10.00^{cde}	13.33^{cd}	15.33^{cd}
T8	1.33	3.33^{ab}	6.33^{abcd}	6.67^{cd}	8.33^{b}	11.67^{bcd}	17.33^{bc}	19.33^{bc}
	ns	**	**	**	**	**	**	**
cv	**34.27%**	**29.51%**	**28.73%**	**21.59%**	**13.02%**	**22.40%**	**17.02%**	**15.51%**

Means with common superscript letters are not significantly different.

This result indicates that the application of Treatment 2 with 100 ppm gibberellic acid (GA_3) significantly increases the number of runners. These findings are consistent with previous research on the effects of gibberellic acid (GA_3) and salicylic acid (SA) on strawberry growth. El-Naggar et al. (2020) reported that the gibberellic acid (GA_3) application enhances the development of strawberries' runners, crowns, and inflorescences. Additionally, SA has been shown to improve plant vigor, increase root length, and enhance overall plant metabolism, which may contribute to increased runner formation (Al-Kawari et al., 2021). Furthermore, Kumra et al. (2018) highlighted that gibberellic acid (GA_3) is crucial in promoting strawberries' plant height and runner formation. These findings reinforce the role of gibberellic acid (GA_3) in stimulating vegetative growth and suggest that its application, potentially combined with salicylic acid (SA), can optimize runner development and overall plant performance.

3.4 Morphological Descriptors of Number of Stolon or Runners

The influence of gibberellic and salicylic acids on the morphological descriptors of the number of stolons or runners of the strawberry cv. Sweet Charlie is presented in Table 4. Statistical analysis reveals no significant difference between all treatments and means tested. Treatment 5 had the most runners with a mean of 6.23, followed by Treatment 6 and Treatment 2 with the same mean of 5.92. Treatment 1, Treatment 8, Treatment 7, Treatment 3, and Treatment 4 had a mean of 5.17, 5.08, 5.00, 3.33, and 3.28, respectively. Treatment 0 had the lowest number of runners, with a mean of 2.92.

Table 4. *Influence of Gibberellic and Salicylic Acids on the Morphological Descriptors of Number of Stolon or Runners of Strawberry cv. Sweet Charlie*

Treatments	Replication			Total	Mean
	I	II	III		
T0 - Control (water)	2.75	2.75	3.25	8.75	2.92
T1 - 75 ppm Gibberellic acid (GA_3)	5.25	5.00	5.25	15.50	5.17
T2 - 100 ppm Gibberellic acid (GA_3)	5.25	6.75	5.75	17.75	5.92
T3 - 100 ppm Salicylic acid (SA)	3.50	3.25	3.25	10.00	3.33
T4 - 200 ppm Salicylic acid (SA)	3.35	3.50	3.00	9.85	3.28
T5 - 75 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	6.00	6.50	6.50	19.00	6.23
T6 - 75 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	6.00	5.75	6.00	17.75	5.92
T7 - 100 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	4.50	5.25	5.25	15.00	5.00
T8 - 100 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	5.00	5.25	5.00	15.25	5.08
Grand Total & Mean	**41.60**	**44.00**	**43.25**	**128.85**	**4.77**

cv = 15.78%
ns = not Significant

3.5 Morphological Descriptors of Time of Appearance of First Stolon or Runners

The influence of gibberellic and salicylic acids on the morphological descriptors of the time of appearance of the first stolon or runners of the strawberry cv. Sweet Charlie is presented in Table 5. Statistical analysis reveals a significant difference between the treatment means. Treatment 8 had a very late appearance of the first stolon or runners, with a mean of 5.77. However, it is comparable to Treatment 6 with a mean of 5.40, followed by Treatment 7 with a mean of 4. 60, Treatment 5 and Treatment 0 with the same mean of 4.53, Treatment 1 with a mean of 4.40, Treatment 3 with a mean of 3.67, Treatment 4 with a mean of 3.47, and Treatment 2 got the earliest time of appearance of first stolon or runners with a mean of 3.40.

This result implies that the application of Treatment 2 with 100 ppm gibberellic acid (GA_3) significantly promotes early runner or stolon appearance, according to Kumra et al. (2018), who found that gibberellic acid (GA_3) plays a crucial role in promoting plant height and runner formation in strawberries. These findings reinforce the role of gibberellic acid (GA_3) in stimulating vegetative growth and suggest that its application, potentially combined with SA, can optimize runner development and overall plant performance.

Table 5. *Influence of Gibberellic and Salicylic Acids on the Morphological Descriptors of Time of Appearance of First Stolon or Runners of Strawberry cv. Sweet Charlie*

Treatments	Replication			Total	Mean
	I	II	III		
T0 - Control (water)	4.40	4.60	4.60	13.60	4.53^{bc}
T1 - 75 ppm Gibberellic acid (GA_3)	4.80	4.20	4.20	13.20	4.40^{cd}
T2 - 100 ppm Gibberellic acid (GA_3)	3.60	3.20	3.40	10.20	3.40^{e}
T3 - 100 ppm Salicylic acid (SA)	3.80	3.60	3.60	11.00	3.67^{cde}
T4 - 200 ppm Salicylic acid (SA)	3.60	3.60	3.20	10.40	3.47^{de}
T5 - 75 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	4.60	4.60	4.40	13.60	4.53^{bc}
T6 - 75 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	5.00	6.20	5.00	16.20	5.40^{ab}
T7 - 100 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	4.40	5.00	4.40	13.80	4.60^{bc}
T8 - 100 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	6.00	5.40	5.90	17.30	5.77^{a}
Grand Total & Mean	**40.20**	**40.40**	**38.70**	**119.30**	**4.42**

cv = 7.42%
*** = Highly Significant*

3.6 Number of Days to Flower per Plant

The number of days to flower per plant of the strawberry cv. Sweet Charlie, as influenced by gibberellic and salicylic acids, is presented in Table 6. Statistical analysis revealed a significant difference among all treatments tested. Treatment 5 had the highest number of days to flower, with a mean of 40.10. It is comparable to Treatment 7 with a mean of 38.10, followed by Treatment 8, Treatment 4, Treatment 6, Treatment 3, Treatment 0, and Treatment 2 with a mean of 37.80, 35.80, 33.57, 33.37, 31.93, and 31.83, respectively, while Treatment 1 got the shortest number of days to flower with a mean of 29.77.

Table 6. *Influence of Gibberellic and Salicylic Acids on the Number of Days to Flower per Plant of Strawberry cv. Sweet Charlie*

Treatments	Replication			Total	Mean
	I	II	III		
T0 - Control (water)	31.80	32.60	31.40	95.80	31.93^{de}
T1 - 75 ppm Gibberellic acid (GA_3)	28.90	30.70	29.70	89.30	29.77^{e}
T2 - 100 ppm Gibberellic acid (GA_3)	30.90	31.80	32.80	95.50	31.83^{de}
T3 - 100 ppm Salicylic acid (SA)	33.60	32.80	3.70	100.10	33.37^{d}
T4 - 200 ppm Salicylic acid (SA)	34.40	35.50	37.50	107.40	35.80^{c}
T5 - 75 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	39.20	40.00	41.10	120.30	40.10^{a}
T6 - 75 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	33.90	32.60	34.20	100.70	33.57^{d}
T7 - 100 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	38.10	37.40	38.80	114.30	38.10^{ab}
T8 - 100 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	37.00	37.70	38.70	113.40	37.80^{bc}
Grand Total & Mean	**307.80**	**311.10**	**317.90**	**936.80**	**34.70**

cv = 7.42%
*** = Highly Significant*

The result implies that the application of Treatment 1 with 75 ppm gibberellic acid (GA_3) can initiate early flower production, as supported by Kumra et al. (2018). They reported that gibberellic acid (GA_3) plays a crucial role in the growth and development of strawberries, stimulating plant height, runner formation, and flower production. These findings are consistent with previous research on the effects of gibberellic acid (GA_3) and Salicylic Acid (SA) on strawberry growth. El-Naggar et al. (2020) reported that gibberellic acid (GA_3) application enhances the development of runners, crowns, and inflorescences in strawberries. According to Rana et al. (2020), gibberellic acid (GA_3) contributes to increased fruit weight, plant height, early flowering, petiole length, fruit set, leaf area, and overall yield while improving fruit quality. Similarly, Sharma and Singh (2008) reported that gibberellic acid (GA_3) promotes flowering, fruit set, and size. Furthermore, Uddin et al. (2020) found that gibberellic acid (GA_3) treated strawberry plants exhibited greater vegetative growth, with increased plant height, leaf development, larger leaf areas, and a higher number of flower buds and flowers. Kumar et al. (2020) also confirmed that gibberellic acid (GA_3) accelerates flowering and bud formation, leading to increased flowers

and a higher fruit yield per plant and per hectare.

3.7 Morphological Descriptors of Time of Flowering (50% of plants at first flower)

The influence of gibberellic and salicylic acids on the morphological descriptors of time of flowering (50% of plants at first flower) of the strawberry cv. Sweet Charlie is presented in Table 7. Statistical analysis revealed no significant difference between all treatments and means tested. Treatment 4 had the longest time of flowering, with a mean of 5.20, followed by Treatment 7, with a mean of 4.87, Treatment 6 and Treatment 0, with the same mean of 4.20, Treatment 8 and Treatment 3, with the same mean of 4.20, Treatment 5, with a mean of 3.93, and Treatment 2, with a mean of 3.80, while Treatment 1 had the shortest time of flowering, with a mean of 3.67.

Table 7. *Influence of Gibberellic and Salicylic Acids on Number of Days to Flower per Plant of Strawberry cv. Sweet Charlie*

Treatments	Replication			Total	Mean
	I	II	III		
T0 - Control (water)	4.00	3.60	4.40	12.60	4.20
T1 - 75 ppm Gibberellic acid (GA_3)	2.80	3.80	4.40	11.00	3.67
T2 - 100 ppm Gibberellic acid (GA_3)	4.60	3.80	3.00	11.40	3.80
T3 - 100 ppm Salicylic acid (SA)	2.80	4.60	4.60	12.00	4.00
T4 - 200 ppm Salicylic acid (SA)	5.00	5.80	4.80	15.60	5.20
T5 - 75 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	3.40	4.40	4.00	11.80	3.93
T6 - 75 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	4.40	4.60	3.60	12.60	4.20
T7 - 100 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	5.20	5.20	4.20	14.60	4.87
T8 - 100 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	4.20	4.00	3.80	12.00	4.00
Grand Total & Mean	**37.00**	**39.80**	**36.80**	**113.60**	**4.21**

cv = 7.42%
*** = Highly Significant*

3.8 Number of Flowers per Plant

The summary table shows the number of flowers per plant every week for the strawberry cv. Sweet Charlie, as influenced by gibberellic and salicylic acids, is presented in Table 8. Statistical analysis showed highly significant differences in flower count among all treatment means from week 3 to week 6, as indicated by different superscript letters. Treatment 2 consistently produced the highest number of flowers during these weeks, with means of 14.67, 17.67, 20.00, and 22.33, respectively.

Table 8. *Summary Table of Number of Flowers per Plant per Weekly Basis of Strawberry cv. Sweet Charlie as Influenced by Gibberellic and Salicylic Acids*

Treatments	Mean Results Per Week					
	W3	W4	W5	W6	W7	W8
T0	9.67^{cd}	11.00^{d}	12.33^{de}	14.00^{de}	16.67^{c}	18.00^{c}
T1	14.00^{ab}	17.00^{a}	19.67^{ab}	22.33^{a}	24.67^{a}	26.00^{a}
T2	14.67^{a}	17.67^{a}	20.00^{a}	22.33^{a}	23.67^{a}	25.67^{a}
T3	12.33^{abc}	14.00^{bc}	16.33^{bc}	19.33^{abc}	21.67^{ab}	23.33^{ab}
T4	11.00^{abc}	12.00^{cd}	14.33^{cd}	16.00^{bcd}	16.33^{c}	18.67^{c}
T5	10.33^{bcd}	12.67^{bcd}	14.00^{cd}	15.33^{cde}	18.67^{bc}	20.00^{bc}
T6	13.00^{abc}	15.00^{ab}	17.00^{abc}	20.00^{ab}	23.33^{a}	27.33^{a}
T7	6.67^{d}	7.67^{e}	9.33^{e}	11.33^{e}	12.33^{d}	13.67^{d}
T8	11.33^{abc}	13.00^{bcd}	14.67^{cd}	16.33^{bcd}	19.33^{bc}	24.00^{ab}
	**	**	**	**	**	**
cv	**12.31%**	**7.34%**	**7.54%**	**8.65%**	**6.36%**	**6.53%**

Means with common superscript letters are not significantly different.

In week 7, Treatment 1 recorded the highest number of flowers per plant, averaging 24.67, while Treatment 6 had the highest number of flowers per plant, with a mean of 27.33 in week 8. However, treatments with common superscripts from week 7 to week 8 showed comparable results, indicating no significant difference. Conversely, Treatment 7 consistently had the lowest number of flowers per plant throughout the study, with 6.67, 7.67, 9.33, 11.33, 12.33, and 13.67 from week 3 to week 8. This suggests that Treatment 7 with 100 ppm gibberellic acid (GA_3) and 100 ppm Salicylic Acid (SA) application was the least effective in enhancing flower

production per plant.

The result implies that the application of Treatment 6, which combines 75 ppm gibberellic acid (GA_3) with 200 ppm salicylic acid (SA), significantly increases the number of flowers per plant. This finding is supported by previous studies highlighting the role of gibberellic acid (GA_3) in enhancing strawberry growth and reproductive development. According to Sharma and Godara (2020) gibberellic acid (GA_3) promotes flowering, fruit set, and size. Also, the influence of gibberellic acid (GA_3) on the growth of fruit and flowers and the lengthening or shortening of roots (Kosakivska, 2021).

Furthermore, Ali et al. (2023) found that gibberellic acid (GA_3) treated strawberry plants exhibited greater vegetative growth, with increased plant height, leaf development, larger leaf areas, and a higher number of flower buds and flowers. Kumar et al. (2020) also confirmed that gibberellic acid (GA_3) accelerates flowering and bud formation, leading to increased flowers and a higher fruit yield per plant and per hectare. In addition to gibberellic acid (GA_3), the application of Salicylic acid (SA) has also been shown to enhance plant growth and reproductive performance. Jamali et al. (2013) demonstrated that foliar spraying of Salicylic acid (SA) improved strawberry growth, flowering, and fruit production while advancing plant development and reducing gray mold incidence. Their study highlighted that the 'Festival' cultivar responded particularly well to Salicylic acid (SA) treatment, resulting in the highest yield and longest production season. These findings confirm that the combined application of gibberellic acid (GA_3) and Salicylic acid (SA) optimizes plant growth and flower production, ultimately improving overall yield and fruit quality.

3.9 Number of Days from Flowering to Fruit Setting

The number of days from flowering to fruit setting of the strawberry cv. Sweet Charlie, as influenced by gibberellic and salicylic acids, is presented in Table 9. Statistical analysis revealed a significant difference among all treatment means tested. Treatment 7 had the highest number of days from flowering to fruit setting, with a mean of 13.10, but was comparable to Treatments 6, 0, 5, and 4, with means of 11.57, 11.43, 11.40, and 11.33, respectively. Treatment 3, Treatment 8, and Treatment 1 got a mean of 11.00, 10.97, and 10.37, respectively, and Treatment 2 got the earliest number of days from flowering to fruit set with a mean of 10.13.

Table 9. *Summary Table of Number of Flowers per Plant per Weekly Basis of Strawberry cv. Sweet Charlie as Influenced by Gibberellic and Salicylic Acids*

Treatments	Replication			Total	Mean
	I	II	III		
T0 - Control (water)	12.70	11.10	10.50	34.30	11.43^{ab}
T1 - 75 ppm Gibberellic acid (GA_3)	10.90	10.40	9.80	31.10	10.37^{b}
T2 - 100 ppm Gibberellic acid (GA_3)	9.60	10.60	10.20	30.40	10.13^{b}
T3 - 100 ppm Salicylic acid (SA)	11.10	11.50	10.40	33.00	11.00^{b}
T4 - 200 ppm Salicylic acid (SA)	11.70	11.00	11.30	34.00	11.33^{ab}
T5 - 75 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	11.60	10.80	11.80	34.20	11.40^{ab}
T6 - 75 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	12.60	10.90	11.20	34.70	11.57^{ab}
T7 - 100 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	13.20	13.20	12.90	39.30	13.10^{a}
T8 - 100 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	10.00	11.70	11.20	32.90	10.97^{b}
Grand Total & Mean	**103.40**	**101.20**	**99.30**	**303.90**	**11.26**

cv = 7.42%

*** = Highly Significant*

This result implies that the application of Treatment 2 with 100 ppm gibberellic acid (GA_3) significantly reduces the number of days from flowering to fruit setting. These findings are supported by previous research on the effects of gibberellic acid (GA_3) and Salicylic Acid (SA) on strawberry growth. El-Naggar et al. (2020) reported that the gibberellic acid (GA_3) application enhances the development of runners, crowns, and inflorescences in strawberries. Additionally, salicylic acid (SA) has been shown to improve plant vigor, increase root length, and enhance overall plant metabolism, which may contribute to increased runner formation (Youssef et al., 2017). Furthermore, Sharma and Godara (2020) highlighted that gibberellic acid (GA_3) is crucial in promoting strawberries' plant height and runner formation. These findings reinforce the role of gibberellic acid (GA_3) in stimulating vegetative growth and suggest that its application, potentially combined with salicylic acid (SA), can

optimize runner development and overall plant performance.

3.10 Number of Fruits per Plant

Table 10 presents a summary table of the number of fruits per plant per week of the strawberry cv. Gibberellic and salicylic acids influence Sweet Charlie. Statistical analysis reveals a highly significant difference among all treatment means from week 4 to week 8. Treatment 3 produced the highest number of fruits per plant, with means of 31.67, 36.00, 37.33, 40.67, and 42.33, respectively.

Table 10. *Summary Table of Number of Fruits per Plant per Weekly Basis of Strawberry cv. Sweet Charlie as Influenced by Gibberellic and Salicylic Acids*

Treatments	Mean Results Per Week				
	W4	W5	W6	W7	W8
T0	18.00^{c}	19.67^{c}	21.67^{b}	25.00^{b}	28.00^{cd}
T1	26.33^{b}	27.67^{b}	34.00^{a}	36.33^{a}	40.33^{a}
T2	26.00^{b}	33.67^{a}	36.33^{a}	37.67^{a}	41.33^{a}
T3	31.67^{a}	36.00^{a}	37.33^{a}	40.67^{a}	42.33^{a}
T4	20.00^{c}	21.00^{c}	22.33^{b}	24.00^{b}	25.33^{cd}
T5	31.33^{a}	34.00^{a}	35.67^{a}	38.33^{a}	38.67^{ab}
T6	17.33^{c}	19.67^{c}	20.67^{b}	22.33^{b}	23.67^{d}
T7	17.33^{c}	21.67^{c}	22.67^{b}	27.33^{b}	31.67^{bc}
T8	16.33^{c}	18.67^{c}	20.67^{b}	22.67^{b}	23.33^{d}
	**	**	**	**	**
cv	6.94%	6.38%	5.02%	9.11%	7.44%

Means with common superscript letters are not significantly different.

Meanwhile, Treatment 8 had the lowest fruit count per plant in weeks 4 and 5, with means of 16.33 and 18.67, respectively. In week 6, Treatment 6 and Treatment 8 recorded the lowest fruit count per plant, with the same mean of 20.67. In week 7, Treatment 6 had the lowest number of fruits per plant, with a mean of 22.33, while Treatment 8 again had the lowest fruit count per plant, with a mean of 23.33 in week 8. Overall, the results suggest that different levels of gibberellic and salicylic acids significantly influenced fruit production per plant, with specific treatments enhancing fruit yield more effectively than others.

The result implies that the Treatment 3 application of 100 ppm Salicylic Acid (SA) significantly increases the number of fruits per plant. This finding is supported by Kumar and Bisarya (2023), who reported that foliar application of Salicylic Acid (SA) enhances plant tolerance and improves key growth characteristics, including leaf area, as well as the fresh and dry weight of shoots and roots, ultimately leading to a higher yield. Similarly, El-kenawy (2017) found that spraying with Salicylic Acid (SA) had a positive and significant impact on vegetative growth, increasing the number of fruits per plant, promoting early and total yields, and enhancing the fruit's soluble solids content. Additionally, these effects are comparable to those of gibberellic acid (GA_3), which is also known to improve fruit production. Silva et al. (2018) demonstrated that gibberellic acid (GA_3) application in strawberries enhanced plant growth by increasing plant height, the number of leaves and crowns, and extending the harvesting period. Moreover, gibberellic acid (GA_3) improved fruit size, weight, and yield. Similarly, Prakash et al. (2022) confirmed that the application of gibberellic acid (GA_3) positively influences fruit weight, size, and yield in strawberries. These findings highlight the effectiveness of both salicylic acid (SA) and gibberellic acid (GA_3) in enhancing fruit production. While Salicylic Acid (SA) improves plant tolerance and fruit quality, gibberellic acid (GA_3) is crucial in promoting vegetative growth and increasing fruit yield, making both plant growth regulators valuable for optimizing strawberry production.

3.11 Fruit Diameter (mm)

The summary table of fruit diameter per weekly basis of the strawberry cv. Sweet Charlie, as influenced by gibberellic and salicylic acids, is presented in Table 11. Statistical analysis showed highly significant differences among treatment means in weeks 5 and 6. Treatment 6 produced the largest fruit diameter, with means of 21.38 mm and 21.40 mm, respectively. In contrast, Treatment 0 of week 5 and week 6 had the smallest fruit diameter, with a mean of 19.10 mm and 19.87 mm, respectively.

Table 11. *Summary Table of Fruit Diameter (mm) per Weekly Basis of Strawberry cv. Sweet Charlie as Influenced by Gibberellic and Salicylic Acids*

Treatments	Mean Result Per Week			
	W5	W6	W7	W8
T0	19.10^{d}	19.87^{d}	19.79^{b}	20.75^{a}
T1	20.06^{bcd}	20.76^{abc}	21.35^{a}	22.01^{a}
T2	19.63^{cd}	20.51^{bcd}	21.20^{a}	22.04^{a}
T3	19.59^{cd}	20.11^{cd}	20.41^{ab}	20.94^{a}
T4	20.07^{bcd}	20.31^{bcd}	20.79^{ab}	21.16^{a}
T5	20.38^{abc}	20.96^{ab}	21.02^{ab}	21.66^{a}
T6	21.38^{a}	21.40^{a}	21.33^{a}	21.74^{a}
T7	21.00^{ab}	20.99^{ab}	21.18^{a}	21.37^{a}
T8	20.67^{ab}	20.66^{abcd}	20.83^{ab}	21.08^{a}
	**	**	**	**
cv	**1.72%**	**1.38%**	**2.03%**	**2.08%**

Means with common superscript letters are not significantly different.

In week 7, Treatment 1 produced the largest fruit diameter with a mean of 21.35 mm, while Treatment 0 recorded the smallest fruit diameter with a mean of 19.79 mm. In week 8, Treatment 2 produced the largest fruit diameter with a mean of 22.04 mm, while Treatment 0 had the smallest fruit diameter with a mean of 20.75 mm. However, treatments with common superscripts from weeks 5 to 8 had comparable results, indicating no significant difference. Overall, the results suggest that applying gibberellic and salicylic acids had a positive influence on fruit diameter, with certain treatments producing significantly larger fruit diameters than Treatment 0 (control).

The result implies that the Treatment 2 application of 100 ppm gibberellic acid (GA_3) significantly increases fruit diameter per plant. This finding is supported by Verma et al. (2022) in their study, Fruit Characters and Yield of Strawberry (*Fragaria ananassa*) as Influenced by Different Concentrations of Gibberellic Acid, which reported that gibberellic acid (GA_3) enhances fruit diameter, length, and weight, ultimately leading to higher yields. Gibberellic acid (GA_3) has consistently improved strawberry fruit diameter and yield across multiple studies. Foliar application of gibberellic acid (GA_3) increased fruit diameter, with 'Winter Dawn' measuring 3.38 cm and 'Sweet Charlie' reaching 3.28 cm. Additionally, gibberellic acid (GA_3) significantly impacted fruit weight and size, promoting the development of larger and heavier fruits (Gundogdu et al., 2021).

3.12 Average Fruit Weight (Grams) per Plant

The summary table of the average fruit weight (grams) per plant every week of the strawberry cv. Sweet Charlie, as influenced by gibberellic and salicylic acids, is presented in Table 12. Statistical analysis showed highly significant differences among treatment means in weeks 5 and 6. Treatment 6 had the highest average fruit weight (grams) per plant, with means of 7.26 and 7.33, respectively. In contrast, Treatment 0 had the lowest average fruit weight (grams) per plant, with means of 5.07 and 5.67, respectively.

Table 12. *Summary Table of the Average Fruit Weight (g) per Plant per Weekly Basis of Strawberry cv. Sweet Charlie as Influenced by Gibberellic and Salicylic Acids*

Treatments	Mean Result Per Week			
	W5	W6	W7	W8
T0	5.07^{e}	5.67^{e}	6.13^{e}	7.12^{bc}
T1	6.17^{cd}	6.79^{bcd}	7.40^{ab}	7.95^{a}
T2	6.62^{bcd}	7.21^{ab}	7.56^{a}	7.96^{a}
T3	6.07^{d}	6.38^{d}	6.69^{d}	7.04^{bc}
T4	6.63^{bcd}	6.70^{cd}	7.08^{bcd}	7.14^{bc}
T5	6.85^{ab}	6.97^{abc}	7.01^{bcd}	6.93^{bc}
T6	7.26^{a}	7.33^{a}	7.22^{abc}	7.35^{b}
T7	6.88^{ab}	6.85^{abcd}	6.94^{cd}	6.99^{bc}
T8	6.66^{bc}	6.64^{cd}	6.71^{d}	6.82^{c}
	**	**	**	**
cv	**3.00%**	**2.54%**	**2.23%**	**2.46%**

Means with common letter superscript are not significantly difference.

In weeks 7 and 8, Treatment 2 produced the highest average fruit weight (grams) per plant, with means of 7.56 and 7.96, respectively. Meanwhile, Treatment 0 recorded the lowest average fruit weight (grams) per plant in week 7, with a mean of 6.13, while Treatment 8 had the lowest average fruit weight (grams) per plant, with a

mean of 6.82 in week 8. However, treatments with common superscripts from weeks 5 to 8 had comparable results, indicating no significant difference. Overall, the results suggest that applying gibberellic and salicylic acids positively influenced the average fruit weight (grams) per plant, with specific treatments producing significantly.

The result implies that the application of Treatment 2 with 100 ppm gibberellic Acid (GA_3) significantly increases the average fruit weight (grams) per plant. Gibberellic Acid (GA_3) plays a crucial role in enhancing fruit weight, plant height, early flowering, petiole length, fruit set, leaf area, and overall yield while also improving fruit quality. Additionally, it promotes stem elongation and stimulates cell division, contributing to better vegetative and reproductive growth (Li et al., 2019). Gibberellic acid (GA_3) significantly impacts the growth and development of strawberries. It enhances plant height, runner formation, and flower production, leading to a higher fruit set percentage, increased fruit count, and greater overall yield. Moreover, Sharman and Godara (2020) reported that the application of gibberellic acid (GA_3) in strawberries effectively enhances fruit weight, size, and yield.

3.13 Morphological Descriptors of Fruit Size (weight in grams)

The influence of gibberellic and salicylic acids on the morphological descriptors of fruit size (weight in grams) of the strawberry cv. Sweet Charlie is presented in Table 13. Statistical analysis revealed no significant difference among the means of all treatments tested. Treatment 2, Treatment 6, and Treatment 8 got the same mean of 5.00 for the highest fruit size (weight in grams), followed by Treatment 7, Treatment 5, Treatment 4, Treatment 1, and Treatment 3 with a mean of 4.98, 4.95, 4.90, 4.77, and 4.60, respectively. Treatment 0 got the lowest fruit size (weight in grams) with a mean of 4.57.

Table 13. *Influence of Gibberellic and Salicylic Acids on Morphological Descriptors of Fruit Size (weight in g) of Strawberry cv. Sweet Charlie*

Treatments	Replication			Total	Mean
	I	II	III		
T0 - Control (water)	5.70	3.90	4.10	13.70	4.57
T1 - 75 ppm Gibberellic acid (GA_3)	4.60	4.90	4.80	14.30	4.77
T2 - 100 ppm Gibberellic acid (GA_3)	5.00	5.00	5.00	15.00	5.00
T3 - 100 ppm Salicylic acid (SA)	4.60	4.50	4.70	13.80	4.60
T4 - 200 ppm Salicylic acid (SA)	4.80	5.00	4.90	14.70	4.90
T5 - 75 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	4.90	4.95	5.00	14.85	4.95
T6 - 75 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	5.00	5.00	5.00	15.00	5.00
T7 - 100 ppm Gibberellic acid (GA_3) + 100 ppm Salicylic acid (SA)	5.00	4.95	5.00	14.95	4.98
T8 - 100 ppm Gibberellic acid (GA_3) + 200 ppm Salicylic acid (SA)	5.00	5.00	5.00	15.00	5.00
Grand Total & Mean	**37.20**	**37.10**	**38.40**	**112.70**	**4.77**

cv = 7.12%
ns = not Significant

3.14 Total Weight of Fruits (grams) per Plant

The summary table of the total weight of fruits (grams) per plant every week of the strawberry cv. Sweet Charlie, as influenced by gibberellic and salicylic acids, is presented in Table 14. Statistical analysis showed highly significant differences among treatment means in weeks 5 and 6. Treatment 6 had the highest total weight of fruit (grams) per plant, with means of 72.66 and 73.31, respectively. In contrast, Treatment 0 had the lowest total weight of fruit (grams) per plant, with means of 50.33 and 56.31, respectively. In weeks 7 and 8, Treatment 2 produced the highest total weight of fruit (grams) per plant with means of 75.56 and 79.59, respectively. Meanwhile, Treatment 0 recorded the lowest total weight of fruit (grams) per plant in week 7, with a mean of 61.30, while Treatment 8 had the lowest total weight of fruit (grams) per plant, with a mean of 68.20 in week 8. However, treatments with common superscripts from week 5 to week 8 had comparable results, indicating no significant difference.

The result implies that the application of Treatment 2 with 100 ppm gibberellic Acid (GA_3) significantly increases the total weight of fruit (grams) per strawberry plant. El-Naggar et al. (2020) support this finding, reporting that gibberellic Acid (GA_3) application enhances strawberry growth, flowering, fruiting, yield, and

overall fruit quality. It has been shown to improve fruit size, weight, and sweetness, making it an effective regulator for plant growth and fruit production.

Table 14. *Summary Table of Total Weight of Fruit (g) per Plant per Weekly Basis of Strawberry cv. Sweet Charlie as Influenced by Gibberellic and Salicylic Acids*

Treatments	Mean Result Per Week			
	W5	W6	W7	W8
T0	50.33^{d}	56.31^{e}	61.30^{e}	71.18^{c}
T1	61.64^{c}	67.83^{bcd}	73.99^{ab}	78.55^{ab}
T2	66.22^{bc}	72.14^{ab}	75.56^{a}	79.59^{a}
T3	60.68^{c}	63.75^{d}	66.85^{d}	70.35^{c}
T4	66.24^{bc}	66.95^{cd}	70.82^{bcd}	71.40^{c}
T5	68.50^{ab}	69.74^{abc}	70.06^{bcd}	69.27^{c}
T6	72.66^{a}	73.31^{a}	72.17^{abc}	73.51^{bc}
T7	68.78^{ab}	68.46^{abcd}	69.37^{cd}	69.91^{c}
T8	66.29^{bc}	66.45^{cd}	67.13^{d}	68.20^{c}
	**	**	**	**
cv	**2.99%**	**2.61%**	**2.22%**	**2.67%**

Means with common superscript letters are not significantly different.

Gundogdu et al. (2021) also found that gibberellic Acid (GA_3) significantly impacts fruit weight and size, leading to the development of larger and heavier fruits. Similarly, Sharma and Godara (2020) demonstrated that gibberellic Acid (GA_3) treated strawberry plants produced more fruits with greater weight, contributing to an increased overall harvest. Additionally, gibberellic Acid (GA_3) was observed to enhance the sweetness of strawberries, further reinforcing its role in improving both growth and fruit quality. Beyond yield improvements, gibberellic Acid (GA_3) application has been linked to increased fruit weight, plant height, early flowering, petiole length, fruit set, and leaf area, all of which contribute to better overall productivity (Prem, 2020).

4.0 Conclusion

This study demonstrated that the application of different levels and combinations of gibberellic acid (GA_3) and salicylic acid (SA) significantly influenced the growth and yield of the strawberry 'Sweet Charlie' variety, particularly from the third week after treatment onward. Specifically, Treatment 2 (100 ppm GA_3) significantly enhanced plant height, number of branch crowns, and runner production from week 3 to week 8 ($p < 0.05$). It also accelerated the appearance of stolons and increased the number of flowers between weeks 3 and 6. Treatment 1 (75 ppm GA_3) consistently increased the number of days to flowering and flower count at later stages, while Treatments 5 (75 ppm GA_3 + 100 ppm SA) and 6 (75 ppm GA_3 + 200 ppm SA) significantly boosted runner numbers during weeks 2 to 4. Regarding fruit yield, Treatment 2 (100 ppm GA_3) shortened the days from flowering to fruit setting and improved fruit diameter and weight from week 7 onwards. Treatment 3 (100 ppm SA) increased the number of fruits per plant between weeks 4 and 8. Treatment 6 (75 ppm GA_3 + 200 ppm SA) notably enhanced fruit diameter, fruit weight, and total fruit yield during weeks 5 to 6, with effects sustained through weeks 7 and 8 under Treatment 2. The combined application of GA_3 and SA, particularly at 75 ppm GA_3 with 200 ppm SA, and the sole application of 100 ppm GA_3, significantly improved both vegetative growth and fruit yield parameters of the 'Sweet Charlie' strawberry. These findings suggest that strategic use of these plant growth regulators can effectively enhance strawberry production.

5.0 Contributions of Authors

The principal author contributes to the study's writing and implementation. The co-author edits and supervises the data.

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7.0 Conflict of Interests

The authors assert no conflicts of interest regarding the publication of this paper.

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Understanding the Roots and Impacts of Conflict on School Culture and Behavior

Lorraine B. Albon*[1], Yvonne P. Cruz[2]
[1]Ponong Elementary School, Siquijor Province, Philippines
[2]Foundation University, Dumaguete City, Negros Oriental, Philippines

*Corresponding Author Email: albonlorraine01@gmail.com

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Abstract. This study explored the causes and consequences of conflict and their effects on school culture behaviors within the Division of Siquijor. Several studies reviewed were more focused on the personal effects of conflict and the lack of knowledge as to the impact of conflict on the school culture behavior is the primary evidence of knowledge gap, hence, this study was conducted. A. total of 125 respondents participated in the research, which utilized a descriptive-correlational design for data collection and analysis. Data were gathered through a structured survey questionnaire, and statistical treatments included mean calculations, multiple linear regression, the Mann-Whitney U-test, the Kruskal-Wallis H-test, and the DSCF Test. Key findings revealed that teachers experience conflict to a "Moderate" extent and perceive both the negative and positive consequences of conflict at a "High Degree." Additionally, the school culture behaviors were rated as "Very High." While no significant relationship was found between the extent of conflict faced by teachers and its positive consequences, a correlation was observed concerning the negative consequences.
Furthermore, no significant relationship existed between the level of conflict experienced and the overall school culture behavior. Notably, the number of teachers within a school was identified as a factor influencing variations in school culture behavior. This research highlights the intricate nature of conflict within educational environments and its subtle effects on school culture, offering valuable perspectives for future intervention strategies and policy formulation.

Keywords: School culture; Educational management.

1.0 Introduction

The dynamic and competitive nature of society today has put organizations worldwide, big or small, to face several extraordinary managerial, financial, and operational challenges. These challenges contribute to the demands on management to create a workplace that can satisfy the interests of its members, thereby improving and maintaining organizational efficiency and productivity (Newswirth et al., 2021). People, as referenced by McShane and von Glinow (2019), possess diverse perspectives, and the necessity to continually adapt to change creates opportunities for conflict to emerge. Conflict is unavoidable in all organizations. It is a natural occurrence in any work environment. It is rooted in social, economic, and political relations, particularly in the struggle over limited resources, social status, and power, which are not equally distributed in society. Though the prevailing point of view in the field is that conflict has adverse effects, Yusuf Daeng (2024) stressed that it can be a strong impetus for change within the organization.

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In the current Philippine educational system, a significant issue is the risk of losing skilled teachers and their inclination to leave because of high levels of emotional exhaustion. Santos (2023) posited that teachers are experiencing negative feelings stemming from conflicting roles and find it challenging to manage the demands of their positions, leading to a depletion of energy. The adverse effects of this intention to leave will profoundly impact not only the individual teachers but also the entire organization. Additionally, Filipino teachers are being attracted to Japan by higher pay and better benefits. They encounter issues with unmanageable class sizes, leading to time-management difficulties and low wages, which contribute to poor academic performance among learners (Santos, 2023).

Review of several studies relative to conflict and its consequences was more focused on emotional effect (Asfahani, 2022); behavioral effect (Hattab, et.al, 2022); satisfaction and discontentment (Wen, et.al, 2020); and physical effect, such as stress and burnout (Sabagh, et.al, 2019). The studies above focused more on the personal effects of conflict on individuals. No studies relative to the impact of conflict on school culture behavior were mentioned in any of those studies. Hence, this study was conducted to fill in the gap. The researcher, motivated by her ambition to become a school leader, believes that conflicts among teachers significantly impact school productivity. This concern has led her to explore the critical causes of conflict in the school setting and their effects on school culture and behavior. Understanding these dynamics can help management better address the needs and interests of teachers, which will ultimately improve efficiency and maintain institutional productivity. As noted by Asfahani (2022), effective management plays a vital role in achieving the institution's desired objectives. Thus, it is the responsibility of management to create a positive work environment for teachers by ensuring their well-being and actively resolving any conflicts that may arise. The researcher is also convinced that when teachers work harmoniously together, they can combine their efforts to provide quality education. This research aligns with Sustainable Development Goal 4 (SDG 4), which aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

2.0 Methodology

2.1 Research Design

This study utilized a descriptive-correlational research design. It is descriptive in the sense that it aimed to determine the causes and consequences of conflict and their influence on the school culture behavior. It is also correlational, in that variables were correlated to determine a relationship. In this study, the extent to which teachers are confronted with conflicts was correlated to the extent of consequences of disputes as well as to the school culture behavior.

2.2 Research Locale

The study was conducted in one of the municipalities in the Division of Siquijor, focusing on the public elementary and secondary schools. DepEd Siquijor is a medium-sized division comprising six (6) municipalities. Siquijor is popularly known as the “Island of Fire.” The name was given to the island because of its eerie glow that appeared after dusk, caused by the swarms of fireflies darting around the luxuriant foliage. From a distance, a light produced by the mangrove trees that surround its coast can be observed. Siquijor is renowned for being the center of mystic power, mystical activities, and black magic. It is becoming one of the most popular tourist destinations in the Philippines, specifically in the Republic of the Philippines, PSA Region VII, Central Visayas, and Siquijor. In terms of instructional quality, DepEd Siquijor has successfully established a strong position, with performances that consistently exceed very satisfactory standards, both at the regional and national levels (DepEd-Siquijor, 2022).

2.3 Research Participants

The research respondents are the 125 elementary and secondary public-school teachers from the Municipality of Siquijor who were selected through sampling.

2.4 Research Instrument

The tool used in the study is a survey questionnaire. The questionnaire consists of five parts. Part I contains the Disclosure Statement, while Part II focuses on the profile. Part III, adopted from Vilendrer (2024), addresses the causes of conflict. Part IV covers the consequences of conflict, and finally, Part V, adopted from Christopher Wagner’s School Culture Triage Survey, measures school culture behavior. The questionnaire is a standardized

one. However, it still underwent a dry run to ensure its consistency. The instrument was administered twice, with a two-week gap between the initial and second administrations. Results revealed a coefficient stability of 0.95 (information conflict), 0.94 (value conflict), 0.91 (interest conflict), 0.93 (relational conflict), 0.89 (structural conflict), 0.95 (positive consequences), and 0.96 (negative consequences). For the School Culture Triage Survey, there was no mention as to its internal consistency. A 5-point scale was used to determine the causes of conflict.

2.5 Data Gathering Procedure

Before the study was conducted, the researcher sought the permission of the Dean of the Graduate School Program to conduct the study in the Division of Siquijor. Upon approval, the researcher then requested the consent and acceptance of the Schools Division Superintendent of the Siquijor Division. She likewise sought the permission of the Public Schools District Supervisor as well as the school heads of the schools covered in the study. The final version of the questionnaire was attached to the letter requesting perusal and approval. The researcher personally distributed the instrument to the heads of different schools for dissemination to the teachers. A visit schedule was established to administer the questionnaire, ensuring that the respondents would not face any inconveniences or be unprepared. The purpose and objectives of the study were communicated to the respondents to encourage their support and cooperation. Additionally, the confidentiality of the results was assured to the respondents to ensure they felt comfortable sharing their genuine feelings and opinions.

2.6 Data Analysis Procedure

The researcher employed several tools for data analysis: Mean**,** this was used to determine the causes and consequences of conflict as well as the school culture behavior; Multiple Linear Regression**,** this tool was utilized to determine relationships and the significant predictors of the consequences of conflict as well as the school culture behavior among the independent or explanatory variables; Mann-Whitney U-test, this tool was used to test significant differences in school culture behaviors among schools categorized by type, with the assumption that the data are not normally distributed; Kruskal-Wallis H-Test**,** this tool was used to test for significant differences in the school culture behaviors of schools categorized by the number of teachers. It was chosen because the data are independent, consist of more than two groups, and do not follow a normal distribution: Dwass-Steel-Critchlow-Fligner Test**.** This procedure is a two-sided, nonparametric procedure that provides family-wise error rate protection. It was used after significance was found from the Kruskal-Wallis test.

2.7 Ethical Considerations

To reduce potential risk, the researcher considered the privacy and dignity of the participants or respondents in protecting the confidentiality of the information. Research ethics were upheld and observed throughout the study. The researcher adhered to the ethical guidelines outlined by the Ethics Committee of Foundation University. A consultation was pursued to ensure that the research issue is clearly sound, significant, and ethically sound. Additionally, the researcher exhibited a nonjudgmental attitude at some point during the research process. Additionally, the researcher collected the data without any modification. Information was supplied with proper citations.

3.0 Results and Discussion

3.1 Extent to which Teachers are Confronted by Conflict

Information Conflict

Table 1 shows the extent to which teachers face information conflicts. The data indicate a "Moderate" level of information conflict for teachers, with an average weighted mean of 2.88. While the overall conflict is moderate in magnitude, its intensity varies.

Table 1. *Extent to which Teachers are Confronted with Information Conflict (n=125)*

Indicators	Mean	Interpretation
1. No clear instruction is given when a task is assigned.	3.14	ME
2. Information is insufficient and the group has different views.	2.95	ME
3. Information disparities are not cleared up.	2.91	ME
4. Disagreement over what data is relevant.	2.83	ME
5. No sufficient time is given to be heard in a respectable environment.	2.59	LE
Aggregate Mean	**2.88**	**ME**

Note: 4.21 – 5.00 (Very High Extent, VHE), 3.41 – 4.20 (High Extent, HE), 2.61 – 3.40 (Moderate Extent, ME), 1.81 – 2.60 (Low Extent, LE), 1.00 – 1.80 (Very Low Extent, VLE)

The result of the conflict, although moderate, suggests that the primary source of information conflict is

insufficient information resulting from imperfections in the communication process, which in turn leads to misunderstandings among the members. As cited by Butalid (2021), incorrect, distorted, and ambiguous information would develop conflict. Similarly, Herrity (2023) stated that conflict arises when there is a disruption in communication flow at work. When an employee lacks the necessary information to perform their job, they may draw incorrect conclusions. Additionally, if an employee misinterprets what a colleague or superior says, it can lead to internal conflicts in the workplace. In a study conducted by Kilag et al. (2024), it was found that hurtful comments, misunderstandings, failure to meet obligations, miscommunication, and inadequate delegation of tasks were significant causes of conflict. However, these disputes were successfully resolved through effective communication and mediation from friends and co-workers. Thus, conflict can be managed and positively influenced by effective conflict resolution strategies.

Values Conflict

Table 2 presents the extent to which teachers are confronted by value conflict. The data reflect a "Moderate" extent, as evidenced by the average of 2.71, which is slightly lower in magnitude compared to the informational conflict confronting teachers.

Table 2. *Extent to which Teachers are Confronted with Values Conflict (n=125)*

Indicators	Mean	Interpretation
1. Values are not discussed with each other.	3.01	ME
2. Someone imposes or claims exclusive rights to a set of values.	2.80	ME
3. Rules are ambiguous and not clear.	2.74	ME
4. Values are imposed on others.	2.58	LE
5. Belief system is incompatible.	2.41	LE
Aggregate Mean	**2.71**	**ME**

Note: 4.21 – 5.00 (Very High Extent, VHE), 3.41 – 4.20 (High Extent, HE), 2.61 – 3.40 (Moderate Extent, ME), 1.81 – 2.60 (Low Extent, LE), 1.00 – 1.80 (Very Low Extent, VLE)

The results indicate that teachers are generally not faced with conflicts related to values. A study by Butalid (2021) revealed that aspects of school culture among teachers, such as professionalism, collegiality, and self-efficacy, are practiced from a high to a very high extent in their schools. Value conflict in public organizations is not as intense as described by Jensen et al. (2021), who argued that the missions of public organizations are typically framed in terms of both classic values and economic values for their members to pursue. This mission statement reflects the organization's desirable outcomes and outlines the prioritized values that the collective aims to achieve. They noted that value conflict in public organizations often arises from goal ambiguity, where goals are not discussed among members. This finding suggests that schools must establish shared values and objectives that are openly discussed and understood by every member, fostering a sense of collective achievement. Aguirre (2023) emphasizes that providing teachers with equal opportunities and empowering them with a shared vision and mission can enhance their commitment to work. This empowerment leads to increased motivation, productivity, and task-oriented behavior.

Furthermore, Butalid (2021) highlights that through collegiality, teachers can innovate and learn to value teamwork, focusing on collective objectives. On the other hand, Hattab et al. (2022) pointed out that when individuals have conflicting ideas and values, they may avoid interaction, which can result in communication breakdowns, distorted perceptions, competition among goals, and the prioritization of individual goals over group goals. Additionally, Weingart et al. (2023) indicated that intrateam conflict arises when members hold differing views, values, or face interpersonal incompatibilities. This is particularly likely in teams composed of members from various sectors, functional areas, disciplines, or diverse backgrounds. They suggest fostering collaboration within teams by creating a team-oriented environment and encouraging members to be more collaborative. Overall, these findings present a challenge to leaders across various fields: recognizing that no two individuals are alike. As McShane and von Glinow (2019) stated, differences among people, such as training, values, beliefs, and experiences, can be significant sources of conflict. Differentiation is a primary source of conflict, making it essential for leaders to reduce differences by increasing commonality and creating shared experiences.

Interest Conflict

Table 3 reflects the extent to which teachers are confronted by interest conflict. Data revealed that teachers are confronted by an interest conflict at a "Moderate" extent, evident in the average of 2.69. To summarize, teachers are not so much confronted by interest conflict as indicated in the result. The result implies that there must be an equitable distribution of funds, resources, and time for the interest of the group.

Table 3. *Extent to which Teachers are Confronted with Interest Conflict (n=125)*

	Indicators	Mean	Interpretation
1.	There is dissatisfaction over issues of money, resources or time.	2.85	ME
2.	There is no competition over perceived on actual incompatible needs.	2.78	ME
3.	Goals or organizational goals are incompatible with one's goals.	2.73	ME
4.	Goals of one person interfere with other person's goal.	2.56	LE
5.	One's interest is sacrificed to satisfy other's needs.	2.53	LE
Aggregate Mean		**2.69**	**ME**

Note: 4.21 – 5.00 (Very High Extent, VHE), 3.41 – 4.20 (High Extent, HE), 2.61 – 3.40 (Moderate Extent, ME), 1.81 – 2.60 (Low Extent, LE), 1.00 – 1.80 (Very Low Extent, VLE)

Relational Conflict

Table 4 presents the extent to which teachers experience relational conflict. The data indicate that teachers face relational conflict to a "low" extent, with an average weighted score of 2.54.

Table 4. *Extent to which Teachers are Confronted with Relational Conflict (n=125)*

	Indicators	Mean	Interpretation
1.	Misperception occurs within a group.	2.60	LE
2.	Communication is not properly disseminated.	2.56	LE
3.	There is a feeling of distrust within the group.	2.53	LE
4.	There is the presence of strong, negative emotions.	2.51	LE
5.	Somebody who is in action is motivated by malice or has an intent to harm others.	2.50	LE
Aggregate Mean		**2.54**	**LE**

Note: 4.21 – 5.00 (Very High Extent, VHE), 3.41 – 4.20 (High Extent, HE), 2.61 – 3.40 (Moderate Extent, ME), 1.81 – 2.60 (Low Extent, LE), 1.00 – 1.80 (Very Low Extent, VLE)

Data indicate that teachers experience a mutual relationship. According to Vilendrer (2024), these issues often lead to what are termed unrealistic or unnecessary conflicts, which can arise even when objective preconditions for conflict, such as limited resources or mutually exclusive goals, are absent. Instead, these conflicts stem from intense emotions like jealousy, mistrust, hatred, and dissatisfaction, which are influenced by perceptions, poor communication, stereotypes, and similar factors. Relationship conflicts often intensify disputes, causing them to escalate. Additionally, Mohamed (2020) noted that this type of conflict may emerge from interpersonal tension among employees within the organization. It is fundamentally rooted in the individuals involved. According to Kujick (2019), employees tend to perform better when the issues that bother them are addressed. He suggested that management should identify the key factors causing employee dissatisfaction. Management needs to understand the nature of these complaints and how employees interact with one another. Similarly, Castellini (2022) emphasized that management must be aware of the factors crucial to employees' job satisfaction, as these contribute to a more positive attitude toward their work. In line with this, Asfahani (2022) further suggested that management should create a better work environment for team members by prioritizing their well-being, clearly defining their roles, and managing workplace relational conflicts. This can be achieved by implementing balanced job designs and descriptions.

Meanwhile, Tabassi et al. (2024) proposed the application of a relational leadership approach to enhance cooperation among team members and promote conflict-avoiding behaviors. Their research revealed a positive association between these practices and improved team coordination and performance. Additionally, Arendt et al. (2024) noted that when individuals collaborate in teams, they ideally share a mutual understanding of both task-related aspects and the fundamental social rules and norms that govern their interactions. Their findings highlight the significance of a shared relational model approach among team members, which fosters perceptions of justice, mitigates conflict, and enhances team viability within organizational settings. This relational model approach advocates for the use of social rules and norms to guide interactions, thereby preventing relational conflicts. It includes a distinct moral motive that sets expectations for fairness and appropriate behavior in social interactions. Furthermore, Kohm and Nance (2023) supported the notion that cultivating positive relationships among team members acts as a cohesive force, promoting collaboration and support within the organization while preventing conflicts. Relationships can be strengthened through social bonding, team-building activities, and the establishment of norms for everyone to follow.

Structural Conflict

Table 5 illustrates the extent to which teachers encounter structural conflict within the organization. The data indicate a "Moderate" level of structural conflict, with an average weighted score of 2.82.

Table 5. *Extent to which Teachers are Confronted with Structural Conflict (n=125)*

	Indicators	Mean	Interpretation
1.	Management constraint is present.	2.92	ME
2.	Resources or opportunities are limited.	2.87	ME
3.	Rules are overlapping.	2.81	ME
4.	Task assignment is not based on the degree of specialization.	2.77	ME
5.	There is the presence of oppressive behavior exerted on others.	2.75	ME
Aggregate Mean		**2.82**	**ME**

Note: 4.21 – 5.00 (Very High Extent, VHE), 3.41 – 4.20 (High Extent, HE), 2.61 – 3.40 (Moderate Extent, ME), 1.81 – 2.60 (Low Extent, LE), 1.00 – 1.80 (Very Low Extent, VLE)

According to McShane and von Glinow (2019), several factors can lead to structural conflict, including management constraints, limited resources, incompatible goals, role ambiguity, differentiation, and communication issues. Vilendrer (2024) further posited that these factors often arise from aggressive interpersonal relations and are frequently influenced by external forces impacting the parties involved in the dispute. He suggests that resolving these structural problems requires identifying the underlying issues and taking steps to change them. In the studies by Suan (2020) and Herrity (2023), it was disclosed that structural problems such as unfairness, unequal distribution of power and resources, favoritism, oppressive patterns of interaction, time constraints, and geographical or environmental factors can lead to conflict. Although teachers experience structural conflict to a moderate extent, the findings suggest that it must be addressed promptly to prevent escalation into more serious issues. Vilendrer (2024) reiterated that identifying the structural problems and working to change the external factors that contribute to conflict can help resolve these issues, as they often stem from external sources. He also emphasizes that if structural disputes remain unresolved, they can act as a catalyst for escalating violent conflict.

3.2 Extent of Consequences of Conflict as Perceived by Teachers

Positive Consequences

Table 6 illustrates the perceived degree of positive consequences of conflict among teachers. The average score indicates that teachers view the positive outcomes of conflict at a "High" level, with a value of 3.98. While all positive consequences are perceived as high, they do vary in magnitude.

Table 6. *Extent of the Positive Consequences of Conflict as Perceived by Teachers (n=125)*

	Indicators	Mean	Interpretation
1.	Once the conflict is resolved, pent-up tensions, suppressed emotions, and frustration are relieved.	4.03	HD
2.	Conflict makes the individual more aware and more understanding of the existing problem.	4.02	HD
3.	Conflict energizes the individual to be more creative and to experiment with new ideas.	4.01	HD
4.	Once the conflict is resolved, the individual becomes more committed.	4.00	HD
5.	Performance tends to improve more when there is conflict among members.	3.96	HD
6.	Conflict motivates a person to adopt new forms of behavior to attain desired goals.	3.94	HD
7.	Conflict helps thresh out differences and clarifies issues and goals, which result in new procedures, norms, and rides.	3.93	HD
Aggregate Mean		**3.98**	**HD**

Note: 4.21 – 5.00 (Very High Degree, VHD), 3.41 – 4.20 (High Degree, HD), 2.61 – 3.40 (Moderate Degree, MD), 1.81 – 2.60 (Low Degree, LD), 1.00 – 1.80 (Very Low Degree, VLE)

Firstly, teachers identified that "once the conflict is resolved, pent-up tensions, suppressed emotions, and frustration are relieved," with a $w\bar{x}$ of 4.03. This finding aligns with Kujiek's (2019) assertion that when conflicting parties express their opinions and reach a close agreement, it leads to the release of strain and tension. Conversely, unresolved conflict can breed discontentment and create mental strain, as noted by Wen et al. (2021). Secondly, teachers felt that "conflict makes individuals more aware and understanding of the existing problem," resulting in a $w\bar{x}$ of 4.02. This aligns with Adam's (2019) perspective that conflict can drive change within an organization. When team members identify the existing issues, it can prompt necessary modifications to prevent the problem from escalating. Thirdly, another perceived positive consequence of conflict is that "it energizes individuals to be more creative and experiment with new ideas," scoring a $w\bar{x}$ of 4.01. This supports the notion presented by Tutor Help Desk (2024), which states that conflict can foster a high degree of cohesion as group loyalty and commitment increase. When group members unite to address challenges, they can take proactive steps to resolve problems. Adams (2019) also suggests that conflicts arising from healthy competition can enhance creativity and innovation among organizational members. In fourth place, teachers perceived that "once the conflict is resolved, individuals become more committed." This finding is supported by Kujiek (2019), who indicated that people tend to work better when the issues bothering them are resolved. Aguire (2023) also

found that providing teachers with equitable opportunities and empowering them with a shared vision and mission increases their commitment. As a result, they become more motivated, productive, and focused on tasks. Other positive consequences of conflict perceived by teachers, all rated at a "High" degree, include: "performance tends to improve more when there is conflict among members" ($w\bar{x}$ of 3.96), "conflict motivates individuals to adopt new behaviors to achieve desired goals" ($w\bar{x}$ of 3.94), and "conflict helps clarify issues and goals, leading to new procedures and norms" ($w\bar{x}$ of 3.93). These findings align with Adams' (2019) suggestion that realigning goals towards common objectives fosters teamwork among competing parties. Team members become more inventive, creative, and innovative as they work towards shared goals.

Negative Consequences

Based on the feedback from the teachers, the data in Table 7 indicates a generally negative perception of the consequences of conflict. While McShane and von Glinow (2019) argued that conflict can have advantages, they suggest that it often leads to more negative outcomes when not resolved appropriately. The table reveals that teachers perceive the negative consequences of conflict to be significant, with an average weighted response ($w\bar{x}$) of 4.02. However, the results vary in terms of severity. The highest concerns include the belief that "conflict can reduce group effectiveness" and "conflict can reduce group cohesiveness," which received the highest $w\bar{x}$ values of 4.12 and 4.11, respectively. This aligns with the assertion by McShane and von Glinow (2019) that conflict may undermine team cohesion. It can distract employees from their tasks and, in some cases, lead them to withhold their valuable skills, knowledge, and resources.

Table 7. *Extent of the Negative Consequences of Conflict as Perceived by Teachers (n=125)*

	Indicators	Mean	Interpretation
1.	Conflict can reduce group effectiveness.	4.12	HD
2.	Conflict reduces group cohesiveness.	4.11	HD
3.	Conflict breeds discontent which acts to dissolve common ties.	4.06	HD
4.	Conflict retards communication.	4.00	HD
5.	Cooperation and teamwork deteriorate if conflict lasts for a long period of time.	3.99	HD
6.	Conflict brings group functioning to a halt and threatens the group's survival.	3.93	HD
7.	Conflict among members will subordinate the primary of group goals.	3.92	HD
Aggregate Mean		**4.02**	**HD**

Note: 4.21 – 5.00 (Very High Degree, VHD), 3.41 – 4.20 (High Degree, HD), 2.61 – 3.40 (Moderate Degree, MD), 1.81 – 2.60 (Low Degree, LD), 1.00 – 1.80 (Very Low Degree, VLE)

Following this, the next perceived negative consequence is that "conflict breeds discontent, which dissolves common ties," with a $w\bar{x}$ of 4.06. This finding is supported by the research of Wen et al. (2020), which suggests that conflict can foster discontent and lead to mental strain. The emotional exhaustion resulting from energy depletion affects not only the teachers but also the entire organization. Another significant consequence of conflict identified is that "conflict retards communication." This finding concurs with the study by Hattab et al. (2022), which revealed that conflict can lead to a breakdown in communication. When individuals hold conflicting views, they may avoid interacting with each other.

Additionally, other negative consequences of conflict perceived to have a "High" degree of impact include "cooperation and teamwork deteriorate," "conflict halts group functioning and threatens group survival," and "conflicts undermine primary group goals," with $w\bar{x}$ values of 3.99, 3.93, and 3.92, respectively. These results are consistent with findings by Strouse and Reed (2021) and Newsham et al. (2022), which suggested that conflict can lead to workforce instability and decreased productivity. Furthermore, Hattab et al. (2022) noted that in extreme situations, members may cease working altogether, leading to a halt in group functioning that threatens the organization's survival.

3.3 Teachers' Perception of the School Culture Behavior Present in School

Professional Collaboration

Table 8 presents teachers' perceptions of school culture behavior regarding professional collaboration. The data indicates that the school culture behavior related to professional collaboration is rated as "Very High," with an average weighted mean of 4.45. This finding suggests that professional collaboration is consistently evident in schools, as reflected in the weighted mean range of 4.41 to 4.50. There is strong collaboration among teachers concerning student behavior, instructional strategies, curriculum issues, decision-making, scheduling, and planning.

Table 8. *Perception of Teachers as to the School Culture Behavior Present in their School in terms of Professional Collaboration (n=125)*

	Indicators	Mean	Interpretation
1.	The student behavior code is a result of collaboration and consensus among staff.	4.50	VHE
2.	Teachers and staff discuss instructional strategies and curriculum issues.	4.49	VHE
3.	The planning and organizational time allotted to teachers and staff is used to plan as collective units/teams rather than as separate individuals.	4.43	VHE
4.	Teachers and staff are involved in the decision-making process with regard to materials and resources.	4.42	VHE
5.	Teachers and staff work together to develop the school schedule.	4.41	VHE
Aggregate Mean		**4.45**	**VHE**

Note: 4.21 – 5.00 (Very High Extent, VHE), 3.41 – 4.20 (High Extent, HE), 2.61 – 3.40 (Moderate Extent, ME), 1.81 – 2.60 (Low Extent, LE), 1.00 – 1.80 (Very Low Extent, VLE)

In contrast, Butalid (2021) found that teachers rated their school's culture behavior related to professional collaboration as "High," which is slightly lower than the findings of the current study. However, they reported that collaboration was highly effective in terms of workloads and scheduling. This supports the assertion by McShane and von Glinow (2019) that individuals instinctively seek a balance between work and life. People tend to respond to situations they perceive as challenging or threatening to their well-being. Thus, this collaborative culture is consistently observed in organizations. Similarly, the study by Alferez and Belleza (2023) also indicated that the respondents rated their school culture behavior as very high. They found that professional collaboration has a positive predictive value for intercultural effectiveness among respondents, emphasizing that collaboration is essential for fostering a supportive and learning-oriented school culture. It facilitates the sharing of ideas, practices, and resources to address challenges.

Furthermore, Kohm and Nance (2023) claimed that effective collaboration requires dedicated time and space. They recommend creating opportunities for teachers to meet by allocating specific time for collaboration. Additionally, fostering positive relationships can act as a cohesive force, strengthening both cooperation and a supportive school culture.

Affiliative Collegiality

Table 9 presents teachers' perceptions of the school culture behaviors related to affiliative collegiality. The data indicate that teachers rated their affiliative collegiality as "High," with an average score of 4.20.

Table 9. *Perception of Teachers as to the School Culture Behavior Present in their School in terms of Affiliative Collegiality (n=125)*

	Indicators	Mean	Interpretation
1.	Teachers and staff visit/talk/meet outside of school to enjoy each other's company.	4.24	VHE
2.	Our school reflects a true "sense" of community.	4.23	VHE
3.	Our school supports and appreciates the sharing of new ideas by members of our school.	4.22	VHE
4.	Teachers and staff tell stories of celebrations that support the school's values.	4.18	HE
5.	There is a rich and robust tradition of rituals and celebrations including holidays, special events and recognition of goal attainment.	4.17	HE
6.	Our school schedule reflects frequent communication opportunities for teachers and staff.	4.16	HE
Aggregate Mean		**4.20**	**HE**

Note: 4.21 – 5.00 (Very High Extent, VHE), 3.41 – 4.20 (High Extent, HE), 2.61 – 3.40 (Moderate Extent, ME), 1.81 – 2.60 (Low Extent, LE), 1.00 – 1.80 (Very Low Extent, VLE)

These results demonstrate a high level of collegiality among teachers. A similar finding was reported in a study by Butalid (2021), which revealed that teachers' collegiality is indeed high. She noted that a strong and healthy collegial relationship among teachers is a crucial component of school effectiveness and teacher development. Dillon (2023) emphasized that teachers' ideas and responsibilities should be shared in a supportive manner to make their work more meaningful and to enhance the school system in ways that resonate with their lives. Additionally, Aguirre (2023) highlighted that a school culture characterized by positive relationships among teachers promotes high standards of behavior.

Furthermore, Butalid (2021) pointed out that the leadership style of the school head can significantly influence school culture behaviors related to affiliative collegiality. She concluded that when affiliative collegiality is high, teachers tend to perform better, experience greater job satisfaction, and demonstrate higher commitment to their organization. Overall, she believes that collegiality is essential for teachers' professional development and is critical for fostering an effective and productive organization. In her research, Suyo (2021) also noted that teachers' positive perceptions of their school leader's behavior can influence their commitment to their jobs. School leaders who are trained in effective leadership practices are more likely to foster a positive school culture.

Self-determination/Self-efficacy

Table 10 presents teachers' perceptions of the school culture behavior about self-efficacy and self-determination. The data indicates that teachers' self-efficacy is rated as "Very High," with an average score of 4.22. This reflects a robust cultural behavior, as teachers enjoy and willingly choose their careers, demonstrate interdependence among colleagues, value one another, and engage with the school community to find solutions to problems. The scores for these aspects range from 4.21 to 4.26, indicating a very high level of agreement.

Table 10. *Perception of Teachers as to the School Culture Behavior Present in their School in terms of Self-determination/Self-efficacy (n=125)*

	Indicators	Mean	Interpretation
1.	People work here because they enjoy and choose to be here.	4.26	VHE
2.	School members are interdependent and value each other.	4.25	VHE
3.	The school staff is empowered to make instructional decisions rather than waiting for supervisors to tell them what to do.	4.24	VHE
4.	Members of our school community seek alternatives to problems/issues rather than reporting what we have always done.	4.21	VHE
5.	When something is not working in our school the faculty and staff predict and prevent rather than react and repair.	4.18	HE
6.	Members of our school community seek to define the problem/issues rather than blame others.	4.17	HE
Aggregate Mean		**4.22**	**VHE**

Note: 4.21 – 5.00 (Very High Extent, VHE), 3.41 – 4.20 (High Extent, HE), 2.61 – 3.40 (Moderate Extent, ME), 1.81 – 2.60 (Low Extent, LE), 1.00 – 1.80 (Very Low Extent, VLE)

These results suggest that school leaders place a great deal of trust in their teachers. School heads are confident in their teachers' abilities to perform well and complete assigned tasks. This finding aligns with Abusubhiah et al.'s (2023) assertion that individuals with high self-efficacy beliefs are more likely to exert greater effort in facing challenges. He also highlighted that the autonomy teachers have in making instructional decisions and the interdependence fostered within the organization can significantly influence their motivation and belief in their abilities. The current results are notably higher than those found by Butalid (2021), who reported a high level of self-efficacy among teachers. However, they expressed that their self-efficacy was "Very High" about their work. Teachers indicated that they are happy, committed, and determined to remain in the profession. Furthermore, Cherry (2023) argued that the self-efficacy beliefs individuals hold influence their thoughts, feelings, and behaviors. She points out that individuals with high self-efficacy tend to have a deeper interest in their activities and suggests that self-efficacy is a skill that should be strengthened and enhanced.

3.4 Relationship Between Conflict and Consequences

Positive Consequences of Conflict

Table 11 presents the analysis of the significant relationship between the extent to which teachers confront conflicts and the positive consequences that may arise. Using multiple linear regression analysis, the results revealed that there is no significant relationship between the extent of conflict and positive consequences, as indicated by a p-value of 0.233, which is greater than the significance level of 0.05. Furthermore, the coefficient of determination (R^2) is 0.05, which is very small and insufficient to predict the outcome partially. To explain in percentage terms, only 5.5% of the variability in the dependent variable (y) can be associated with the variability in the independent variable (x), or vice versa.

Table 11. *Influence of the extent of conflicts on positive consequences*

Predictors	Estimate	SE	t	p
Intercept	3.50	0.20	17.00	<.001
Information Conflict	0.16	0.11	1.49	.138
Value Conflict	0.06	0.12	0.54	.590
Interest Conflict	-0.01	0.12	-0.11	.911
Relational Conflict	-0.11	0.15	-0.75	.452
Structural Conflict	-0.05	0.08	0.62	.532

Note: R = .23, R2 = .05, Adjusted R2 = .01, F= 1.39, p= .233

These findings indicate that the extent to which teachers experience conflict is not significantly related to the positive consequences of that conflict. Therefore, the data does not provide sufficient evidence to reject the null hypothesis. The conflicts experienced by teachers do not influence the positive outcomes that could result from conflict. According to Adams (2019), when conflicts are resolved effectively, they can be beneficial. They can accelerate organizational change, prompt modifications to policies and procedures, foster goal alignment,

enhance problem-solving, clarify issues, increase participant involvement and commitment, and lead to better decisions or outcomes. The key lies in managing conflict to maximize its positive effects.

Additionally, Kilag et al. (2024) emphasized the necessity of conflict management in their study, highlighting its significance, particularly in the relationship between administrators and those they supervise. They unveiled that disputes could be successfully resolved through effective communication and mediation of friends and co-workers. Conflict can be effectively managed and influenced. This result affirmed the statement of McShane and von Glinow (2019) that conflict, though advantageous, can produce more adverse outcomes if not properly resolved. They further argued that even a moderately low level of disagreement can tatter the fabric of workplace relations. In the same stance, Ladreit et al. (2024) cited that the negative effects of conflict are larger and more persistent compared to the positive effects, partly reflecting a sharper impact of higher intensity. The effect of conflicts stretches well beyond economics, causing immense human suffering, death, and increased fragility and food insecurity.

Additionally, a study conducted by Wen et al. (2020) disclosed that due to the negative emotions as a result of conflict, faculty members find themselves unable to control and balance the demands of each role, resulting in energy depletion. Emotional exhaustion affects not only the faculty members but also the entire organization as a whole. This result indicates that conflict, no matter its intensity, can lead to positive outcomes when managed constructively. As Conroy (2023) emphasized, practical conflict resolution skills can strengthen relationships, enhance communication, improve decision-making, boost creativity, and foster a deeper understanding of diverse perspectives. This occurs because individuals are encouraged to discuss and consider different viewpoints openly.

Negative Consequences of Conflict

Table 12 presents a test examining the significant relationship between the extent to which teachers face conflicts and the negative consequences that arise from these conflicts. Through Multiple Linear Regression analysis, the results reveal a significant relationship between these two variables, indicated by a p-value of 0.030, which is less than the significance level of 0.05. Additionally, the R^2 value of 0.97 means that it is sufficient to predict the outcomes to some extent. In percentage terms, 9.74% of the variability in the negative consequences of conflict (y) is associated with the variability in the extent to which teachers are confronted by conflicts (x), and vice versa. These results allow the rejection of the null hypothesis stating that no relationship exists between the extent of conflicts encountered by teachers and their negative consequences.

Table 12. *Influence of the extent of conflicts on negative consequences*

Indicators	Estimate	SE	t	p
Intercept	3.35	0.25	13.12	<.001
Information Conflict	0.25	0.13	1.84	.048
Value Conflict	0.24	0.15	1.54	.026
Interest Conflict	-0.03	0.14	0.21	.827
Relational Conflict	0.09	0.19	0.51	.611
Structural Conflict	0.08	0.10	0.88	.377

Note: R = .31, R2 = .09, Adjusted R2 = .05, F= 2.56, p= .030

Data indicate that among the types of conflicts, informational conflict and value conflict are significantly associated with the negative consequences of conflict, as represented by p-values of 0.048 (informational conflict) and 0.026 (value conflict), both of which are below the 0.05 significance threshold. This suggests that informational and value conflicts are significant predictors of the negative consequences of conflict. From these findings, one can deduce that the greater the extent of informational and value conflicts that teachers face, the more severe the negative consequences they experience. This finding supports Faris's (2019) assertion that communication is at the heart of workplace conflict. When tasks are assigned without clear instructions, it can lead to misunderstandings and conflict. Without proper information, colleagues may misinterpret each other's communications, resulting in misunderstandings. Similarly, Herrity (2023) emphasized that conflict arises when communication at work is disrupted; an employee may draw incorrect conclusions when lacking critical information needed to perform their job effectively. In addition, Hattab et al. (2022) highlighted that conflict can lead to communication breakdowns, distorted perceptions, competition for goals, and the prioritization of individual objectives over group goals. When individuals have conflicting ideas, they may avoid engaging with one another.

Furthermore, the study by Cain and Plessis (2020) on teachers' perceptions of conflict consequences concluded that conflict is generally experienced as an opposing force, resulting in defiant attitudes, intolerance, poor cooperation and teamwork, strained relationships, division, low morale, compromised work ethics, and a negative impact on overall wellness. Additionally, Ladreit et al. (2024) emphasized that the negative implications of conflict are more significant and persistent, reflecting a sharper impact from higher-intensity conflicts. Meanwhile, Guerra et al. (2020) found a significant relationship between conflict and its negative consequences. Their results indicated that relationship conflict diminishes both private and public sector employees' job satisfaction and affective well-being. In terms of task conflict, it was found to reduce job satisfaction and negatively impact the well-being of employees in private organizations. At the same time, this dysfunctional effect did not occur in public organizations, where the culture of support moderated the impact of task conflict. Overall, the extent to which teachers confront conflicts has negative consequences in their lives. As noted by Ladreit et al. (2024), the effects of conflict extend well beyond economic considerations, causing significant human suffering, increased fragility, food insecurity, and even loss of life.

3.5 Relationship Between Conflict and School Culture Behavior

Table 13 presents the results of a test examining the relationship between the extent to which teachers experience conflicts and the behavior of school culture. A Multiple Linear Regression analysis was conducted to determine if any relationship exists between these variables. The results indicate that there is no significant relationship, as evidenced by a p-value of 0.608, which exceeds the established level of significance of 0.05. Furthermore, the Coefficient of Determination (R^2) value of 0.02 is too low to predict any meaningful outcome. Specifically, only 2.94% of the variability in the dependent variable (school culture behavior) can be attributed to the variability in the independent variable (extent of conflict confronting teachers), and vice versa. Consequently, the data did not provide enough evidence to reject the null hypothesis, which states that no relationship exists between the extent of conflict teachers face and school culture behavior. It is important to note that the behavior of school culture is not influenced by the extent of conflict encountered by teachers.

Table 13. *Influence of the extent of conflicts on school culture behavior*

Indicators	Estimate	SE	t	p
Intercept	4.48	0.19	22.42	<.001
Information Conflict	0.00	0.10	0.03	.972
Value Conflict	0.06	0.12	0.53	.591
Interest Conflict	0.00	0.11	0.04	.968
Relational Conflict	-0.04	0.14	-0.27	.787

Note: R = .17, R2 = .02, Adjusted R2 = .01, F= 0.72, p=.608

The study by Butalid (2021) supports this finding, as she disclosed that having a strong, positive culture in school can lead to improvements in processes for achieving goals. She further cited that a positive school culture stimulates improvement in work, better collegial collaboration, and receptiveness to change for improvement that will build commitment and dedication among its members. The study by Guerra et al. (2020) revealed that the negative impact of task conflict in public organizations is mitigated by the organization's culture, which acts as a moderating factor. Additionally, Monsanto (n.d.) highlighted that understanding school culture is essential for transforming the school into an environment where students can thrive academically and where teachers can continuously improve. The moderate level of conflict experienced by teachers, as indicated in Table 1.6, may be linked to the very high extent of positive school culture behaviors reflected in Table 3.4. This suggests that a stronger positive school culture can lead to reduced conflict among teachers. In other words, when a school exhibits strong and positive cultural behaviors, conflicts are more easily resolved. Moreover, the findings support Dillon's (2023) assertion that school culture plays a crucial role in enhancing teachers' quality of life. A positive school culture can mitigate the negative impacts of social media, affecting both students and teachers. It influences the processes by which teaching and learning occur. Furthermore, Kohm and Nance (2023) maintained that fostering positive relationships among team members serves as adhesive support for a collaborative and nurturing school environment, thus preventing conflict from arising. Kroc (2023) added that conflicts in the workplace can stem from differing goals, values, beliefs, interests, needs, expectations, work styles, communication styles, and resource allocation—all of which are integral elements of school culture.

3.6 Differences in the School Culture Behavior when Grouped According to Profile

Type of School

Table 14 presents a test examining the significance of differences in school culture behavior when categorized by school type (small vs. large). The Mann-Whitney U-test was employed due to indications of a violation of normality assumptions, as shown by the Shapiro-Wilk normality test result (W = 0.94) with a p-value of .001.

Table 14. *Differences in the School Culture Behavior when Grouped According to the Type of School (n=125)*

School Type	N	$\bar{x}$	t	Mann-Whitney U	df	p	Remark
Small	73	4.29	0.27	1944	123	.966	Not Significant
Large	52	4.26					

Level of Significance = 0.05; Normality Test Using Shapiro-Wilk, W=9436, p=0.001 (Note: A low p-value suggests a violation of normality)

The results of the test show no significant difference in school culture behavior based on school type, as evidenced by a p-value of 0.96, which exceeds the significance level of 0.05. The data reveal that small schools have a mean score of 4.29 in school culture behavior, while large schools have a mean score of 4.26. This results in a negligible difference of 0.025, which is not significant and does not support the rejection of the null hypothesis, which states that no significant difference exists in school culture behavior when categorized by school type. This finding is further supported by Behtoui and Stromberg (2024), who argued that schools, regardless of size, can foster an effective culture if strong alliances are built among teachers, students, parents, and community members. Although the test results did not show significant differences, it is noteworthy that small schools exhibited higher school culture behavior. This observation aligns with the findings of Gregory and Smith (n.d.), who suggested that in smaller schools, scheduling is less rigid, allowing for more interaction between students and teachers during free time.

Additionally, students in small schools tend to receive a reasonable amount of attention, and their performance is typically average compared to that of students in larger schools. Similarly, Behtoui and Stromberg (2024) noted that small schools can create a nurturing environment where all students have the opportunity to engage meaningfully. In these smaller settings, students benefit from a dynamic curriculum that promotes their active participation in activities tailored to their individual needs, helping to build their confidence. While smaller schools have their advantages, it is generally found that the overall school culture and behavioral dynamics are similar, regardless of whether a school is small or large.

Number of Teachers

Table 15 presents an analysis of the significant differences in school culture behavior based on the number of teachers. The Kruskal-Wallis H-test was employed to determine whether significant differences exist in school culture behavior across different teacher groupings. The results indicate a considerable difference, with a p-value of less than 0.001, which is significantly lower than the 0.05 significance level. When examining the mean scores based on the number of teachers, the data revealed the following: schools with nine teachers or fewer had a mean score of 4.535; schools with 10 teachers had a mean score of 3.879; schools with 11 teachers received a mean score of 3.986; and those with 12 or more teachers had a mean score of 4.258 in their school culture behavior.

Table 15. *Differences in the School Culture Behavior when Grouped According to the Number of Teachers (n=125)*

No. of Teachers in School	n	$\bar{x}$	H	df	p	Remarks
9 & below	44	4.53				
10	14	3.87	19.54	3	<.001	Significant
11	15	3.98				
12 & above	52	4.25				
	No. of Teachers	**Computed Values and Remarks**				
	9 vs. 10:	W = -5.5718; p<.001 (significant)				
	9 vs. 11:	W = -4.4042; p=0.010 (significant)				
	9 vs. 12:	W = -3.1567; p=.115 (not significant)				
	10 vs. 11:	W = 0.8974; p=.921 (not significant)				
	10 vs. 12:	W = 3.1979; p=.107 (not significant)				
	11 vs. 12	W = 1.9601; p=.508 (not significant)				

Level of Significance = 0.05

A post hoc analysis using the DSCF pairwise comparison was conducted to identify differences in school culture behavior related to the number of teachers. The results showed significant differences between schools with nine

teachers and those with 10 teachers, as well as between schools with nine teachers and schools with 11 teachers, with p-values of < .001 and 0.010, respectively. These results suggest that schools with fewer teachers tend to exhibit higher levels of positive school culture behavior. This finding aligns with the study by Lee and Loeb (2019), which revealed that teachers in smaller schools tend to have better relationships with their students, colleagues, and community members. They often participate in essential community functions, enjoy a family-like atmosphere, and can closely attend to students' needs. Teachers in smaller schools generally possess a more positive attitude towards their responsibility for students' learning. However, it is concerning that the majority of enrollment in the Philippine education system currently leads to overcrowded classrooms, placing significant burdens on teachers. Today's educators are experiencing emotional exhaustion and energy depletion, making it difficult for them to balance their roles effectively. This imbalance adversely affects their performance and intentions to continue in their roles, resulting in role conflict (Wen et al., 2020).

Additionally, Ekaette et al. (2020) emphasized that a high teacher-to-pupil ratio creates severe challenges for teachers managing oversized classes. According to Wen et al. (2020), converting all schools to what is known as a "reasonable class size" could alleviate the burden of overcrowded classrooms on teachers. Furthermore, Chuktu et al. (2024) found that parents are significantly satisfied with the services provided in schools that maintain a low Teacher-Pupil Ratio (TPR). A lower TPR enables teachers to manage their classes more effectively, leading to improved teaching and learning outcomes. The current state of the Philippine educational system may be a significant contributing factor to the decline of education in the country. Teachers are often stressed and overwhelmed by oversized classes, which can lead to emotional exhaustion and energy depletion. As noted by Santos (2023), this situation increases the risk of losing committed and talented teachers due to unmanageable class sizes.

4.0 Conclusion

Conflict is natural in any organizational environment; it is inevitable. It may sometimes be advantageous or disadvantageous depending on how leaders manage conflict to bring about a positive effect. Although teachers are confronted with conflicts at a "moderate" level, this can still damage workplace relationships and hinder their productivity in activities. Conflict produces more adverse outcomes if not adequately resolved. Hence, it must be addressed immediately to prevent it from escalating. Information conflict and value conflict are significant predictors of the negative consequences of conflict due to insufficient information and faulty communication processes, which in turn will lead to other forms of conflict. Indeed, effective communication is at the heart of workplace conflict. Employees are more productive when their concerns are addressed. Therefore, it is a challenge for school leaders to identify the key factors that contribute to teacher dissatisfaction or disagreements, which can ultimately lead to conflict. As the saying goes, "Only a contented cow produces the best milk." School leaders must foster an environment grounded in a positive school culture and a supportive climate. This approach can encourage improvements in work, enhance collegial collaboration, promote receptiveness to change, and build teacher commitment and dedication, all of which contribute to better school performance. By creating a happy workplace for teachers, we can help the educational system achieve and sustain national development goals related to quality education. This study could serve as a reference for future researchers who wish to improve the school culture of their institution.

5.0 Contributions of Authors

The authors confirm their equal contribution to every part of this research. All authors reviewed and approved the final version of this paper.

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7.0 Conflict of Interests

This study has no conflict of interest of any sort.

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Developing Social and Emotional Learning Wellness Intervention for Filipino Students: An Integrative Literature Review

Cindy P. Molina*, Jerald Q. Vergara, Mark Anthony B. Manalo
Philippine Normal University, Manila, Philippines

*Corresponding Author Email: molina.cp@stud.pnu.edu.ph

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Abstract. Despite widespread implementation of Social and Emotional Learning (SEL) programs globally, there is a lack of culturally and linguistically responsive research evaluating their effectiveness among Filipino learners. SEL interventions are becoming more extensive. In many nations, interest in SEL is growing daily (Turan, 2021). This study examines the implementation and impact of Social-Emotional Learning (SEL) on the well-being and academic performance of Filipino students through an integrative literature review. A total of 43 sources, including empirical studies (n=20), conceptual/theoretical papers (n = 13), and policy/practice resources (n=10), were reviewed. These sources, published between 2017 and 2025, offer insights into the effectiveness of SEL globally, with a focus on the Philippine context. This gap presents an opportunity to develop context-specific, low-cost SEL interventions that reflect students' lived experiences in the Philippines. The review addresses three main research questions: (1) How is SEL implemented in classroom settings? (2) How does SEL influence students' well-being? (3) What SEL wellness interventions can be recommended for Filipino students? The findings reveal that well-implemented SEL programs significantly enhance students' social-emotional competencies, improving academic outcomes, classroom behavior, and interpersonal relationships. However, existing frameworks often lack cultural contextualization, limiting their relevance in the Philippine educational landscape. The study emphasizes the need for culturally responsive SEL strategies, considering Filipino students' unique social, familial, and academic pressures. Based on the reviewed literature, recommended interventions include breather wellness breaks, reflective journaling, and emotional regulator booths within classrooms to promote emotional resilience, self-awareness, and mental well-being, particularly in low-resource settings. This research highlights the need to adapt global SEL models to local realities to create inclusive, supportive environments that foster Filipino learners' academic success and holistic development.

Keywords: Filipino students; Intervention; SEL; Social and emotional learning; Wellness.

1.0 Introduction

Contemporary students tend to get easily stunned by the daily challenges, such as dealing with the social and emotional turmoil of their academic life. This creates a dilemma regarding emotional mindfulness and how to handle relationships with others. A lack of social and emotional skills leads to educational distress, which is linked primarily to a low quality of life. SEL is the cornerstone of a constructive academic mindset, with civic, social, emotional, and physiological consequences for both adults and children (Quiamno, 2021). SEL is an essential part of human growth and education (Fronda & Dolandolan, 2022). The Social and Emotional Learning (SEL) intervention will reinforce the students' achievement in scholastic and holistic views of life. Programs for

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evidence-based social-emotional learning (SEL) interventions should be viewed as a crucial component of learning and development. To choose the best SEL programs for intervention, it is essential to determine each student's unique needs and objectives (Aksoy & Gresham, 2024). This study will significantly contributed to long-term academic development that nurtures students' academic success and cultivates soft skills for the future career readiness of the learners. The SEL supports positive behavior in interaction with other people that values empathy and is suited to the Philippine context for Filipino learners.

Global organizations such as the OECD, UNESCO, and the World Bank are well-suited to help advance the worldwide agenda. Their studies and recommendations determine the significance of social and emotional skills in the 21st century for local and global soft skills competencies. It is widely acknowledged that socio-emotional skills are essential for success in the 21st-century labor force (UNICEF Philippines, 2023). These organizations provide funding and other support for the education reform initiatives of individual countries. Higher socio-emotional skill levels in students are associated with greater work prospects, underscoring the significance of these abilities in obtaining employment possibilities. This is particularly relevant for developing countries, where global organizations often have a strong presence. Organizations are also exclusively stationed to muster the skills and other resources of diverse international employment, facilitating exchanges and partnerships among stakeholders and institutions that cut across national, organizational, and disciplinary lines. Additionally, they provide forums to bring together relevant stakeholders to find feasible solutions to the gaps in developing social and emotional skills (World Economic Forum, 2017).

The SEL concepts act as an extra window for education. Students entering the school may have developed many social and emotional competencies that were built at home and nurtured in their younger years. Through the abundant benefits of SEL, the school can build on strengths and support students in enhancing their self-awareness, self-management, social awareness, relationship skills, and proper decision-making.

The five interrelated areas of competencies in Social and Emotional Learning (CASEL Framework, 2022) are: Self-awareness, which involves acknowledging feelings, emotions, and ideas and relating them to actions and behavior. Social awareness refers to respecting others and empathizing with their perspectives. Responsible decision-making is the capability to make sound judgments and determine the proper life choice. Self-management is the ability to handle emotions, regulate stress, and attain personal aims. Relationship skills refer to the ability to connect with others and maintain effective interpersonal relationships. SEL occurs naturally as students' developmental stages unfold. However, if children are unable to thrive in these five areas, they may develop behavioral issues that hinder their daily academic functioning or progress. Various methods, including Collaborative for Academic, Social and Emotional Learning, the Responsive Classroom approach, and Promoting Alternative Thinking Strategies, have been utilized to offer SEL because of its many long-term benefits (Kothari & Wesley, 2020).

The significance of ongoing, professional development for leaders and teachers in implementing Social-Emotional Learning (SEL) in schools is also supported by research. Teachers must receive training to carry out SEL programs for kids, but addressing teachers' personal SEL also benefits their well-being, the quality of their instruction, and student outcomes. Like teachers, principals rarely receive the necessary instruction or guidance to effectively implement SEL and establish SEL-infused, compassionate learning environments in schools. Scholars and practitioners have long observed that school ecologies that adopt a comprehensive vision and a set of policies and practices that support whole-child development and supplement and reinforce social-emotional learning (SEL) programs are more likely to achieve success and sustainability in their SEL initiatives. Students' engagement and academic success are impacted by the skills they acquire due to SEL programs, including increased positive peer collaboration, positive connections, self-knowledge and management, social awareness, and responsible decision-making (Pitlik, 2021).

Administrators should constantly evaluate stakeholder viewpoints, program implementation, student outcomes, and school and district resources to enhance SEL programs and make well-informed judgments regarding their efficacy in a specific school context. Several key factors influence the effectiveness of Social and Emotional Learning (SEL) programs, including program duration, scope, and leadership support. Longer and more intensive programs, especially those implemented consistently from preschool through high school, yield more significant outcomes than shorter interventions.

Despite the growing implementation of Social and Emotional Learning (SEL) programs, significant research gaps remain that limit their inclusivity and scalability, particularly in the Philippine context. Importantly, although most cultures share the five fundamental competency categories of CASEL, socioeconomic level, language, race or ethnicity, and other cultural characteristics may cause differences in certain aspects of adaptive SEL functioning (Mondi et al., 2021). One notable gap is the lack of culturally and linguistically responsive studies that assess the effectiveness of SEL interventions among Filipino learners. While diversity is often acknowledged in SEL discourse, the limited empirical evidence suggests that these programs may not adequately address the unique social-emotional needs, cultural values, and language backgrounds of Filipino students. Furthermore, with the increasing demand for mental health and emotional support in schools, many of which are under-resourced, there is a pressing need for research on the feasibility and effectiveness of virtual and low-cost SEL interventions. Exploring these dimensions is crucial for developing more equitable, accessible, and sustainable Social-Emotional Learning (SEL) programs that reflect the lived experiences of Filipino learners in diverse educational settings (Kim et al., 2024).

This paper addresses the research questions: "How is Social and Emotional Learning (SEL) implemented in the classroom setting? How does SEL influence the well-being of students? Based on the integrative literature review, what SEL wellness interventions for Filipino students can be recommended?" This study aims to explore the implementation of SEL in classroom settings, examine its impact on students' well-being, and identify culturally relevant SEL wellness interventions for Filipino students through an integrative literature review. The findings will contribute to academic understanding of SEL practices and inform the development of effective, contextually appropriate interventions supporting students' emotional and social development in the Philippines.

2.0 Methodology

This study employed an integrative literature review approach in response to the growing need for contextualized and evidence-based strategies in promoting Social and Emotional Learning (SEL), particularly among Filipino students. An integrative literature review was chosen for its unique capacity to systematically synthesize diverse theoretical and empirical literature—quantitative, qualitative, and mixed-methods—allowing for a comprehensive understanding of SEL implementation's complex and multidimensional nature and its impact on student well-being.

Integrative reviews help maintain a current knowledge base for each research topic. A comprehensive analysis of the literature is described as one where previous research is summed up by making generalizations based on numerous studies (Russell, 2005). Unlike traditional systematic reviews, which often limit inclusion to a single methodology, the integrative review allows for the inclusion of varied methods, thereby enabling the identification of gaps, emerging trends, and effective practices grounded in different educational contexts. This approach is especially critical given the emerging issues in mental health, post-pandemic academic recovery, and the pressing demand for socio-emotional support in school settings.

Table 1. *Inclusion and Exclusion Criteria for SEL Literature Review*

Category	Included	Excluded
Research Design	Any research design (e.g., experimental, quasi-experimental, mixed methods, etc.)	Historical and Grounded Theory designs
Year of Publication	Published from 2017 to 2025	Published in 2016 or earlier
Relevance to Topic	Focuses on Social and Emotional Learning (SEL) interventions, outcomes, or frameworks	Papers unrelated to SEL or those only tangentially related
Population	Students (preschool, elementary, secondary, tertiary) and educators are involved in SEL programs.	Populations not related to the education or school context.
Setting	School-based or education-related settings	Non-educational settings (e.g., corporate, clinical, unless within schools)

Table 1 presents the inclusion and exclusion criteria used to screen studies for this integrative review. Studies were selected based on their relevance to social and emotional learning (SEL) within educational contexts, their publication date (2017–2025), and their use of applicable research designs. Articles not centered on SEL, those conducted outside school-based settings, or using historical or grounded theory methods were excluded.

The researchers adopted a rigorous inclusion-exclusion criterion to guide the review process. The inclusion criteria for this integrative literature review encompassed studies employing various research designs such as quantitative (descriptive, meta-analysis, correlational, and experimental), qualitative (phenomenological and case study), mixed-methods (with a convergent design), and action research (with a single-subject focus). Participants included students and teachers from all educational levels, ranging from kindergarten to university, regardless of gender or nationality. Studies conducted in diverse educational settings, including elementary, high school, and university environments, were considered. As shown in Figure 1, a total of 43 sources were reviewed, categorized into empirical studies (n = 20), conceptual/theoretical papers (n = 13), and policy/practice resources (n = 10). Only publications from 2017 to 2025 were included to ensure the relevance of findings to current educational contexts. Conversely, studies utilizing grounded theory or historical research approaches were excluded due to their methodological divergence from the objectives of this review, along with publications dated before 2017, to maintain a focus on recent advancements in SEL frameworks and interventions.

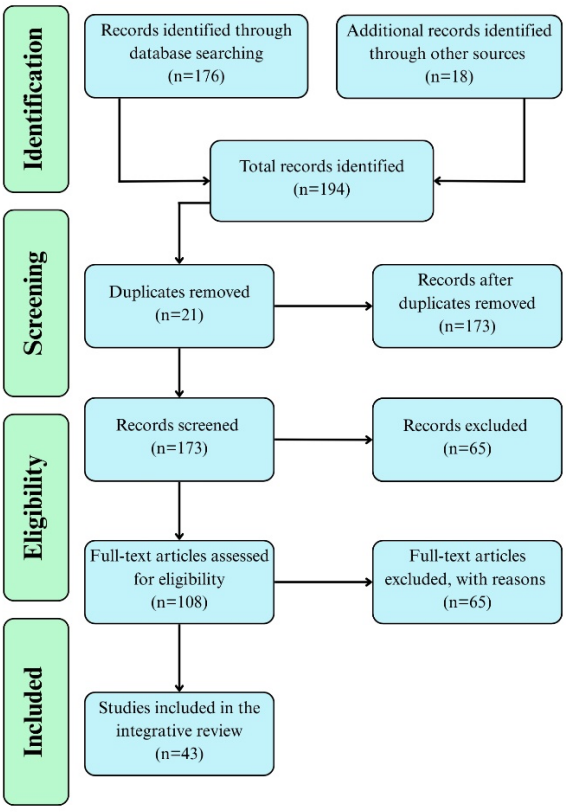

Figure 1. *PRISMA Flowchart for Integrative Literature Review*

The process involved a systematic search of peer-reviewed articles using academic databases such as ERIC, ScienceDirect, Google Scholar, JSTOR, Research Gate, and PubMed, employing key terms like "Social and Emotional Learning," "SEL implementation," "student well-being," and "Filipino students." Articles were then screened through title and abstract review, followed by full-text analysis to determine eligibility based on the predefined criteria. This methodical approach ensured the credibility, relevance, and breadth of literature gathered, ultimately supporting the formulation of context-sensitive SEL wellness recommendations for the Filipino educational setting.

The data gathering for this study on Social and Emotional Learning (SEL) involved reviewing 43 sources, categorized into empirical studies (n = 20), conceptual/theoretical papers (n = 13), and policy/practice resources (n = 10). The empirical sources comprised peer-reviewed studies using quantitative, qualitative, or mixed

methods. Conceptual papers, including models, frameworks, and literature reviews, shaped the development of SEL theory. Policy and practice resources from reputable institutions like CASEL, ChildFund Philippines, and the Department of Education, in partnership with SEAMEO INNOTECH, developed a localized SEL framework tailored to the Filipino context. UNESCO and UNICEF Philippines offered insights into real-world implementation. Only literature published between 2017 and 2025, with transparent methodologies and full-text access, was included in the review.

3.0 Results and Discussion

Social and emotional learning (SEL) refers to children developing the proper skills to regulate their social and emotional competencies. SEL focuses on managing negative emotions, which strengthens learners across levels to face challenges, thrive on their academic journey, and form relationships with the society to which they belong. SEL is the process through which all young people and adults acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions and achieve personal and collective goals, feel and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions (CASEL, 2022).

3.1 The Implementation of SEL in the Classroom Settings

The SEL is widely researched and studied globally; however, its implementation has been at the forefront of scientific inquiries. The primary concern that needs to be addressed is how Social-Emotional Learning (SEL) has been implemented in the classroom. SEL's implementation is created in a supportive environment that goes beyond just improving academic performance, but a setting that encourages children to accept responsibility for their actions, cultivate a sense of community, and intrinsically cherish their education (O'Brien, 2025). Behavioral approaches are helpful and should be treated as a form of academic mediation. When teachers implement Social-Emotional Learning (SEL) effectively, it creates lasting results in students' SEL skills. Students' SEL competencies improved due to SEL treatments and programs focusing on enhancing instructors' SEL and their active participation in program implementation (Aradhya & Parameswaran, 2023).

According to Lawson (2019), implementing social and emotional learning in the educational setting is a good start to advocate and strengthen the importance of SEL skills. The author further emphasized that it is vital for students to easily understand and retain the concepts during implementation. Establishing SEL programs in schools has multiple drawbacks, including high program expenses, divergent needs, and established curricula that cannot be customized to classroom requirements. Hence, identifying the fundamental components of evidence-based SEL programs could pave the way for more realistic approaches to implementing SEL in schools. Activities that support SEL should not be disregarded, regardless of whether they are part of a bigger program or course or stand alone. In any case, SEL has shown itself to be resilient, and as such, its continued existence opens the door to a more promising future for society and the education (Tabalanza et al., 2022).

According to Moffat (2021), inclusive SEL classroom implementation, anchored in differentiated instruction, must be employed to meet the individualized needs of students. SEL can be expressed through the principles of action that accommodate learn in various ways. This helpengage iners to express their emotions and perform social interactions with the aid of scaffolding. SEL intervention effectiveness must be well-planned and grounded in theory and research. Students should be taught how to apply SEL skills to their everyday life. It is essential to address both the emotive and social aspects of learning (Cristóvão et al., 2017). A conducive and safe space, a calm-down area in an inclusive classroom, is equipped with many promising student interventions. This area will be utilized for a respectful zone of emotional regulation through breathing techniques and privacy from overstimulation of feelings. It has a co-regulation teacher wherein the students learn to label emotions, practice emotional regulation skills, and support social problem issues. Sentence stems such as "I feel ___ when ___" can be used to help students' social and emotional development (SEL) by directing polite conversation and dispute resolution. Provide students with organized opportunities to practice empathy, collaboration, and active listening, such as lunch buddies or social skills groups. These exercises assist kids in forming wholesome bonds and navigating a variety of social situations with poise and confidence (Weingarten et al., 2020).

The readiness and self-efficacy of the teachers can determine the best practices for the initial implementation of SEL instructions. Recognizing the teachers' challenges, conducting proper training, collaborating with colleagues, and strong support from the administration are the factors that guarantee positive outcomes of the SEL implementation. The significance of ongoing, professional development for leaders and teachers in

implementing Social-Emotional Learning (SEL) in schools is also supported by research. Teachers must receive training to effectively implement SEL programs for students; however, addressing their own personal SEL also benefits their well-being, the quality of their instruction, and student outcomes (Greenberg, 2023). Teachers are the ones who drive social and emotional learning (SEL) programs and practices in classrooms and schools, and their social-emotional competence and well-being have a significant impact on their pupils. Students benefit from social-emotional learning because it teaches them critical life skills, including self-awareness, fostering a good self-image, accepting accountability for their actions, and building relationships with others (Austral et al., 2023). Additionally, teacher education programs must expand beyond the existing approach to promote equality and establish SEL basic competencies for inclusive SEL implementation. Teacher preparation programs should provide formal training in SEL, including implementation and assessment, to support future educators.

Social and Emotional Learning provides significant student benefits and can serve as one of the foundations of teachers' preparation programs. Teachers with excellent SEL competencies appreciate the value of SEL and are better prepared to implement the program. Teachers are the ones who drive social and emotional learning (SEL) programs and practices in classrooms and schools, and their social-emotional competence and well-being have a significant impact on their pupils (Patrylow, 2023). Students benefit from social-emotional learning because it teaches them critical life skills, including self-awareness, fostering a good self-image, accepting accountability for their actions, and building relationships with others. In addition, efficiently utilizing SEL in multiple situations involves incorporating it (Katz et al., 2020). A teacher with positive traits conducts the SEL program by delivering well-contextualized learning, anchored in the school's vision and mission (Domitrovich, 2017).

3.2 The Influence of SEL on the Students' Well-being

The benefits of SEL confirm the extent of the social and emotional skill sets of essential education students at risk of social exclusion. SEL has a significant impact on students' academic progress and preparedness. Strong SEL students are more engaged in class, have more positive attitudes toward and involvement in school, are more accepted by their peers, and receive more positive teacher comments and instruction. Students who lack social-emotional learning (SEL) skills are more likely to struggle academically and dislike school, which can lead to grade retention and dropout. Since SEL improves academic performance, lowers dropout rates, enhances general mental health and well-being, and—most importantly—strengthens the emotional and relational dynamics of classrooms, schools, communities, and societies, it should be incorporated into the collective efforts to transform education (UNESCO, 2021). This may aid their promotion in school, providing them with a higher chance of labor market prospects. On the other side, a lack of SEL affects not only a person's academic achievement but also their lifetime outcomes. Negative consequences, such as a higher risk of job loss, separation, illness, and reduced engagement in prosocial activities, are associated with lower levels of SEL (Ferrer et al., 2023). Offer them a life disposition so that they can make better-informed judgments and decisions about their future.

In a study, it was found that SEL interventions can have a positive impact on the progress of students from diverse family and societal backgrounds. Not only does the localized SEL benefit children, but it also benefits educators and other caregivers. It aids in the development of critical qualities that are essential for success in both school and daily life, such as self-awareness, emotional control, and social skills (ChildFund Philippines, 2024). Moreover, emotional dilemmas and drug dependency were lessened for students who received SEL involvement than for those who did not (Taylor et al., 2017). SEL interventions decrease students' classroom misbehavior and misconduct by providing children with stronger emotional abilities. Additionally, the learning atmosphere becomes more optimistic and compassionate when students can express themselves more effectively, manage their emotions, and respond to others' feelings. This means that kids are less likely to engage in inappropriate conduct, which may negatively impact their academic performance.

Positive social behaviors, such as collaborating with others, communicating with community members, showing empathy and emotional sensitivity towards others, understanding, prosocial conflict resolution, peacebuilding, working together, and cooperation, can all be observed when SEL activities are implemented (Napa et al., 2022). Students' social and emotional aptitudes improved intensely as they delved into their achievements, shortcomings, views towards others, and other characters within. These SEL skills are taught in social-emotional learning lessons to enhance students' socioemotional competencies. With the emotional and social learning approach, pupils received the opportunity to collaborate and participate in events to receive accurate feedback on their emotions. They frequently tracked their emotions and used an emotion scale to assess their levels

of happiness, stimulation, or enthusiasm. These resources assist pupils in improving their ability to regulate themselves and enhance their interpersonal skills. It also encouraged students to interact comfortably with others and learn more effectively by collaborating with their classmates. Connecting with other students helps them feel more secure and learn better from each other (Ahmed et al., 2020).

Social and emotional learning can be helpful for students' well-being. Creating Compassion is an intervention that combines empathy training with the arts. It was created as a high-quality, short-term, inexpensive SEL program. (Kim et al., 2024). Six domains were identified: social and emotional skills, attitudes toward self and others, positive social behavior, conduct problems, emotional distress, and academic performance (Weissberg et al., 2017). Significant results from operational and competent assessments included the following: first, when compared to control students, students who participated in SEL interventions showed relevantly greater favorable outcomes in all six domains, including an 11-point obtain in progress in scholastic achievement, and second SEL activities that were effectively executed and conformed to a combination of suggested practices—specifically arranged, active, focused, and specific facilitation—were more likely to emanate positive emotional response.

3.3 Development of SEL Wellness Intervention for Filipino Students

As for the researchers' view on social and emotional learning in the context of Filipino learners, it will be a great aid to formulate SEL interventions for young Filipino learners that are supported and tailored with the studies of the scholars' effective and diligent works about SEL's recommended programs, approaches being already used and validated by professionals. Culture-specific modifications can offer valuable information on the optimal implementation strategies that are essential to the SEL program's long-term viability (Jones et al., 2023).

As connected to SEL research, the goals and preparedness of senior high school students in the Philippines were linked to their social and emotional learning, including self-motivation and time management for self-management, decision-making abilities for responsible decision-making, and self-awareness through knowledge of academic strengths (Cuenca et al., 2023). SEL's effectiveness in terms of students' well-being will be carried out in the long term as their soft skill competencies are strengthened. The possession of positive social and emotional conduct by students is thereby connected with success in their future endeavors. Good social skills are related to the students' interpersonal dealings with other groups of individuals within the school. They are highly regarded and can lead to a lower incidence of misbehavior. Research evaluating the efficacy of SEL interventions based on play-based and social learning theory revealed the highest impact on students (Hassani & Schwab, 2021). Establishing a safe atmosphere, instituting regular routines, improving relationships between peers and adults, giving students a voice and a choice, addressing injustices, and using culturally sensitive and instructional methods (Cox et al., 2024).

This finding will serve as a good baseline for adopting or implementing Social-Emotional Learning (SEL) in the local Philippine setting. To educate students for social responsibility and post-secondary prospects, the Department of Education (DepEd) is taking the initiative to incorporate socio-emotional skills into the Philippine education system. The 2022–2030 Basic Education Development Plan includes the MATATAG agenda and socio-emotional skills. As per DepEd Order 71, s. In 2009, the Edukasyon sa Pagpapakatao (EsP) curriculum emphasized social awareness, relational skills, self-management, self-awareness, and making responsible decisions (Palma & Barberan, 2025). Additionally, socio-emotional skills are given higher weight in this curriculum. The researchers viewed SEL as a better way to support challenging concerns about students' social and emotional well-being in and out of the classroom.

4.0 Conclusion

This integrative literature review highlights the vital role of Social and Emotional Learning (SEL) in shaping students' academic success and personal development. SEL equips learners with core competencies such as self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. These skills enhance classroom behavior and academic outcomes and nurture emotional resilience and empathy, which are essential in navigating everyday life challenges. The findings also reveal that effective implementation of SEL requires cultural relevance and contextual adaptation. Schools that use SEL intervention effectively report higher academic achievement, better teacher-student connections, and fewer negative behaviors (Pitlik, 2021). Following empirical research on SEL, effective programs need to be evidence-based, well-designed, and well-

executed—that is, developmentally and culturally appropriate (Raimundo et al., 2024). While many global models have shown positive results, localizing SEL strategies remains crucial. Filipino students face unique social, familial, and academic pressures that call for context-sensitive interventions. Hence, there is a pressing need to move beyond generalized approaches and ensure that SEL practices reflect the lived realities and cultural values of Filipino learners.

Developing a Social and Emotional Learning wellness intervention designed explicitly for Filipino students is timely and essential. A variety of techniques and interventions, including classroom activities (like play, storytelling, drama, drawing, role-playing, etc.), home-based activities, and family involvement activities (like worksheets, parent meetings, portfolios, home visits, etc.), can be used to provide social-emotional learning training for students (Aksoy & Gresham, 2024). Social and emotional learning abilities can be developed safely and effectively through creative drama. According to studies, children's early social-emotional development is positively influenced by creative drama. Through improvisation and role-playing while constructing scenes, creative theater allows students to reflect on real-world problems by bringing their own experiences into the classroom (Koç & SungurtekiN, 2023). Peer tutoring and group contingency capitalize on the increasing role peers play for students in elementary school, but practice aspects like self-management might not have been included in the early childhood literature due to the developmental skills of young children (Sutherland et al., 2019). Topper Training is a cognitive-behavioral theory-based SEL intervention. A variety of intervention elements, including emotional, cognitive, and skill-building components where the Filipino students can learn a variety of skills throughout ten 90-minute sessions, including basic social skills like self-presentation, how to deal with bullying situations, how to demonstrate interest, trust, and friendship, how to give and receive feedback, and how to reflect on their value (De Mooij et al., 2024). Sample interventions may include a "breather wellness break," which gives students a few minutes to pause, stretch, or practice mindful breathing during busy academic hours. Journaling sessions can also be facilitated weekly to help students reflect on their thoughts and emotions. Students can practice and progressively enhance their emotional awareness through SEL activities, such as breathing exercises and movement that supports emotional regulation(Cox et al., 2024). Lessons on SEL can be incorporated into various topics, such as reading, arithmetic, and history. Teachers might offer reading-related group projects where students can role-play as historical individuals to comprehend the reasoning behind one another's actions or assign themselves roles to collaborate. Also, educators can set out a particular time for SEL. In addition to asking students to write in their notebooks, teachers can set up buddy classrooms where students can work in pairs (Sapungco, 2022).

Another advantage is the ease with which the SEL lesson on Creating Compassion can be incorporated into existing art curricula. Due to these advantages and its efficacy, Creating Compassion is a time- and cost-efficient alternative to many comprehensive SEL programs, which can help students in underprivileged and economically disadvantaged regions (Kim et al., 2024). Additionally, setting up an emotional regulator booth inside the classroom provides a safe space where learners can briefly retreat, calm down, and use tools like emotion cards or fidget items to self-regulate. These practices support students' emotional health and create a nurturing and responsive learning environment.

However, it is essential to note the limitations of this study regarding the sample size of the published literature reviewed. While the findings provide valuable insights, the relatively small and selective pool of sources enhances the capture of the broad spectrum of SEL practices and outcomes across diverse educational contexts. To improve the overall implementation and sustainability of the SEL approach, the program must actively engage various stakeholders, including students and teachers. This action will realize lifelong benefits (Aradhya & Parameswaran, 2023). Future research is encouraged to expand the literature base by including more extensive empirical studies and localized evidence to validate and enrich the development of culturally responsive SEL interventions. It is recommended that further research be conducted on the implementation of SEL in the local setting.

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Each researcher equally contributed to the overall development and refinement of the paper.

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7.0 Conflict of Interest

The researchers confirmed that there is no conflict of interest in the publication of this review.

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Assessing Core, Technical, and Leadership Competencies of Sangguniang Kabataan Officials in Negros Occidental: Key Determinants and Implications for Youth Governance

Shiela O. Suarez[1], Ruvy M. Tuble*[2]
[1]City Budget and Management Office, San Carlos City, Negros Occidental
[2]Carlos Hilado Memorial State University, Bacolod, Negros Occidental

*Corresponding Author Email: ruvy.tuble@chmsu.edu.ph

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Abstract. This study investigates the core, technical, and leadership competencies of Sangguniang Kabataan (SK) officials, who play a critical role in local youth governance. It aims to assess the competency levels of SK officials from eighteen barangays in a component city. The study utilized a descriptive and correlational research design, with participants including SK Chairmen, SK Kagawad, SK Secretaries, SK Treasurers, and barangay officials. The sample size was calculated using Yamane's formula, and respondents were chosen through simple random sampling using online lottery software. The Mean was used to assess core, technical, and leadership competencies, while multiple linear regression analyzed the influence of age, sex, education, and training attendance on these competencies. The result on the core, technical, and leadership competencies of Sangguniang Kabataan (SK) officials reveals a different perspective between self-assessments and evaluations by barangay officials. SK officials consistently rated their competencies higher, with overall "very good" ratings, but barangay officials rated them slightly lower, indicating a gap in perception. Communication was highlighted as the highest-rated core competency, yet barangay officials pointed out shortcomings in sustaining objectives due to communication inefficiencies. Financial management, although self-rated highly by SK officials, received lower ratings from barangay officials, suggesting the need for targeted training in this area. Moreover, regression analysis showed no significant relationships between demographic factors and competencies, except for the number of trainings attended, which significantly predicted both technical and leadership competencies. This emphasizes the importance of continuous professional development and structured training programs to enhance the effectiveness of SK officials in governance and project execution.

Keywords: Leadership competencies; Sangguniang Kabataan.

1.0 Introduction

Youth leaders, particularly Sangguniang Kabataan (SK) officials, play a pivotal role in advancing community development and fostering civic engagement among young Filipinos. Recognized as vital partners in nation-building by the Philippine Constitution, their role is institutionalized through the Local Government Code of 1991 and further strengthened by the Sangguniang Kabataan (SK) Reform Act of 2015 (Republic Act No. 10742). These legal frameworks mandate SK officials to undergo structured training in leadership, governance, and community development to ensure their readiness for public service (Palangdao et al., 2023).

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Despite these efforts, persistent gaps in the competencies of SK officials continue to emerge. Research highlights that while mandatory training programs have raised awareness of governance principles, many officials still lack critical skills, particularly in project planning, budgeting, monitoring, and evaluation (Sombrio et al., 2024; Madrid et al., 2020). Moreover, the weak enforcement of anti-dynasty provisions under the SK Reform Act has allowed political interference to undermine the autonomy and effectiveness of SK leadership (Flores et al., 2022; UNICEF, 2007). These challenges, compounded by competency gaps in financial management, decision-making, and accountability, have led to inefficient program implementation and incidents of unauthorized fund disbursement (Aligato et al., 2019; Banzuela et al., 2019).

International and local literature on youth leadership competencies increasingly emphasizes the need for core skills such as advocacy, adaptability, resilience, digital literacy, cultural competency, and strategic problem-solving (Eide & Kunelius, 2021; Smischney et al., 2018; Pribac et al., 2017). However, there remains a significant lack of localized and systematic assessments of the actual competency levels among SK officials, particularly in specific contexts such as Negros Occidental. Global frameworks (Rychen & Salganik, 2003) stress that competency assessments are essential for designing targeted interventions that can strengthen youth governance and develop future-ready leaders.

In the context of the component city in Negros Occidental where this study is conducted, observations by the City Budget Office and the City Accountant's Office have revealed practical challenges faced by SK officials. These include delayed submission of annual budgets, clerical errors, incomplete documentary requirements, and instances of unauthorized disbursement. Such operational issues point not only to administrative inefficiency but also to deeper gaps in core, technical, and leadership competencies, further exacerbated by political pressures and limited capacity-building initiatives. Given these pressing challenges, it becomes imperative to assess systematically the competencies of SK officials across three key domains: core competencies (such as adaptability, commitment to youth service, effective communication, and organizational awareness), technical competencies (including project execution, technical writing, and financial management), and leadership competencies (such as decision-making, coaching, mentoring, and embracing change). Furthermore, understanding how personal and demographic variables influence these competencies can help identify key determinants critical to improving youth governance.

Thus, this study seeks to contribute to the development of more responsive and evidence-based leadership training programs by assessing the competency levels of SK officials in Negros Occidental, identifying significant differences based on profile variables, and determining predictors of competency that have implications for strengthening youth governance at the grassroots level.

2.0 Methodology

2.1 Research Design

The study employed a descriptive-correlational research design, complemented by a comprehensive research framework. Descriptive research, as elucidated by McCombies (2019), was used to facilitate a detailed understanding of the core, technical, and leadership competencies of SK as assessed by themselves and barangay officials. Furthermore, as discussed by Curtis et al. (2016), relational research was utilized to explore if the respondents' age, sex, educational attainment, and number of trainings attended have influenced their level of competencies.

2.2 Research Participants

The participants of this study consisted of one hundred ninety-four (194) individuals, including the SK Chairperson, seven (7) SK Kagawads, SK Secretary, SK Treasurer, Barangay Chairperson, at least two (2) Barangay Kagawads, Barangay Secretary, Barangay Treasurer, and Barangay Records Keeper (BRK) from each of the eighteen (18) barangays of a component city. The list of the actual population was officially obtained from the Department of the Interior and Local Government (DILG) and the Local Youth Development Office (LYDO) of the component city, ensuring the accuracy and completeness of the sampling frame. The sample size was determined using Yamane's formula (1967), which is widely used for calculating an appropriate sample size based on a known population, ensuring a 95% confidence level and a 5% margin of error. This method was chosen to guarantee that the sample would be statistically representative of the total population while remaining manageable and practical for data collection. To ensure fairness and minimize selection bias, the participants were selected using simple random sampling. An online lottery application was used to randomly draw names

from the complete list of qualified officials. This approach ensured that each potential participant had an equal chance of being selected, thereby enhancing the representativeness of the sample and reducing the risk of researcher bias in the sampling process.

2.3 Research Instrument

The study utilized a researcher-made questionnaire, carefully crafted based on the Competency Framework for Sangguniang Kabataan (SK) Officials and Local Youth Development Officers (LYDOs) developed by the National Youth Commission and the Development Academy of the Philippines. The development process involved reviewing the official competency standards and adapting them into measurable indicators suitable for a survey format. Initial draft items were formulated to comprehensively cover the three major competency domains: core, technical, and leadership.

The questionnaire was divided into two parts. The first part collected respondents' demographic and professional profiles, including age, sex, position, and the number of trainings attended. The second part measured competency levels in three key areas: (1) Core Competencies—adaptability, commitment to serve, effective communication, and organizational awareness; (2) Technical Competencies—project execution, technical writing, and financial management and budgeting; and (3) Leadership Competencies—effective decision-making, coaching and mentoring, and embracing change. Responses were recorded using a five-point Likert scale, with options ranging from "Very Low" to "Very High" competency.

To ensure content validity, the initial questionnaire underwent expert validation by eleven (11) specialists in public administration, governance, and research. These experts were selected based on their academic qualifications, professional experience in youth development programs, and involvement in the development of competency frameworks. Using the Lawshe Content Validity Ratio (CVR), the relevance of each item was rated, resulting in a high CVR score of 0.958, exceeding the minimum acceptable threshold of 0.636, indicating excellent content validity. All items were retained without significant revisions. The instrument's reliability was further tested by administering the questionnaire to a pilot group of thirty-two (32) SK officials from another component city within the same province, who were not part of the actual study sample. Reliability analysis yielded a Cronbach's Alpha coefficient of 0.996, demonstrating extremely high internal consistency.

2.4 Data Gathering Procedure

This study used specific steps to ensure a systematic data collection process. First, a permission letter was sent to and approved by the Local Chief Executive, allowing the research to be conducted. The questionnaire included a cover letter that outlined the purpose of the study and assured respondents of the confidentiality of their data. It was administered through both face-to-face interactions and a drop-and-collect method. Upon retrieving the completed questionnaires, the researcher carefully reviewed the responses to verify the accuracy of the data. The raw data was then processed electronically with guidance from the Research Adviser and a Statistician. The same procedure was followed during the reliability testing of the questionnaire in a different component city. Notably, the study achieved a 100% retrieval rate for all distributed questionnaires.

2.5 Ethical Considerations

This research strictly adhered to ethical guidelines, prioritizing the anonymity and confidentiality of the participants. Before completing the questionnaires, participants were fully informed of their rights, and an Informed Consent Form was signed to ensure their voluntary participation. The Data Privacy Act was diligently observed throughout the study, allowing participants to feel secure in sharing their opinions and experiences. The researcher ensured that there were no unethical motives during the data collection process. Upon the study's completion, all soft copies of the data were permanently deleted, and the physical copies of the questionnaires were shredded to maintain confidentiality and data protection.

3.0 Results and Discussion

3.1 Core Competency of Sangguniang Kabataan

Table 1 presents a comparative analysis of the core competencies of Sangguniang Kabataan (SK) officials, as assessed through self-ratings and evaluations by barangay officials. The competencies examined include Adaptability, Commitment to Serve the Filipino Youth, Communicating Effectively, and Organizational Awareness. On average, SK officials rated themselves higher (M = 4.32) compared to the barangay officials'

evaluations (M = 3.84), although both scores fall within the "Very Good" category. Across all competency areas, SK officials consistently provided higher self-assessments than those given by barangay officials. In terms of Adaptability, SK officials reported a mean score of 4.21, while barangay officials rated them at 3.79. For Commitment to Serve, self-ratings averaged 4.31 compared to 3.83 from barangay officials. Communicating Effectively emerged as the highest-rated competency, with SK officials giving themselves a mean score of 4.35 (SD = 0.80), while barangay officials rated this slightly lower at 3.88 (SD = 0.86). Similarly, for Organizational Awareness, the self-ratings of SK officials averaged 4.32, compared to 3.84 for barangay officials.

Table 1. *Core Competency of Sangguniang Kabataan*

	SK Official (Self Rating)			Barangay Official		
	M	**SD**	**Interpretation**	**M**	**SD**	**Interpretation**
1. Adaptability	4.21	0.76	Very Good	3.79	0.90	Very Good
2. Commitment to Serve the Filipino Youth	4.31	0.49	Very Good	3.83	0.83	Very Good
3. Communicating Effectively	4.35	0.8	Very Good	3.88	0.86	Very Good
4. Organizational Awareness	4.32	0.75	Very Good	3.84	0.84	Very Good
Overall	**4.32**	**0.78**	**Very Good**	**3.84**	**0.86**	**Very Good**

Mean Scale: 4.50 - 5.00 (Excellent); 3.50 - 4.49 (Very Good); 2.50 - 3.49 (Good); 1.50 - 2.49 (Low); 1.0 -1.49 (Very Low)

The consistent pattern of higher self-ratings highlights a perceptual gap that warrants attention. This finding may be understood considering the concept of self-enhancement bias (Dunning, 2011), where individuals tend to view their abilities more favorably than external evaluators. In the context of SK governance, the discrepancy may reflect optimism or confidence among SK officials regarding their performance. Still, it could also indicate a limited awareness of areas requiring further development. Such gaps have important implications for leadership credibility and governance effectiveness.

Further qualitative data from interviews with five barangay officials suggest that while SK officials often exhibit enthusiasm at the beginning of their terms, challenges emerge in sustaining planning efforts and ensuring thorough preparation for activities. Communication inefficiencies were frequently cited as a contributing factor, underscoring the critical role of effective communication in translating plans into successful initiatives.

These findings are consistent with prior studies. Castillo et al. (2024) emphasize the need for strengthening communication pathways between SK leaders and their constituents to enhance governance outcomes. Similarly, Especial et al. (2022) highlight persistent communication gaps among SK officials, recommending structured training and improved collaboration between schools and communities. Boustani and Hanafi (2021) further argue that effective communication forms the foundation of successful youth leadership, influencing not only project implementation but also community engagement and trust. Conversely, Cruz (2018) found that youth leaders with weak communication skills were more likely to encounter project delays and lower community participation.

Several factors may explain the discrepancies in ratings. Differences in standards of evaluation are likely: SK officials may place greater weight on their intentions and effort, whereas barangay officials assess based on observable outcomes and consistency of performance. Generational differences could also shape expectations around leadership approaches and communication styles, contributing to varying perceptions.

The implications of these findings are substantial. Overestimating competencies may hinder SK officials from identifying critical areas for growth, potentially leading to inefficiencies in project management, weakened stakeholder relationships, and reduced program impact over time. Addressing these perceptual gaps through more realistic self-assessments, capacity-building interventions, and constructive feedback mechanisms can enhance leadership development and better align SK initiatives with community needs. Thus, strengthening communication skills and institutionalizing regular performance feedback between SK and barangay officials represent essential strategies for fostering more responsive, capable, and accountable youth leadership at the community level.

3.2 Technical Competency of Sangguniang Kabataan

As presented in Table 2, the analysis of the technical competency of Sangguniang Kabataan (SK) officials reveals noteworthy insights from both self-assessments and evaluations by barangay officials. Overall, SK officials rated their technical competencies highly, with a mean score of 4.31 (SD = 0.51), interpreted as "Very Good." Barangay

officials also categorized their performance as "Very Good," but with a lower mean rating of 3.68 (SD = 0.60), indicating a significant gap in perception. This disparity highlights the need for a more balanced and objective understanding of the officials' technical abilities from both perspectives.

Table 2. *Technical Competency of Sangguniang Kabataan*

	SK Officials (Self Rating)			Barangay Officials		
	M	**SD**	**Interpretation**	**M**	**SD**	**Interpretation**
A. Project Execution	4.26	0.00	Very Good	3.83	0.00	Very Good
B. Technical Writing	4.33	0.72	Very Good	3.79	0.88	Very Good
C. Financial Management and Budgeting	4.34	0.81	Very Good	3.42	0.91	Good
Overall	**4.31**	**0.51**	**Very Good**	**3.68**	**0.60**	**Very Good**

Mean Scale: 4.50 - 5.00 (Excellent); 3.50 - 4.49 (Very Good); 2.50 - 3.49 (Good); 1.50 - 2.49 (Low); 1.0 -1.49 (Very Low)

When disaggregated by specific skills, notable differences become more evident. Financial management and budgeting, a critical technical competency, was self-rated by SK officials at a high mean of 4.34 (SD = 0.81), suggesting strong confidence in their fiscal management skills. However, barangay officials rated them considerably lower, with a mean of 3.42 (SD = 0.91), indicating concerns about their practical application of financial knowledge. Given that financial management is fundamental for the planning and sustainability of youth-led projects, this gap is concerning. Ahmed (2021) emphasized that financial literacy and budgeting skills are essential to achieving project sustainability and preventing resource mismanagement. Similarly, Scheer and Stegmaier (2018) argued that youth leaders must not only manage funds effectively but also demonstrate transparency and accountability to gain community trust and ensure the long-term success of their programs. These findings suggest that while SK officials may feel confident, there is a perceived gap in actual financial management performance that must be addressed through focused capacity-building programs and mentorship from more experienced local leaders.

In the area of technical writing, SK officials again expressed a strong self-assessment with a mean score of 4.33 (SD = 0.72). Barangay officials, while still positive, provided a slightly lower mean rating of 3.79 (SD = 0.88). This skill is essential for preparing project proposals, reports, and documentation necessary for transparency and funding acquisition. Martin (2017) highlighted that proficient technical writing enhances project credibility and increases opportunities for external support, grants, and partnerships. The relatively lower rating by barangay officials could indicate a need for better articulation, structure, or compliance with formal standards in SK documents, which should be a focus area in future capacity-building workshops.

Interestingly, project execution competencies garnered relatively closer ratings from both groups. While SK officials still rated themselves slightly higher, the smaller gap suggests that both parties recognize the importance and performance of project delivery. This is a positive signal that SK officials are perceived as capable of implementing activities, although Crawford et al. (2019) caution that successful execution must also be matched by effective planning and post-implementation evaluation—areas where technical writing and financial management skills are closely interlinked.

The consistent trend of higher self-ratings among SK officials compared to those of barangay officials may be attributed to several factors. One plausible explanation is the presence of optimism bias or self-enhancement tendencies common among young leaders, leading them to view their competencies more favorably. Additionally, barangay officials may apply stricter standards based on experience and tangible outcomes, rather than self-perceived growth or effort. Heck and Krueger (2020) observed that individuals tend to overestimate their capabilities while simultaneously underestimating the prevalence of self-enhancement biases in others, which could partially explain the discrepancy.

These gaps have critical implications for SK governance. Overconfidence without corresponding external validation can lead to challenges in project implementation, budgeting, and reporting, which are essential for maintaining public trust. Addressing these gaps through continuous skills training, third-party assessments, mentorship programs, and real-time feedback mechanisms will not only enhance the technical competencies of SK officials but also foster greater alignment between self-perception and external evaluation. Ultimately, aligning the perspectives of SK officials and barangay leaders is essential to building a more effective, transparent, and accountable youth governance system that genuinely serves the Filipino youth. Future leadership development initiatives must prioritize financial management, technical writing proficiency, and

critical self-assessment practices to bridge these gaps and realize the full potential of SK leadership.

3.3 Leadership Competency of Sangguniang Kabataan

The data presented in Table 3 provide essential insights into the leadership competencies of Sangguniang Kabataan (SK) officials, based on both self-assessments and evaluations by barangay officials. SK officials rated their overall leadership competency at a high mean score of 4.31 (SD = 0.51), interpreted as "Very Good," reflecting strong confidence in their leadership abilities. Barangay officials, while also giving a "Very Good" rating, provided a lower mean score of 3.74 (SD = 0.66), indicating a perceptual gap between how SK officials view themselves and how they are perceived externally. In specific leadership dimensions, notable discrepancies emerge. For decision-making, SK officials rated themselves very highly (mean = 4.26, SD = 0.00), whereas barangay officials rated them much lower (mean = 3.53, SD = 0.20). This finding suggests a need for improved decision-making processes, particularly involving consultation, evidence-based judgment, and responsiveness to community needs. Pama (2019) and Pabalan and De Lara (2021) have similarly emphasized the pivotal role of SK officials in participatory governance, highlighting that meaningful youth involvement in decision-making is critical to community development. The observed gap may be attributed to a potential overconfidence among SK officials or a lack of transparency and inclusivity in their actual decision-making practices.

Table 3. *Leadership Competency of Sangguniang Kabataan*

	SK Official (Self Rating)			Barangay Official		
	M	**SD**	**Interpretation**	**M**	**SD**	**Interpretation**
1. Effective Decision-making	4.26	0.00	Very Good	3.53	0.20	Very Good
2. Coaching and Mentoring	4.33	0.72	Very Good	3.87	0.88	Very Good
3. Embracing Change for Youth Development	4.34	0.81	Very Good	3.82	0.91	Very Good
Overall	**4.31**	**0.51**	**Very Good**	**3.74**	**0.66**	**Very Good**

Mean Scale: 4.50 - 5.00 (Excellent); 3.50 - 4.49 (Very Good); 2.50 - 3.49 (Good); 1.50 - 2.49 (Low); 1.0 -1.49 (Very Low)

The relatively aligned ratings on coaching and mentoring — SK officials at 4.33 (SD = 0.72) and barangay officials at 3.87 (SD = 0.88) — show a shared recognition of the importance of guidance, support, and peer leadership. This suggests that SK officials are somewhat successful in providing mentorship within their circles, though barangay officials see room for further enhancement. Althunyan and Almulhim (2020) and Ikpefan and Ologunde (2020) emphasize that coaching skills, such as communication, delegation, and problem-solving, are key to strengthening leadership pipelines. Further development in this area could solidify SK officials' roles as effective youth mentors and community mobilizers, as also highlighted by Palangdao et al. (2023).

Meanwhile, in embracing change for youth development, SK officials demonstrated strong confidence (mean = 4.34, SD = 0.81), while barangay officials gave a slightly more conservative rating (mean = 3.82, SD = 0.91). This suggests that while SK officials see themselves as adaptable and innovative, barangay officials may perceive their efforts as limited or needing more visible impact. Research by Adomako et al. (2021) and Lee and Choi (2019) supports that adaptability is a critical leadership trait, particularly in dynamic community environments where flexibility and innovation are needed to navigate complex challenges.

The discrepancies observed in the ratings could stem from several factors. First, younger leaders may have a self-enhancement bias, leading them to view their leadership capacities more favorably. Second, barangay officials, often more experienced, may assess SK performance based on stricter benchmarks tied to tangible results, rather than intentions or perceived effort. Furthermore, differences in expectations — with SK officials focusing more on their potential and intentions, and barangay officials emphasizing outcomes and accountability — could contribute to the perceptual gaps.

These differences have important implications for SK leadership competency and governance. An inflated self-assessment among SK officials may lead to complacency and underestimation of areas for improvement, potentially affecting the delivery of effective youth programs. On the other hand, barangay officials' more critical evaluations point to the need for SK officials to develop greater self-awareness, seek constructive feedback, and pursue continuous professional development. To enhance leadership effectiveness, targeted training programs focusing on decision-making, strategic thinking, mentoring, and adaptive leadership should be institutionalized. Moreover, fostering a culture of open dialogue between SK and barangay officials can help bridge these perceptual gaps, ensuring that SK governance becomes more aligned with community expectations and grounded in collaborative leadership practices. Strengthening these competencies is essential to

empowering SK officials to fulfill their mandate as catalysts of youth development and community transformation.

3.4 Determinants of Core Competency of the Sangguniang Kabataan

The multiple regression results in Table 4 highlight the lack of significant relationships between the age, position, sex, educational attainment, and number of trainings attended and the core competencies of Sangguniang Kabataan officials, as indicated by their respective p-values being greater than the alpha level of 0.05. Specifically, the variables were as follows: age ($R = 0.078$, $R^2 = 0.006$, $p = 0.421$), position ($R = 0.014$, $R^2 = 0.000$, $p = 0.887$), sex ($R = 0.144$, $R^2 = 0.021$, $p = 0.136$), educational attainment ($R = 0.123$, $R^2 = 0.015$, $p = 0.203$), and number of trainings attended ($R = 0.069$, $R^2 = 0.005$, $p = 0.477$).

Table 4. *Multiple Linear Regression Results on the Determinants of Core Competencies*

Variable	R	R^2	p-value
1. Age	.07	.006	.421
2. Position	.01	.000	.887
3. Sex	.14	.021	.136
4. Educational Attainment	.12	.015	.203
5. No. of Trainings Attended	.06	.005	.477

*Significant if p-value <.05

This aligns with findings from several recent studies that have explored similar themes. For instance, a study by Parker et al. (2020) found that while training plays a crucial role in developing competencies, individual demographic factors such as age and sex did not significantly predict the competencies of public sector employees. This suggests that targeted training programs may be more effective in enhancing competencies than relying solely on demographic characteristics. Additionally, a research study conducted by Delorino (2019) emphasizes that educational attainment alone does not guarantee improved performance or competencies in leadership roles. They argue that hands-on experience and practical training often outweigh the importance of formal education (Sadiq & Hassan, 2021). This is further supported by the work of Brunson (2020), Palangdao et al. (2023) which concludes that continuous professional development and training attendance significantly impact employee effectiveness, but the relationship is complex and may vary based on individual roles within an organization.

3.5 Determinants of Leadership Competency of the Sangguniang Kabataan

The results in Table 5 indicate that the demographic variables—age, position, sex, and educational attainment—do not significantly predict the technical competencies of Sangguniang Kabataan officials, as reflected by their respective p-values (all greater than 0.05). However, the number of trainings attended shows a significant positive relationship with technical competencies, evidenced by an R value of 0.690 and a p-value of 0.004. This finding suggests that the more training SK officials attend, the higher their technical competencies are likely to be.

Table 5. *Multiple Linear Regression Results on the Determinants of Technical Competencies*

Variable	R	R^2	p-value
1. Age	.078	.006	.421
2. Position	.014	.000	.887
3. Sex	.144	.021	.136
4. Educational Attainment	.123	.015	.203
5. No. of Trainings Attended	.690	.751	.004

*Significant if p-value <.05

The lack of significance for demographic variables implies that factors such as age, position, and sex may not be as influential on technical competencies as previously thought. This could mean that these variables are not necessarily predictors of performance in technical roles within the organization. Consequently, this finding highlights the importance of institutions focusing on providing adequate training opportunities rather than relying solely on demographic characteristics to assess competencies. It reinforces the idea that continuous professional development is crucial for enhancing technical skills among SK officials.

The significant impact of training attendance on technical competencies underscores the importance of developing structured training programs. This finding suggests that institutions should prioritize creating accessible, relevant, and comprehensive training sessions to equip SK officials with the necessary technical skills.

Recent research supports the findings presented in Table 5. For instance, a study by Shenoy and T (2023) highlights that professional training programs significantly enhance technical competencies among public officials. They found that employees who participated in more training sessions reported a greater level of proficiency in technical skills compared to those who did not. This aligns with the current study's results, which suggest that increasing the number of training sessions attended by SK officials could lead to improved technical competencies. Conversely, a survey by Zubairi and Khan (2018) challenges the notion that training alone suffices for skill enhancement. They argue that while training is beneficial, other factors such as practical experience and mentorship are equally crucial in developing technical competencies. This perspective can provide a counterpoint to the findings in Table 5, indicating that while training attendance is significant, it should not be the sole focus for skill development.

3.6 Determinants of Leadership Competency of the Sangguniang Kabataan

The results presented in Table 6 indicate the determinants of leadership competencies among Sangguniang Kabataan (SK) officials. The variables analyzed include age, position, sex, educational attainment, and the number of trainings attended. Among these variables, the number of trainings attended stands out as the only statistically significant predictor of leadership competencies, with an R value of 0.770 and a p-value of 0.030. This suggests a strong positive relationship, indicating that increased participation in training programs correlates with improved leadership competencies.

Table 6. *Multiple Linear Regression Results on the Determinants of Leadership Competencies*

Variable	R	R^2	p-value
1. Age	.078	.006	.421
2. Position	.014	.000	.887
3. Sex	.144	.021	.136
4. Educational Attainment	.123	.015	.203
5. No. of Trainings Attended	.770	.650	.030

*Significant if p-value <.05

The implication of these results is significant for the development and support of SK officials. The finding that training attendance is a critical determinant of leadership competencies highlights the importance of ongoing professional development and targeted training programs. As leadership skills are essential for effective governance and community engagement, investing in training initiatives may enhance the capabilities of SK officials, ultimately benefiting the communities they serve. Conversely, the lack of significant relationships for the other demographic variables—age, position, sex, and educational attainment—suggests that these factors do not influence leadership competencies in a meaningful way. This finding suggests that organizations should prioritize practical training and development over relying on demographic attributes to cultivate leadership skills among their members.

Recent literature supports the findings in Table 6 regarding the impact of training on leadership competencies. For instance, a study by Carolino and Rouco (2022) found that structured training programs significantly enhance leadership skills in young leaders, emphasizing the necessity for continuous development opportunities in leadership roles. Additionally, a study by Wang et al. (2021) corroborates the notion that training can significantly improve leadership competencies. The researchers highlighted that organizations that prioritize training and development for their leaders observed substantial improvements in overall team performance and morale, indicating a direct link between trained leadership and effective organizational outcomes.

4.0 Conclusion

Sangguniang Kabataan (SK) officials demonstrate a potent combination of core, technical, and leadership competencies, particularly in effective communication, community engagement, and project management. Their strengths in collaboration and adaptability enable them to respond to the diverse needs of their communities and mobilize resources efficiently. However, notable gaps remain in advanced technical skills, especially in financial management, budgeting, and strategic planning, which are critical for sustaining successful community initiatives. Addressing these areas is essential further to enhance their effectiveness and credibility in local governance.

To support this, targeted training programs such as financial literacy workshops, strategic planning seminars, leadership development programs, and digital governance training should be implemented. These initiatives would build their technical expertise and leadership capabilities while fostering a culture of accountability and innovation. Future research could examine the long-term impact of such interventions, compare competency development across regions, and explore youth constituents' perspectives to gain a fuller understanding of SK leadership effectiveness. Continued investment in capacity building will be crucial in empowering SK officials to lead transformative efforts within their communities.

5.0 Contributions of Authors

AA – writing, data gathering, encoding, processing of data electronically, data analysis, etc.
BA – writing, editing, data presentation, formatting the manuscript into a publishable paper.

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None

7.0 Conflict of Interests

There is no conflict of interest to declare.

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Beyond Instruction: The Role of Emotional Intelligence Competencies in Enhancing Classroom Effectiveness

Margie N. Laput, Jane C. Oropa*
North Eastern Mindanao State University, Tandag, Surigao del Sur, Philippines

*Corresponding Author Email: janeoropa2022@gmail.com

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Abstract. Emotional intelligence (EI) is recognized as a key factor in achieving educational goals and enhancing teacher effectiveness. This study assessed the level of EI competencies through validated questionnaire among 152 elementary school teachers in the San Francisco District of Agusan del Sur Division, Philippines. The study employed a descriptive correlational research design. Data were analyzed using statistical tools such as frequency count, percentage, mean, standard deviation, and Pearson correlation. Findings indicated high levels of EI competencies, with significant correlations between empathy and the number of mental health trainings attended ($r = 0.241$, $p = 0.003$), and between social skills and length of service ($r = 0.189$, $p = 0.020$). Specifically, teachers with more training and longer service demonstrated higher levels of empathy and social skills, respectively. The study identified areas needing improvement, particularly in adaptability, staying updated with best practices, recognizing students' emotional needs, and conflict resolution. To address these gaps, an action plan was developed for a comprehensive training program. This includes preparatory activities, needs assessment, curriculum planning, resource preparation, collaborative sessions, and continuous monitoring. The results highlighted the critical need for targeted training and constant support. Additionally, leveraging the expertise of experienced educators and ensuring the availability of resources and professional development opportunities. These efforts are expected to enhance teachers' emotional intelligence (EI) competencies, thereby improving the quality of education. The study's findings have significant policy implications, emphasizing the need for educational policymakers to integrate EI training in teacher development programs, allocate resources for continuous professional development, and establish robust support systems to enhance the effectiveness of EI competencies in schools.

Keywords: Emotional intelligence; Empathy; Professional development; Social skills; Teacher effectiveness.

1.0 Introduction

Quality education is recognized as a pivotal force for both individual and societal progress. Central to this is the role of effective teachers who can deliver well-prepared and well-explained lessons, enhancing students' educational knowledge. This study examines the impact of emotional intelligence (EI) on teachers in the San Francisco Unified School District. The need to investigate these factors arises from their potential impact on teacher effectiveness and, consequently, on student achievement. Research suggests a positive correlation between these factors and teacher effectiveness globally. For instance, a study of university students in Bangladesh found that teachers' emotional intelligence has a significant influence on students' motivation for academic learning (Rahman et al., 2024). Similarly, Salleh et. al. (2024) highlight the importance of emotional

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intelligence in enhancing academic success among university students. Their study found that components of emotional intelligence, such as self-awareness, self-regulation, motivation, empathy, and social skills, significantly influence academic performance, as measured by GPA, retention rates, and educational engagement. However, Kgosiemang and Khoza (2022) argue that the challenges faced by teachers complicate the influence of EI. Their study on primary school teachers in the Southeast Region of Botswana found that while emotional intelligence skills are crucial for improving teachers' performance and attitudes towards instructional practices, various external factors can impact the effectiveness of these skills. Thus, this study aims to contribute to this ongoing debate by examining the specific context of San Francisco District, Agusan del Sur Division.

Despite national mandates for quality education, schools often struggle with limited resources and a shortage of qualified teachers. These challenges can lead to lower student achievement compared to national averages (Deped, 2022). In the San Francisco District, teachers frequently report high levels of stress and burnout, which can negatively impact their performance. For instance, one teacher faced significant turmoil due to family issues, including a husband struggling with alcoholism and infidelity, which affected her well-being and professional responsibilities. Another teacher battled severe depression, leading to harmful interactions with colleagues and students, and eventually, concerned parents petitioned for her removal. Alarmingly, there was a lack of intervention or support from the educational department to address these mental health challenges.

The significance of this study lies in its potential to enhance our understanding of the role of emotional intelligence in teacher effectiveness by identifying the level of emotional intelligence and the pedagogical competence that influence teachers' work performance. Furthermore, this investigation also examined the level of awareness among teachers regarding the mandates for mental health activities and programs in the workplace, where teachers may require additional support and development. This research contributes to the ongoing efforts to improve educational practices and outcomes in the San Francisco District, Agusan del Sur Division. The findings will provide valuable insights that can inform policy and practice, benefiting both educators and students by fostering a more supportive and effective educational environment.

2.0 Methodology

2.1 Research Design

This study utilized a descriptive correlational design to assess the level of emotional intelligence competencies among elementary school teachers in the San Francisco District. The research aimed to determine the relationship between the respondents' profiles (sex, age, civil status, length of service, appointment status, training on mental health, and academic background) and their emotional intelligence competencies. These competencies include self-awareness, self-regulation, motivation, empathy, and social skills. The descriptive correlational design allowed for the collection and analysis of quantitative data to identify patterns and relationships between variables. This approach provided a comprehensive understanding of the current level of emotional intelligence among teachers. It highlighted areas where further training and support may be needed to enhance their emotional intelligence competencies.

2.2 Research Participants

The study involved 152 elementary teachers from public schools within San Francisco District, Agusan del Sur division for the School Year 2024-2025. This included a diverse range of schools to ensure a comprehensive analysis. They were selected from a total population of 242 teachers using a stratified random sampling with a 5% margin of error.

2.3 Research Instruments

A researcher-made questionnaire was used to collect data, which underwent content validation and reliability testing by education experts, including a Division Personnel, District Supervisor, School Principal, and Master Teachers. The questionnaire was divided into two sections. Part I gathered demographic information, including age, sex, civil status, years of service, academic rank, appointment status, training on mental health, and highest educational qualification. Part II assessed the level of emotional intelligence competencies, covering self-awareness, self-regulation, motivation, empathy, and social skills, using a 5-point Likert scale. A pilot test with 20 teachers confirmed good internal consistency across all indicators, with Cronbach's alpha values as follows: self-awareness ($\alpha = 0.785$), self-regulation ($\alpha = 0.838$), motivation ($\alpha = 0.796$), empathy ($\alpha = 0.786$), and social

skills (α = 0.797). These values indicate that the questionnaire is a reliable tool for measuring the specified aspects of emotional intelligence competencies.

2.4 Data Gathering Procedure and Analysis

The data-gathering procedure followed a structured approach. The researcher first obtained approval from relevant authorities, including the Dean of the Graduate School Office, the Schools Division Superintendent, and school principals. Once permission was granted, the researcher personally administered the survey to ensure respondents understood the instructions. Quantitative data were collected using a validated questionnaire, and the responses were tallied, tabulated, and analyzed using statistical tools, including frequency counts, percentages, means, standard deviations, and Pearson correlations. Ethical standards, including confidentiality and voluntary participation, were strictly adhered to throughout the process. This structured approach ensured the reliability and validity of the data collected, providing a solid foundation for analyzing the effectiveness of the digitalized quality management system.

2.5 Ethical Considerations

The study followed strict ethical guidelines to protect participants' rights and ensure data confidentiality. Informed consent was obtained both in writing and verbally, and participants were assured of their right to withdraw at any time. Confidentiality and anonymity were maintained by securing personal data and ensuring that identifying information was not linked to any responses. The principle of beneficence was upheld by ensuring that the study contributed to educational improvements while minimizing risks to participants. Justice and fair treatment were observed by ensuring equitable selection criteria and avoiding the exploitation of vulnerable groups. The researcher maintained transparency and honesty by clearly communicating the study's objectives and faithfully reporting findings. Additionally, cultural sensitivity was consistently demonstrated throughout the research process, ensuring respect for participants' diverse backgrounds and values.

3.0 Results and Discussion

3.1 Profile of the Respondents

Table 1 presents the frequency distribution of respondents based on sex, age, civil status, years of service, highest educational qualification, appointment status, training on mental health, and academic background. The majority (89%) of the 152 respondents are female, with males comprising just 11%, highlighting a significant gender imbalance in the teaching profession (Naz, Raza, & Romena, 2024). This finding is crucial as it underscores the need to address gender-specific challenges in emotional labor and work-life balance among female teachers, particularly regarding their emotional intelligence. In terms of age, the majority (53%) are aged 27 to 45 years old, followed by those aged 46 to 55 years old (28%), and those aged 56 years old and above (19%). This age distribution suggests that a significant portion of the teaching workforce is in their prime working years, which may influence their emotional intelligence and ability to manage work-life balance effectively. These findings align with previous research indicating that emotional intelligence can develop and improve with age and experience, highlighting the importance of targeted support for teachers at different career stages (Nadaf et al., 2024).

Regarding civil status, the majority (95%) are married, while 3% are single and 2% are widowed, highlighting a workforce primarily composed of individuals in committed relationships. This finding aligns indicates that marital status does not significantly influence emotional intelligence levels among teachers (Galang et al., 2024). The results suggest that both married and unmarried teachers possess similar emotional intelligence, emphasizing the need for support programs that cater to all teachers regardless of their marital status.

The respondents also demonstrate a diverse range of experience. A small percentage (2%) have been in service for 1 to 5 years, while the majority (30%) have 6 to 10 years of experience. The rest are distributed across various service lengths, with 17% having 11 to 15 years, 16% having 16 to 20 years, 9% having 21 to 25 years, and 26% having 26 years and above. This distribution indicates a well-balanced mix of early-career, mid-career, and veteran teachers, which can significantly impact their emotional intelligence and classroom performance. Previous research has shown that teachers with more experience tend to have higher emotional intelligence, which positively affects their teaching effectiveness and ability to manage classroom dynamics (Kgosiemang & Khoza, 2022).

Table 1. *Demographic details of the survey respondents*

Profile	Classifications	Frequency	Percentage
Sex	Male	17	11.00%
	Female	135	89.00%
Age	27 to 45 years old	80	53.00%
	46 to 55 years old	43	28.00%
	56 years old and above	29	19.00%
Civil Status	Single	5	3.00%
	Married	144	95.00%
	Widowed	3	2.00%
Number of Years in Service	1 to 5 years	3	2.00%
	6 to 10 years	46	30.00%
	11 to 15 years	26	17.00%
	16 to 20 years	24	16.00%
	21 to 25 years	13	9.00%
	26 years and above	40	26.00%
Highest Educational Qualification	Bachelors' degree	32	21.00%
	With Master's degree units	47	31.00%
	With Master's degree CAR	57	38.00%
	Master's degree	15	10.00%
	With Doctorate degree units	1	1.00%
Appointment Status	Regular Permanent	152	100.00%
Trainings on Mental Health	No training	11	7.00%
	1-2 trainings	104	68.00%
	3-5 trainings	24	16.00%
	more than 5 trainings	13	9.00%
Academic Background	Teacher I	36	24.00%
	Teacher Il	22	14.00%
	Teacher lll	78	51.00%
	Master Teacher I	10	7%
	Master Teacher Il	6	4%

In terms of highest educational qualification, 21% of the respondents hold a bachelor's degree, 31% have a Master's degree, 38% have a Master's degree CAR, 10% have a Master's degree, and 1% have a Doctorate. This distribution indicates a highly educated workforce, which can significantly impact their emotional intelligence and teaching effectiveness. Previous research has shown that higher educational qualifications are associated with greater emotional intelligence, which in turn positively influences psychological well-being and academic achievement (Shengyao et al., 2024).

All respondents have a regular permanent appointment status, indicating job stability and a secure working environment. This stability is crucial for maintaining a consistent and effective teaching workforce. Most respondents (68%) have attended 1-2 mental health trainings, while 16% have attended 3-5 trainings, 9% have attended more than 5 trainings, and 7% have had no training. This distribution suggests that the majority of respondents have some exposure to mental health training, which can significantly impact their emotional intelligence and overall well-being. Previous research has shown that mental health training can enhance emotional intelligence, leading to better stress management and improved well-being among teachers and students (Deepa, 2024).

Regarding academic background, more than half (51%) hold the position of Teacher III, followed by Teacher I (24%), Teacher II (14%), Master Teacher I (7%), and Master Teacher II (4%). This reflects a diverse range of teaching experience and expertise, which can significantly influence the implementation and effectiveness of emotional intelligence (EI) interventions in educational settings. Teachers with higher positions and more experience may have better-developed EI skills, which can positively impact their teaching methods and student outcomes (Gkintoni et al., 2024).

Overall, these findings provide insight into the demographic and professional backgrounds of the respondents, reflecting trends in the teaching profession and highlighting areas for potential focus in professional development and support. The data suggests a workforce that is predominantly female, relatively young, highly educated, and committed to professional growth, with a strong emphasis on mental health training and career progression (Sebastian et al., 2022; Almuhatar et al., 2025; Rahman et al., 2024).

3.2 Classroom Management Issues and Challenges

Table 2 presents the mean scores and descriptive interpretations of the respondents' emotional intelligence competencies, specifically focusing on self-awareness, self-regulation, motivation, empathy, and social skills.

Table 2. *Descriptive details of the classroom management issues and challenges encountered*

Indicators	Mean	SD	Interpretation
Self-Awareness			
1. I am able to accurately assess my own strengths and weaknesses as an educator.	4.43	0.61	Strongly Agree
2. I reflect on my teaching practices and seek feedback to improve my performance.	4.34	0.65	Strongly Agree
3. I am aware of my emotional triggers and how they impact my interactions with students.	4.34	0.59	Strongly Agree
4. I regularly set personal and professional development goals for myself.	4.39	0.75	Strongly Agree
5. I understand my teaching philosophy and how it shapes my approach in the classroom.	3.80	0.97	Agree
Aggregate Mean	**4.259**	**0.71**	**Strongly Agree**
Self-Regulation			
1. I remain calm and composed in challenging classroom situations.	4.64	0.49	Strongly Agree
2. I manage my time effectively to balance teaching responsibilities and personal life.	4.27	0.62	Strongly Agree
3. I adapt my teaching strategies to accommodate different classroom dynamics.	3.57	0.91	Agree
4. I handle stress and pressure in a healthy and productive manner.	4.05	0.21	Agree
5. I consistently model positive behavior and emotional regulation for my students.	4.42	0.64	Strongly Agree
Aggregate Mean	**4.189**	**0.58**	**Agree**
Motivation			
1. I am passionate about teaching and continuously seek to improve my skills.	4.32	0.58	Strongly Agree
2. I am motivated to help each student reach their full potential.	4.40	0.65	Strongly Agree
3. I find joy and satisfaction in seeing my students succeed.	4.28	0.74	Strongly Agree
4. I set high expectations for myself and my students and work hard to meet them.	3.83	0.56	Agree
5. I stay updated with the latest educational research and best practices.	3.68	0.83	Agree
Aggregate Mean	**4.103**	**0.67**	**Agree**
Empathy			
1. I actively listen to my students and try to understand their perspectives.	4.82	0.40	Strongly Agree
2. I show compassion and understanding towards students' individual challenges.	4.62	0.54	Strongly Agree
3. I create a supportive and inclusive classroom environment for all students.	3.43	0.62	Agree
4. I recognize and address the emotional needs of my students.	3.41	0.63	Agree
5. I build strong, trusting relationships with my students based on mutual respect.	4.30	0.58	Strongly Agree
Aggregate Mean	**4.097**	**0.56**	**Agree**
Social Skills			
1. I effectively communicate with students, parents, and colleagues.	4.91	0.29	Strongly Agree
2. I foster a collaborative and team-oriented classroom environment.	4.68	0.51	Strongly Agree
3. I resolve conflicts in a constructive and respectful manner.	4.02	0.88	Agree
4. I encourage students to develop their social skills and build positive relationships.	4.70	0.46	Strongly Agree
5. I participate in professional learning communities to enhance my teaching practice.	4.85	0.38	Strongly Agree
Aggregate Mean	**4.630**	**0.50**	**Strongly Agree**
Overall Mean	**4.256**	**0.60**	**Strongly Agree**

The data suggests a positive perception across all indicators related to emotional intelligence competencies. The mean score for Self-Awareness is 4.26, indicating a "Strongly Agree" level of self-awareness. The highest mean score within this indicator is 4.43 for "I am able to accurately assess my own strengths and weaknesses as an educator," while the lowest is 3.80 for "I understand my teaching philosophy and how it shapes my approach in the classroom." The findings indicate a strong level of self-awareness among educators, with the highest scores reflecting their ability to accurately assess their strengths and weaknesses. This aligns with Pretorius and Plaatjies (2023), who emphasize the importance of self-assessment in educational leadership, suggesting that teachers' strong self-awareness can significantly enhance their effectiveness in the classroom.

Similarly, the perception of Self-Regulation is "Agree," with a mean score of 4.19. The highest mean score within this indicator is 4.64 for "I remain calm and composed in challenging classroom situations," while the lowest is 3.57 for "I adapt my teaching strategies to accommodate different classroom dynamics." This indicates that while teachers are generally good at maintaining composure, there may be a need to enhance their adaptability to different classroom dynamics. Providing training on adaptive teaching strategies could help address this gap.

The level of Motivation is also high, with a mean score of 4.10. The highest mean score within this indicator is 4.40 for "I am motivated to help each student reach their full potential," while the lowest is 3.68 for "I stay updated with the latest educational research and best practices." The findings indicate that teachers' strong self-awareness and high motivation levels significantly enhance their effectiveness in the classroom. This aligns with previous research by Pretorius and Plaatjies (2023) and Rahman et al. (2024), highlighting the positive impact of emotional intelligence on educational outcomes.

In terms of Empathy, the mean score is 4.10, indicating a high level of empathy among the respondents. The highest mean score within this indicator is 4.82 for "I actively listen to my students and try to understand their perspectives," while the lowest is 3.41 for "I recognize and address the emotional needs of my students." This suggests that while teachers excel in actively listening and understanding their students' perspectives, there is room for improvement in recognizing and addressing students' emotional needs. Traikou (2024) emphasizes the importance of empathy and emotional intelligence in building rapport and managing classroom dynamics, particularly in multicultural settings, highlighting the need for continuous professional development in these areas.

The level of Social Skills is very high, with a mean score of 4.63. The highest mean score within this indicator is 4.91 for "I effectively communicate with students, parents, and colleagues," while the lowest is 4.02 for "I resolve conflicts constructively alyectful manner." This indicates that teachers excel in communication with students, parents, and colleagues, which is crucial for creating a supportive educational environment. However, there is a slight need for improvement in conflict resolution skills. Betinelli et al. (2025) highlight the importance of emotional intelligence in higher education, emphasizing that strong social skills, including effective communication and conflict resolution, are essential for fostering positive interactions and achieving educational goals. Continuous professional development in these areas can further enhance teachers' effectiveness and overall classroom dynamics.

The findings of this study revealed that among the five parameters of emotional intelligence — self-awareness, self-regulation, motivation, empathy, and social skills — social skills registered the lowest grand mean in the descriptive analysis of classroom management issues and challenges encountered by teachers. This result suggests that while teachers may demonstrate sufficient levels of self-awareness, emotional control, drive, and empathy individually, they face more significant challenges in their interpersonal interactions within the classroom setting. Social skills in classroom management encompass a wide range of competencies, such as conflict resolution, communication, collaboration, and relationship-building with students. A lower rating in this parameter indicates difficulties in sustaining positive student-teacher interactions, handling disruptive behaviors constructively, and fostering a classroom environment characterized by trust and respect.

3.3 Relationship Between Profile Variables and Classroom Issues and Challenges

Table 3 presents the results of correlation analyses examining the relationship between various demographic factors (sex, age, civil status, length of service, highest educational attainment, training, and academic rank) and different aspects of emotional intelligence competencies (self-awareness, self-regulation, motivation, empathy, and social skills). The analysis reveals that most variables do not have a significant relationship with the emotional intelligence competencies, with a few exceptions.

For self-awareness, the computed R-values for the relationship with the demographic variables range from 0.002 to 0.145, with p-values ranging from 0.616 to 0.976. All p-values are greater than 0.05, leading to the decision to fail to reject the null hypothesis. This indicates that there is no significant relationship between self-awareness and any of the demographic variables. These findings suggest that teachers' demographic characteristics do not influence their self-awareness.

Similarly, for self-regulation, the computed R-values for the relationship with the demographic variables range from 0.002 to 0.117, with p-values ranging from 0.152 to 0.979. All p-values are greater than 0.05, leading to the decision to fail to reject the null hypothesis. This indicates that there is no significant relationship between self-regulation and any of the demographic variables. These findings suggest that self-regulation among teachers is not influenced by their demographic characteristics.

Table 3. *Relationship between the profile of the respondents and emotional intelligence competence*

Variables		r	p	Decision	Conclusion
Self-awareness	Sex	.02	.759	Failed to reject null hypothesis	Not Significant
	Age	.14	.075	Failed to reject null hypothesis	Not Significant
	Civil Status	.04	.616	Failed to reject null hypothesis	Not Significant
	Length of Service	.02	.739	Failed to reject null hypothesis	Not Significant
	Highest educ	.01	.862	Failed to reject null hypothesis	Not Significant
	Appointment status	-	-		
	Trainings	.00	.976	Failed to reject null hypothesis	Not Significant
	Academic rank	.01	.847	Failed to reject null hypothesis	Not Significant
Self-regulation	Sex	.11	.152	Failed to reject null hypothesis	Not Significant
	Age	.00	.979	Failed to reject null hypothesis	Not Significant
	Civil Status	.06	.423	Failed to reject null hypothesis	Not Significant
	Length of Service	.04	.619	Failed to reject null hypothesis	Not Significant
	Highest educ	.00	.976	Failed to reject null hypothesis	Not Significant
	Appointment status	-	-		
	Trainings	.05	.474	Failed to reject null hypothesis	Not Significant
	Academic rank	.03	.637	Failed to reject null hypothesis	Not Significant
Motivation	Sex	.05	.538	Failed to reject null hypothesis	Not Significant
	Age	.04	.600	Failed to reject null hypothesis	Not Significant
	Civil Status	.07	.339	Failed to reject null hypothesis	Not Significant
	Length of Service	.05	.544	Failed to reject null hypothesis	Not Significant
	Highest educ	.06	.409	Failed to reject null hypothesis	Not Significant
	Appointment status	-	-		
	Trainings	.07	.375	Failed to reject null hypothesis	Not Significant
	Academic rank	.07	.342	Failed to reject null hypothesis	Not Significant
Empathy	Sex	.09	.231	Failed to reject null hypothesis	Not Significant
	Age	.07	.352	Failed to reject null hypothesis	Not Significant
	Civil Status	.05	.519	Failed to reject null hypothesis	Not Significant
	Length of Service	.06	.453	Failed to reject null hypothesis	Not Significant
	Highest educ	.09	.273	Failed to reject null hypothesis	Not Significant
	Appointment status	-	-		
	Trainings	.24	.003	Reject null hypothesis	Significant
	Academic rank	.05	.544	Failed to reject null hypothesis	Not Significant
Social Skills	Sex	.01	.830	Failed to reject null hypothesis	Not Significant
	Age	.07	.366	Failed to reject null hypothesis	Not Significant
	Civil Status	.05	.486	Failed to reject null hypothesis	Not Significant
	Length of Service	.18	.020	Reject null hypothesis	Significant
	Highest educ	.14	.084	Failed to reject null hypothesis	Not Significant
	Appointment status	-	-		
	Trainings	.01	.813	Failed to reject null hypothesis	Not Significant
	Academic rank	.05	.472	Failed to reject null hypothesis	Not Significant

For motivation, the computed r-values for the relationship with the demographic variables range from 0.043 to 0.078, with p-values ranging from 0.339 to 0.600. All p-values are greater than 0.05, leading to the decision to fail to reject the null hypothesis. This indicates that there is no significant relationship between motivation and any of the demographic variables. These findings suggest that teacher motivation is not influenced by their demographic characteristics.

In terms of empathy, the computed r-values for the relationship with the demographic variables range from 0.053 to 0.241, with p-values ranging from 0.003 to 0.519. The p-value for the relationship between empathy and training is 0.003, which is less than 0.05, leading to the decision to reject the null hypothesis. This suggests a significant relationship between empathy and training. Teachers who have undergone more training tend to have higher levels of empathy. This finding aligns with previous research that highlights the importance of professional development in enhancing teachers' emotional intelligence (Rahman et al., 2024). For the other demographic variables, the p-values are greater than 0.05, indicating no significant relationship.

For social skills, the computed r-values for the relationship with the demographic variables range from 0.018 to 0.189, with p-values ranging from 0.020 to 0.830. The p-value for the relationship between social skills and length of service is 0.020, which is less than 0.05, leading to the decision to reject the null hypothesis. This suggests a significant correlation between social skills and length of service. Teachers with longer service tend to have better social skills. This finding is consistent with the idea that experience in the teaching profession can enhance

interpersonal skills (Valente & Lourenço, 2020). For the other demographic variables, the p-values are greater than 0.05, indicating no significant relationship.

Overall, the results indicate that while most demographic factors do not significantly influence teachers' emotional intelligence competencies, the number of trainings attended and length of service do play a significant role in certain areas. Specifically, more training is associated with higher levels of empathy, and longer service is associated with better social skills. These findings suggest that targeted training and support should be provided to enhance teachers' emotional intelligence competencies, particularly in empathy and social skills. Additionally, leveraging the experience of long-serving teachers through mentorship programs could further improve the overall emotional intelligence competencies of the teaching staff.

4.0 Conclusion

The findings indicate that teachers demonstrate high levels of emotional intelligence competencies, particularly in self-awareness, self-regulation, motivation, empathy, and social skills, suggesting their adeptness at managing emotions and interactions. However, empathy is significantly influenced by the number of trainings attended, and social skills are significantly related to the length of service, highlighting the importance of continuous professional development and experience. To address these areas, an action plan focusing on targeted training, mentorship programs, and robust support structures is necessary to maintain positive mental health and well-being. This approach will optimize teaching effectiveness and create a supportive learning environment. Key implications include the need for ongoing professional development to enhance emotional intelligence, the value of leveraging experienced teachers for mentorship, and the importance of providing comprehensive mental health support to sustain teacher well-being and performance. Future research could explore the long-term impact of these interventions on teacher performance and student outcomes, as well as investigate other factors influencing emotional intelligence competencies in teachers. This study highlights the critical role of social skills in effective classroom management, suggesting that future emotional intelligence (EI) development programs should place greater emphasis on building teachers' interpersonal competencies. By addressing this area, schools can design more targeted training and professional development initiatives. Furthermore, the findings can guide school policies toward integrating social-emotional learning frameworks for teachers, ensuring that relational skills are recognized, nurtured, and sustained as essential components of educational excellence.

5.0 Contributions of Authors

The authors of this research collaborated to review and approve the final version of the study. This ensures the study's completeness and integrity. Author Jane C. Oropa played an integral part in the editing, writing, supervision, data analysis, and encoding. Author Margie N. Laput concentrated on the fieldwork, distribution, and retrieval of survey instruments, doing comprehensive data analysis, transcribing the gathered material, and adhering to ethical guidelines throughout the study. These complementary contributions underscore the collaborative endeavors and mutual obligations as adviser and mentee to generate a thorough and ethically robust research output.

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Library Resources: College Students' Preferences of Cordillera Career Development College, La Trinidad, Benguet

Wilma C. Balao-as
Benguet State University, La Trinidad, Benguet, Philippines

Author Email: wilmacbalaoas@gmail.com

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Abstract. Despite the availability of library resources and encouragement for students to utilize them, observations indicate a significant underutilization of these materials. It highlights the need to understand the factors influencing students' engagement with library resources. To address this gap, the study examines the extent of students' use of library resources, preferred information sources, and difficulties in using them. The study used a descriptive survey research method, involving 322 Cordillera Career Development College students selected through purposive sampling. The primary data source was a validated survey questionnaire. Results of the study show that, in general, students rarely use the library resources; however, general collection books ranked first as the most frequently utilized. Respondents prefer print resources over non-print resources as information sources. Printed books rank as the most preferred information sources. There is no significant difference in students' preference between print and non-print resources. However, students encounter slight difficulties in utilizing library resources. The three most common challenges they face are difficulty locating needed information resources, insufficient materials available for specific topics, and struggles selecting research topics, making finding relevant resources more challenging. With the results, it can be concluded that while students rely on print, specifically books, and non-print resources for their academic needs, they encounter slight difficulties using them. Therefore, it is recommended that the library improve access to print and digital resources, expand and update its book collection, and strengthen information literacy programs to help students navigate and utilize these resources more effectively.

Keywords: Library resources; Students' preferred information source; Library preference; Print materials.

1.0 Introduction

The library plays a vital role in academic institutions by supporting its users' educational and research pursuits by providing various facilities and a wide range of print and non-print information resources. Okiki (2013) asserts that the library is an essential facility that enhances learning, teaching, and research. The library is widely recognized for its collection of relevant resources, enabling it to serve its users effectively. According to Ternenge and Agipu (2019), many users perceive the library primarily as a place for storing and accessing books and other learning materials. Historically, printed materials have been the primary carriers of information, widely used for teaching, learning, and research. However, the learning environment has evolved with the advancement of information and communication technology (ICT), and libraries have expanded their collections to include electronic or online information resources. Dela Peña (2018) emphasized that electronic information resources—or e-resources—are among the most significant developments in 21st-century libraries. These resources facilitate the global dissemination of scholarly information, helping libraries fulfill their core mission of providing up-to-date content to support teaching, learning, and research.

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Atanda and Uchendu (2019) posited that the library's primary function is not only to fulfill the academic institution's mission to which it belongs but also to advance its aims and objectives. One of the library's aims is to promote effective utilization of library resources to contribute to the success of academic and research endeavors by its users. To achieve this aim, it is essential to assess and understand how people interact with library resources, rather than relying solely on perceptions and assumptions. As asserted by Ani et al. (2022), it is essential to know the extent of library use because an individual's perception of the use of a library may differ significantly from the actual situation. They further added that the frequency of library use will be influenced by the availability of information sources to the user within the library.

Another library aim is to meet users' particular needs and understand their preferences for information sources. According to Aladeniyi and Owokole (2018), library information resources refer to materials or information sources acquired by the library to meet the information needs of its patrons. Besides, Onghenere et al. (2018) asserted that librarians must understand their users' information needs and preferred formats, rather than solely acquiring information resources based on popular trends. They also emphasized the importance of focusing on meeting the specific requirements of their users to ensure that their needs are adequately addressed. Samzugi (2019) asserted that gathering feedback from library patrons was essential to gain a comprehensive and balanced understanding of library user preferences for print and non-print resources within the academic community. This approach ensures the optimal utilization of institutional financial resources by aligning acquisitions with user preferences.

Library users are among the very important stakeholders in the library. Onye (2016) stated that students require library resources that can be applied practically to their needs and enrich their knowledge. The library's primary goal is to fulfill its users' needs by offering timely and relevant resources. Therefore, if the resources meet the needs of library users, their experience will be beneficial. Given this, the library must have a comprehensive understanding of the resources required and the needs of its users. Abukari (2019) pointed out that for libraries to reach their desired level of usage, it is crucial to provide appropriate information resources and deliver high-quality services to meet the needs of their clientele. Utilizing the library regularly enables students to enhance their expertise in their respective fields of study, thus improving their effectiveness in fulfilling their academic responsibilities. However, they may still encounter difficulties in using these library resources. Based on Ani et al. (2022), several factors influence the use of institutional library collections. They further stated that these include library materials' availability, location, collection age, and user education.

The central mission of every educational institution is to develop lifelong learning. Cordillera Career Development College Library aims to support the institution's mission, goals, and objectives. Consequently, the library provides clients with relevant and diverse information resources to support their research and development. New students enroll in the institution with different needs and expectations every year. Additionally, an annual library budget is allocated for the purchase of relevant information resources. These collections are essential for students' learning and research, as well as the library's operation. Additionally, with the rapid progress of information communication technologies, more innovative strategies for accessing library resources are introduced; electronic resources or databases are also encouraged in libraries, which makes them more complex. Despite the cost of electronic resources, the library has included electronic databases to meet the requirements of the digital environment. Students are given the privilege and encouraged to make the most of the library's resources. However, it was observed that the library resources provided were underutilized. Therefore, the library must provide a fair understanding of the use of library resources in the academic community. In response to these challenges, the study assesses the students' use of library resources, their preferred information sources, and the difficulties they encounter with the library resources at the Cordillera Career Development College Library. Moreover, this study's results will benefit the institution's administration and college librarians. This will serve as a basis for them to create adequate resource allocations for print and electronic resources, improve marketing strategies, and develop information literacy programs to help students utilize the library resources effectively.

2.0 Methodology

This study used the descriptive survey research design. It involves describing the data and information. Descriptive research describes what exists and may help uncover new facts and meaning. Descriptive research aims to observe, describe, and document aspects of a situation as they naturally occur. (Polit & Hungler, 1999).

The respondents were 322 college students who actively use the library. The sample size was determined based on the library's seating capacity, and purposive sampling was used to select the respondents. This study utilized a validated survey questionnaire as the primary tool to answer the research questions. The researcher developed the questionnaire based on the literature from previous studies related to the topic. The advisory committee assessed its validity. A pre-test was conducted with a small sample of respondents who were not part of the actual study, and Cronbach's alpha was used to evaluate its reliability.

This study used specific data collection steps. First, the researcher sought permission from the chief librarian to conduct the study. The chief librarian then recommended that the researcher secure permission through a formal communication letter addressed to the school president. Upon approval, the researcher personally administered the survey questionnaire, explaining the study's purpose and objectives to the respondents. The researcher informed the respondents that their scores would be used for research purposes. The data collected through the questionnaire were tabulated, ranked, and interpreted using appropriate statistical tools. This study adheres to the standard of ethical conduct in research by prioritizing the rights, welfare, and privacy of all participants. In compliance with R.A. 10173, or the Data Privacy Act, the confidentiality of personal information is strictly observed and protected. All information collected is utilized solely for this study and will not be shared or used beyond the scope of educational objectives.

3.0 Results and Discussion

3.1 The Extent of Use of the Library Resources

Table 1 presents the extent of use of library resources by college students at Cordillera Career Development College Library, showing a grand mean of 1.96, indicating that the resources are rarely used. This suggests that students do not actively use the library resources as primary tools for their academic needs. While students are aware that the library offers books, many are unfamiliar with the other resources it provides. They consult Google for alternatives when they cannot find the information in the library. Moreover, based on the statistical report, it is evident that many students rely on Wi-Fi coupons to access the Internet. These findings contrast with studies by Ani et al. (2022) and Mesagan and Fufuri (2021), which showed that students highly utilized library resources for academic purposes. The contrasting results may be attributed to awareness and accessibility of library resources.

Table 1. *The Extent of Use of the Library Resources*

	Library Resources	Mean	Interpretation
1.	Filipiniana Books	2.04	Rarely
2.	General Circulation Books	2.27	Rarely
3.	General Collection Books	2.62	Often
4.	Dictionary	2.41	Rarely
5.	Encyclopedia	2.00	Rarely
6.	Atlas	1.70	Never
7.	Almanac	1.71	Never
8.	Handbook	2.16	Rarely
9.	Manual	2.06	Rarely
10.	Journal	1.98	Rarely
11.	Magazine	1.87	Rarely
12.	Newspaper	1.92	Rarely
13.	Thesis	2.04	Rarely
14.	Dissertation	1.62	Never
15.	Fiction book	1.87	Rarely
16.	E-book	1.84	Rarely
17.	E-journal	1.81	Rarely
18.	E-magazine	1.72	Never
19.	E-newspaper	1.78	Rarely
20.	E-thesis/dissertation	1.78	Rarely
Grand Mean		**1.96**	**Rarely**

General Collection Books, tailored to specific degree programs, were often used as a library resource, with a weighted mean of 2.62. This suggests that students rely heavily on these books because they are directly relevant to their coursework and serve as primary academic references. The high usage is also attributed to the larger number of these books available in the library, aligning well with the curriculum needs. This result supports previous studies, such as Bernardo (2016), which found that textbooks are the most used resources in libraries,

as students value their quality and authority. Additional studies by Bosilo (2018) and Ani et al. (2022) also found that students prioritize books for academic reference. Students also revealed that they used these books because they observed instructors often referencing them and because their teachers encouraged borrowing them for study purposes.

The dictionary ranked second with a weighted mean of 2.41, but students rarely use it. While dictionaries are consulted for quick and specific information, such as meanings or pronunciations of unfamiliar words, they are not part of students' daily study routines. In informal interviews, respondents mentioned that they only use dictionaries when encountering unfamiliar terms. Additionally, the availability of free dictionary apps has made it easier for students to access this resource offline. This result contrasts with the study by Caroline and Adewale (2018), which found that undergraduate students frequently used dictionaries as an academic resource in libraries.

General circulation books, which include foreign-authored books on subjects like philosophy, psychology, economics, and science, ranked third with a weighted mean of 2.27, indicating they are rarely used. These books provide broad knowledge across multiple disciplines, supporting students' general education and critical thinking skills. Despite their relevance, students rarely use these resources. Respondents mentioned that they were unaware of the range and scope of these books and did not fully understand the subjects they covered. This lack of awareness, combined with the closed-shelf system, may contribute to the low usage. In response, the library introduced a semi-open shelf system at the start of the school year, but students are still adjusting to the new system and learning how to locate and utilize these books.

Dissertations, atlases, and almanacs are the least utilized among library resources. Dissertations ranked last with a weighted mean of 1.62, indicating respondents never used them. This suggests that most students do not currently need most dissertations for their academic work, as they are typically more relevant to graduate students or those involved in in-depth research. Additionally, the limited number of dissertations available in the library may contribute to this low usage. This finding contradicts Ani et al. (2022), who reported that undergraduate students frequently used dissertations than other library materials for research purposes. Similarly, the almanac (1.71) and atlas (1.70) also have low scores, implying that students do not rely on these resources for academic research. The lack of specific courses or subjects requiring these materials, along with the availability of more accessible digital resources, likely contributes to their infrequent use. Some respondents mentioned using Google Maps for location-based needs, while others pointed out that globes and maps in the library serve similar purposes. Furthermore, the atlas and almanac in the library are outdated and no longer provide current information, which further reduces their relevance. This aligns with David-West (2019), who noted that almanacs and atlases are among the least consulted reference materials, a finding supported by Ajani et al. (2021).

3.2 Level of the Preferred Information Source

Table 2 presents the preferred information sources among students. The table shows that the respondents prefer print resources over non-print resources. Print resources are often perceived as more reliable and authoritative, especially books and academic journals that are published and undergo the process of evaluation and peer review, which makes the content accurate and reliable. According to Santini (2018), peer-reviewed articles provide a reliable and established form of exchange for scientific ideas, generally ensuring the quality requirements of scientific publications.

Printed books are students' most highly preferred print resource, ranking first with a weighted mean of 3.29, as shown in the table. This suggests that students still rely on print books for their academic needs due to their reliability, depth, and relevance. Supporting this, Sanches et al. (2021) noted that reading in print is more enjoyable and suitable for leisure activities. Enis (2018) also found that students find print more manageable to read than digital formats. Journals (2.75) and theses/dissertations (2.65) ranked second and third, indicating a preference due to their value in academic research, particularly for students working on related literature or specialized topics. However, while these/dissertations are preferred, students do not frequently use them in practice, possibly because they do not yet see them as necessary for their current coursework. Newspapers and magazines, ranked fourth and fifth, received lower preference scores (2.43 and 2.40), as they are generally viewed as sources of general or current information rather than academic content. This aligns with Cabonero et al. (2017), who found that reading magazines is often not required in the classroom.

Table 2. *Level of the Preferred Information Source*

Information Resource	Mean	Descriptive Equivalence
Print Resources		
Books	3.29	Highly Preferred
Journals	2.75	Preferred
Magazines	2.40	Slightly Preferred
Newspapers	2.43	Slightly Preferred
Thesis/Dissertation	2.65	Preferred
Grand mean	**2.70**	**Preferred**
Non-Print Resources		
E-Books	2.47	Slightly Preferred
E-Journals	2.37	Slightly Preferred
E-Magazines	2.23	Slightly Preferred
E-Newspapers	2.26	Slightly Preferred
E-Thesis/Dissertation	2.43	Slightly Preferred
Grand Mean	**2.35**	**Slightly Preferred**

On the other hand, non-print resources have a grand mean of 2.35, indicating they are slightly preferred by respondents, though less favored than print resources. Students appreciate digital resources for their accessibility, ease of use, and the ability to store and access them anytime on mobile devices or laptops. E-books ranked highest among non-print materials (2.47), valued for their convenience and practicality, aligning with findings by Sanches et al. (2021) and Enis (2018) for their convenience, practicality, and ease of access. E-theses/dissertations (2.43) and e-journals (2.37) followed, slightly preferred due to their relevance in supporting research projects, echoing the findings of Naik et al. (2019) that the respondents specified that e-journals, e-theses, and dissertations are the most essential e-resources. E-newspapers (2.26) and e-magazines (2.23) were the least preferred, with some students citing a lack of time and focus on academic tasks as reasons for not using them. This contrasts with Roy et al. (2023), where students frequently used e-news for current information. While non-print resources are valued for their practicality, they are still secondary to print materials in preference.

3.3 Difference between the Levels of the Preferred Print and Non-print Information Sources

Table 3 presents the relationship between students' preferences for print and non-print information sources. The results show no significant difference in preference level between the two formats, suggesting that students use print and non-print resources in a complementary manner. This indicates that students value the strengths of each format based on their specific information needs. Some prefer print resources for their familiarity and reliability, while others are drawn to non-print resources for their accessibility, multimedia features, and ease of use on digital devices. This finding supports the studies of Agyeiku and Odie (2022) and Samzugi (2019), highlighting that students consider print and electronic resources necessary. Similarly, Idiegbeyan-Ose et al. (2019) emphasized that electronic and print resources complement each other in fulfilling users' information needs. Therefore, the hypothesis of a significant difference in preference between print and non-print information sources is rejected.

Table 3. *The Significant Difference between the Level of the Preferred Print and Non-Print Information Sources*

Variables	N	Mean	t	p	Interpretation
Print Resources	322	2.70	2.0906^{ns}	.070	Not significant
Non-Print resources	322	2.35			

Legend: ns-not significant

3.4 Difficulties Encountered in Using the Library Resources

Table 4 outlines the difficulties encountered when using library resources. The grand mean of 2.10 indicates that students generally find using the library materials slightly tricky, but not extremely hard or unmanageable. This means that students do not encounter significant problems using the library resources. This implies that while students face some difficulties, these are not perceived as significant challenges to their academic work. However, there are some differences in how students experience each specific problem. The top difficulties encountered, with a weighted mean of 2.34, are the inability to find the necessary information resources, insufficient information resources for a specific topic, and difficulty in selecting a research topic, which makes it challenging to find relevant resources.

Table 4. *Difficulties Encountered by Students in Using the Library Resources*

	Indicators	Mean	Interpretation
1.	Information resources needed cannot be found.	2.34	Slightly Difficult
2.	The information resources are insufficient for a specific topic.	2.34	Slightly Difficult
3.	The information resources are outdated.	2.18	Slightly Difficult
4.	Not familiar with the library resources.	2.16	Slightly Difficult
5.	Unfamiliar with electronic databases such as ProQuest and Britannica Academic.	2.18	Slightly Difficult
6.	Electronic databases are challenging to navigate and utilize.	2.11	Slightly Difficult
7.	The number of computer units is inadequate, so I cannot access the library resources.	2.17	Slightly Difficult
8.	Limited knowledge and understanding of using the library resources.	2.07	Slightly Difficult
9.	Difficulty in choosing research topics makes it hard to find relevant resources.	2.34	Slightly Difficult
10.	Anxious about using the library resources.	2.00	Slightly Difficult
11.	Information overload--too many results.	2.02	Slightly Difficult
12.	I do not know how to identify credible sources.	1.97	Slightly Difficult
13.	The complicated user interface of the electronic database.	2.00	Slightly Difficult
14.	The library resources cannot be freely browsed.	2.02	Slightly Difficult
15.	The library resource has mismatched titles and content	1.78	Slightly Difficult
16.	Library resources lack illustrations and examples.	1.84	Slightly Difficult
Grand Mean		**2.10**	**Slightly Difficult**

The respondents encounter slight difficulty in finding library resources, with the highest challenge being the struggle to find needed resources due to the continued use of a manual card catalog system. Many students are unfamiliar with how to use the card catalog and are unaware of the different library sections and the resources available in each. This aligns with the findings of Beneyat-Dulagan and Cabonero (2023) and Heriyanto and Hariyati (2020), which highlight the difficulties in navigating library systems and accessing necessary materials. The second major challenge identified was the insufficiency of library resources in certain academic areas such as social work, office management, and midwifery. Students noted that available materials often lack depth, are outdated, or are too few in print and digital formats. This issue is supported by studies from Vera et al. (2018) and Faga et al. (2024), which found that inadequate relevant resources hinder effective library use. The third challenge was difficulty choosing appropriate research topics, which affects the ability to find relevant sources. This highlights the need for enhanced information literacy skills, as emphasized by Mahwasane and Mudzielwana (2016).

Meanwhile, respondents ranked identifying credible resources, mismatched titles and content, and a lack of illustrations in library resources as the lowest, interpreting these as slightly difficult. The difficulty in identifying credible resources, with a weighted mean of 1.97 and ranked fourteenth, suggests that most students feel confident in evaluating the credibility of sources. They also recognize that library materials are pre-evaluated by faculty and librarians. Additionally, many are aware of trusted domains such as .edu and .gov, which align with StudyCorgi (2025), indicating that URLs with these domain extensions are credible sources because they signify that the website belongs to a government or educational institution that can be trusted. Library resources lacking illustrations and having mismatched titles and content were ranked fifteenth and sixteenth, indicating that these issues are rarely encountered. Respondents generally find that library materials contain relevant visuals and that the titles accurately reflect the content. The low concern over these issues suggests that the library resources have well-matched titles and content and have illustration features. Additionally, since many students are visual learners, as shown in Cabual's (2021) study on the VARK learning model, the presence of illustrations is valued, further affirming that this is not seen as a widespread problem among respondents.

4.0 Conclusions

In conclusion, the study reveals that although library resources are generally underutilized, students strongly prefer general collection books and printed materials, while still demonstrating flexibility in using print and non-print resources. Several challenges, such as difficulty locating materials, limited resources for specific topics, and uncertainty in choosing research topics, slightly hinder their library experience. While these issues are not severe, they highlight areas for improvement. Therefore, to better support students' academic needs, libraries should enhance resource accessibility, continue to offer print and non-print resources, update their collections, and enhance literacy programs to help students navigate and utilize available resources effectively.

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7.0 Conflict of Interests

The author declares no conflict of interest.

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Understanding the Link between Literacy and Numeracy Skills among Primary Pupils

Agripina S. Jabanes*[1], Maria Chona Z. Futalan[2]
[1]Balugo Elementary School, Valencia, Negros Oriental, Philippines
[2]Foundation University, Dumaguete City, Negros Oriental, Philippines

*Corresponding Author Email: agripina.jabanes002@deped.gov.ph

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Abstract. This study examined the relationship between literacy and numeracy skills among Grade 3 learners. A total of 340 learners from 21 schools in the Valencia District were selected using a systematic sampling method. Informed consent was obtained from all participants, and strict measures were implemented to ensure data confidentiality. The study employed a descriptive-correlational design and utilized standardized EGRA and EGMA testing tools. Percentages, means, and the Chi-Square Test were used for statistical analysis. Findings revealed that approximately 20% of the learners were non-readers, while 30% were non-numerate. The study also established a significant relationship between learners' foundational literacy and their numeracy skills. Data on foundational literacy showed that female learners, those excelling in English and Math, learners from higher-income families, and those with educated parents achieved higher scores. For numeracy skills, only English and Math performance were significantly linked to learners' math abilities. These findings underscore the importance of targeted educational planning and interventions that support disadvantaged groups and enhance core subject skills to improve overall literacy and numeracy outcomes.

Keywords: English performance; Foundational literacy; Learner profile; Math performance; Primary numeracy skills; Socioeconomic factors.

1.0 Introduction

Over the past 20 years, the Programme for International Student Assessment (PISA) has evaluated education systems worldwide (Zheng et al., 2024; Deta et al., 2024). However, recent results reveal a pressing global challenge: many countries are struggling with literacy and numeracy. In 2022, Kazakhstan ranked 61st out of 81 countries, showing notable declines in English, science, and math, which signals an urgent need for educational reform to strengthen reading skills (Zhanabil & Tazhenova, 2024). Similarly, Indonesia ranked 62nd out of 70 countries, facing similar difficulties (Tañiza et al., 2024). These findings highlight the critical need for policymakers and educators to prioritize improvements in foundational literacy and numeracy, as these skills are essential for learners' academic and future success (Abella et al., 2024).

Reflecting these global challenges, the Philippines' performance in the Organization for Economic Co-operation and Development (OECD) PISA assessments in 2018 and 2022 consistently ranked among the lowest globally, with the country placing third-lowest in science and sixth-lowest in math and reading (OECD, 2023; PISA, 2022; Acido & Caballes, 2024). A significant factor contributing to these low scores is learners' struggles with reading proficiency, which directly affects their numeracy and overall academic performance (Idulog et al., 2023). For

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instance, Pulumbarit et al. (2023) reported a sharp decline in reading and numeracy skills among fifth graders, while Maquiling (2023) observed similar challenges across all grade levels, revealing the necessity for immediate action. In response, the Department of Education (DepEd) launched the National Learning Camp (NLC). A local initiative that supports this effort is the PS-ELANS (Problem-Solving to Enrich Literacy and Numeracy Skills) program in the Division of Negros Oriental. Launched in 2023 through DepEd Order No. 14, s. 2023, PS-ELANS aims to improve students' reading, writing, and math skills by using problem-solving activities to make learning more practical and engaging (Maguate et al., 2024).

Numerous studies have examined the relationship between foundational literacy and numeracy skills, especially in the context of educational challenges surrounding the COVID-19 pandemic (Samia, 2024). International research has addressed various dimensions of this connection, including gender differences in reading and numeracy (Thomas et al., 2024), the association between math abilities and self-confidence among children with special needs (Waluya & Sukestiyarno, 2023), and the role of reading skills in supporting mathematical understanding (Prabowo et al., 2023). In the Philippines, Santiago and Mustaciasa (2024) investigated the effectiveness of literacy and numeracy programs on learner achievement, while Casupanan and Fastidio (2024) assessed foundational literacy among Grade 2 learners using the enhanced Marungko Approach. Although previous studies offer valuable insights, there remains a lack of research focusing specifically on the post-pandemic relationship between literacy and numeracy skills at the Grade 3 level. Addressing this gap, the present study examines the impact of foundational literacy on numeracy skills among Grade 3 learners during the 2023–2024 school year, with particular attention to their demographic profiles.

Aligned with the Department of Education's vision of a learner-centered institution, this study also contributes to Sustainable Development Goal No. 4 (SDG 4), which promotes inclusive and equitable quality education. Specifically, it addresses Target 4.1.1, which measures the proportion of learners attaining minimum proficiency in reading and mathematics at key primary levels. Despite continuous efforts to improve foundational literacy and numeracy skills, persistent learning gaps remain among early-grade learners. This study aims to investigate the impact of foundational literacy on primary numeracy skills. By providing empirical evidence, it aims to support the implementation of evidence-based approaches that enhance pupil learning outcomes in these essential areas.

2.0 Methodology

2.1 Research Design

This research employed a descriptive-correlational survey type, which aims to explore relationships between variables and describe patterns or trends within the data. It was descriptive since it presented and explained the foundational literacy level and primary numeracy skills of the learners. It was correlational since the study determined the relationship between (a) the foundational literacy level and the primary numeracy skills of the learners; (b) the profile of the learners and their foundational literacy level; and (c) the profile of the learners and their primary numeracy skills.

2.2 Research Participants

The respondents of this study are the Grade 3 learners from 21 schools in the Valencia District, Schools Division of Negros Oriental, for the School Year 2023–2024. Out of the total population of 787 learners in these schools, 340 were selected as the sample. The sample size was calculated using Yamane's formula (Yamane, 1967), which is a widely used method for determining sample sizes in statistical surveys. However, schools with a population of fewer than 15 were all included. The respondents were proportionately chosen using a systematic sampling technique, in which every third learner on the list was selected randomly. The margin of error was set at 5%.

2.3 Research Instrument

This study employed a standardized questionnaire comprising four parts. Part I included the disclosure statement, while Part II collected information on the learners' profiles. Part III employed the DepEd-standardized EGRA assessment tool, which measured reading skills through subtasks such as listening comprehension, letter-sound identification, phonemic awareness, familiar and non-word reading, and oral reading fluency. Part IV applied the DepEd-standardized EGMA assessment tool to assess numeracy skills through various components, including oral and rational counting, number identification, number discrimination, missing numbers, addition, subtraction, word problems, geometric pattern completion, and

geometric visualization (Department Order 57, s. 2015). The tools had been pre-validated and widely used.

2.4 Data Gathering Procedure

Any revisions and recommendations provided by the panel members were incorporated into the study. Once endorsed by the Dean of the Foundation University Graduate School, a formal request for permission to conduct the survey was submitted to the Schools Division Superintendent of SDO Negros Oriental. After receiving approval, the request was relayed to the School Principals and learners' advisers through the Public Schools District Supervisor. The advisers supervised the collection of survey responses, while the researchers maintained direct communication with each adviser to ensure efficient data gathering.

2.5 Data Analysis Procedure

The researchers used the frequency distribution technique to analyze the data. It is by displaying how often each value or range of values appeared in a dataset that a frequency distribution is a technique for organizing and summarizing data. Percent was used to indicate the relationship between a part and a whole. It was applied in presenting the foundational reading literacy level and primary numeracy skills of the learners. In addition, chi-square was used to identify the relationship between (a) the foundational reading literacy level and primary numeracy and mathematics skills of the learners and (b) the profile of the learners and their foundational reading literacy level and primary numeracy skills. This test was applicable since one of the variables was measured on a nominal scale.

2.6 Ethical Considerations

The researchers strictly followed all essential ethical guidelines during the study to ensure that the collected data remained confidential. The researchers securely retained all completed questionnaires. Additionally, the health and safety of both the researchers and the learners were carefully considered and protected. Furthermore, the researchers complied with the ethical standards established by the Ethics Committee of Foundation University. This included obtaining consent from the Schools Division office, district, school heads, teachers, and parents before beginning the study, while also ensuring that the respondents' health and well-being were safeguarded. Participation was voluntary, and no learner was forced to answer.

3.0 Results and Discussion

3.1 Foundational Literacy Level of Learners based on EGRA

The data revealed that, in general, 282 learners (82.94%) are readers, while 58 learners (17.06%) are non-readers. The highest number of learners, 322 (94.71%), demonstrate the ability to identify letter sounds, whereas the lowest number, 242 (71.18%), possess skills in non-word reading. Table 1 presents the foundational literacy level of 340 learners, as measured by EGRA, highlighting a notable gap between readers and non-readers across various literacy skills. Learners perform exceptionally well in letter sound identification, with 322 (94.71%) classified as readers. Similarly, they excel in listening comprehension, where 300 (88.24%) are categorized as readers.

Table 1. *Foundational Literacy Level of Learners based on EGRA (n = 340)*

Areas	Reader		Non-Reader	
	f	%	f	%
Listening Comprehension	300	88.24	40	11.76
Letter Sound Identification	322	94.71	18	5.29
Phonemic Awareness	284	83.53	56	16.47
Familiar Word Reading	251	73.82	89	26.18
Non-Word Reading	242	71.18	98	28.82
Oral Reading	287	84.41	53	15.59
Overall	282	82.94	58	17.06

These findings suggest that most learners can recognize letter-sound correspondence, a crucial early literacy skill. In addition, they demonstrate strong listening comprehension skills, enabling them to understand spoken language, process information, and derive meaning from oral texts. This result aligns with the findings of Piasta et al. (2022), who reported that both high- and low-alphabet-knowledge learners can show improvement in literacy skills. Since listening is a fundamental skill in both communication and education (Hammad Al-Khresheh, 2020), learners need to learn and interact effectively (Hardiyanto et al., 2021). However, Tran et al. (2020) contradict this, as learners struggle with understanding pronunciation, vocabulary, meaning, and

sentence structure. In addition, Nkomo and Carrim (2024) argue that many early-grade learners struggle with letter sounds, which significantly hinders their reading development. Table 1 further reveals that 287 learners (84.41%) are classified as readers in Oral Reading, while 284 learners (83.53%) are considered readers in Phonemic Awareness. This indicates that most learners can accurately decode and fluently read words, which is essential for comprehension and overall literacy development. In addition, the high percentage suggests that the majority of learners can identify, manipulate, and distinguish sounds within words, a foundational skill for decoding and spelling.

Gioia et al. (2024) emphasize that these are crucial literacy skills, especially for learners entering Grade 1 with limited knowledge of letter sounds (Nkomo & Carrim, 2024), which makes it difficult for them to develop early reading skills. Yadav (2023) emphasizes that the absence of this fundamental skill renders future education ineffective, while Rice et al. (2024) observe that non-readers often struggle in these areas and require additional support. Furthermore, continued efforts are needed to develop their reading abilities further (Rosnelli & Ristiana, 2023).

Table 1 also exhibits a lower number of readers in familiar word reading (251 or 73.82%) and non-word reading (242 or 71.18%). These findings illustrate that while most learners can recognize commonly encountered words, a significant portion (26.18%) still struggles with automatic word recognition. Additionally, the lower percentage in Non-Word Reading suggests that some learners may struggle with phonetic decoding, a crucial skill for reading unfamiliar words. These findings align with Tomas et al. (2021), who found that learners often experience difficulties with phonics and sight word recognition. Similarly, Irkinovich and Izatullaevna (2022), reported that learners who read only occasionally tend to struggle with understanding word formation, leading to further reading difficulties.

A synthesis of the results in Table 1 reflects that 282 learners (82.94%) are classified as readers, while 58 learners (17.06%) are non-readers. Although the majority of learners demonstrate reading proficiency, the 17.06% who struggle with reading cannot be overlooked. Ensuring that all learners acquire foundational literacy skills is critical for their academic success. Every learner deserves a quality education, and effective programs should be in place to support them and prevent them from falling behind.

3.2 Primary Numeracy Skills of the Learners based on EGMA

The data revealed that, overall, 240 learners (70.59%) are numerate, while 100 learners (29.41%) are non-numerate. The highest number of learners, 274 (80.59%), demonstrate proficiency in rational counting, whereas the lowest number, 204 (60.00%), exhibit skills in subtraction-level 2. Table 2 depicts the primary numeracy skills of learners based on the EGMA. Overall, 240 learners (70.59%) are classified as numerate, while 100 learners (29.41%) are considered non-numerate. The data reveal that the majority of learners demonstrate strong numeracy skills, particularly in Rational Counting (274 or 80.59%) and Geometric Visualization (271 or 79.71%), indicating well-developed number sense and spatial reasoning. According to Cruz et al. (2024), these skills are generally easier for learners to acquire and play a crucial role in building mathematical confidence.

Table 2. *Primary Numeracy Skills of the Learners based on EGMA (n = 340)*

Areas	Numerates		Non-Numerates	
	f	%	f	%
Oral Counting	265	77.94	75	22.06
Rational Counting	274	80.59	66	19.41
Number Identification	257	75.59	83	24.41
Number Discrimination	265	77.94	75	22.06
Missing Number	228	67.06	112	32.94
Addition-Level 1	215	63.24	125	36.76
Addition-Level 2	217	63.82	123	36.18
Subtraction-Level 1	220	64.71	120	35.29
Subtraction-Level 2	204	60.00	136	40.00
Word Problems	236	69.41	104	30.59
Geometric Pattern	258	75.88	82	24.12
Geometric Visualization	271	79.71	69	20.29
Overall	240	70.59	100	29.41

Additionally, most learners demonstrate proficiency in Oral Counting (265, or 77.94%) and Number Discrimination (265, or 77.94%). This aligns with findings by Birgin et al. (2022), who identified these skills as key predictors of mathematical success. These foundational abilities contribute to numerical fluency, enhancing learners' efficiency in mathematical tasks (Shumway, 2023) and equipping them for real-world challenges beyond mathematics (Pramasdyahsari et al., 2025). On the other hand, fewer learners demonstrate numeracy in Missing Number (228 or 67.06%), Addition-Level 1 (215 or 63.24%), Addition-Level 2 (217 or 63.82%), Subtraction-Level 1 (220 or 64.71%), and Subtraction-Level 2 (204 or 60.00%). This suggests that many learners struggle with arithmetic operations and number sequencing. Supporting this observation, Leuenberger et al. (2024) note that difficulties in these fundamental areas often hinder learners' ability to grasp higher-level mathematical concepts.

Moreover, non-numerate learners face significant challenges in basic math skills. The most common difficulties include finding missing numbers, performing simple addition and subtraction (Levels 1 and 2), and solving word problems. Many learners struggle with these skills, with 104 to 136 learners affected—about 30% to 40% of the group—indicating possible gaps in their basic math understanding. These tests assess essential numeracy skills, such as counting aloud, identifying missing numbers, and distinguishing between numbers. Developing these foundational skills is crucial for improving overall math proficiency.

Furthermore, mastering primary numeracy plays a vital role in learners' academic performance. Shumway (2023) emphasized that learners with a strong understanding of number sense are more efficient in solving math problems. Similarly, Leuenberger et al. (2024) found that many first graders who struggle with math often have difficulty mastering simple addition and subtraction. Finally, the low performance in word problems (104 or 30.59%) indicates challenges in mathematical reasoning. Chand et al. (2021) attribute this difficulty to a negative attitude toward mathematics, which can further impact learners' confidence and ability to engage with problem-solving tasks.

3.3 Relationship between the Foundational Literacy and Numeracy Level

The data indicated a significant relationship between the foundational literacy of learners and their primary numeracy and mathematics skills ($p < .001$). Table 3 reveals the data in identifying the relationship between the foundational literacy of the Grade 3 learners and their primary numeracy and Math skills. Using the Chi-square test, it is shown that the p-value (< .001) is less than the level of significance (0.05). This finding warrants the rejection of the null hypothesis. This means that there is an association between learners' foundational literacy and primary numeracy and Math skills. This signifies that these competencies are interdependent and mutually reinforcing. Whitehead et al. (2024) support this, stating that literacy and numeracy are closely connected. Similarly, Gesuelli et al. (2025) found that learners with strong reading skills also perform better in math. Strong literacy skills can enhance a learner's ability to understand and solve word problems, follow instructions, and comprehend mathematical concepts. In contrast, numeracy skills can support logical thinking and the ability to interpret and analyze written information, such as data in charts or graphs.

Table 3. *Relationship between the Foundational Literacy of the Grade Three Learners and Their Primary Numeracy Level (n = 340)*

Variables	x^2	p	Decision	Remark
Foundational Literacy and Primary Numeracy and Math	152	<.001	Reject H_{o1}	Significant

Chi-Square Test at 0.05 Level of Significance and 1 degree of Freedom

According to Indrawatiningsih et al. (2024), literacy and numeracy are essential skills that help learners become effective problem solvers. The findings of this study align with Shamir et al. (2024), who reported a strong correlation between math performance and reading skills. Similarly, Prabowo et al. (2023) found that learners with strong reading skills perform better in mathematics. Similarly, Pratiwi et al. (2024) emphasized that literacy plays a crucial role in numeracy, significantly contributing to learners' math skills, a conclusion also supported by Pawartani et al. (2025). These researchers recommend that schools and educators systematically integrate reading literacy into math instruction to improve learning outcomes. Furthermore, Jannah et al. (2025) highlighted the importance of literacy and problem-solving abilities in tackling math word problems, a perspective echoed by Iswara et al. (2022), who identified literacy skills as fundamental to developing problem-solving competencies. In contrast, Dassa et al. (2023) emphasized that learners with low foundational literacy skills struggled to understand primary numeracy problems, further reinforcing the strong connection between

these two skill areas.

3.4 Relationship between the Profile of the Grade Three Learners and Their Foundational Literacy Level

The data revealed that (a) female learners outperformed their male counterparts, (b) learners with better performance in English and Math tend to have higher mean literacy scores, (c) learners from higher-income families achieve better mean literacy scores, and (d) learners with educated parents tend to acquire higher mean literacy scores. Table 4 on the next page presents data on the relationship between learners' profiles and their foundational literacy skills. The results indicate that all p-values are less than the significance level (0.05), warranting the rejection of the null hypothesis. This means that sex ($p = 0.003$), English performance ($p < .001$), Math performance ($p < .001$), income ($p = 0.041$), mothers' educational attainment ($p < .001$), and fathers' educational attainment ($p < .001$) are significantly related to learners' foundational literacy skills. The mean literacy scores reveal that (a) female learners outperform their male counterparts, (b) learners with better English and Math performance tend to have higher literacy scores, (c) learners from higher-income families achieve better literacy scores, and (d) learners with educated parents tend to acquire stronger literacy skills.

Table 4. *Relationship between the Profile of the Grade Three Learners and Their Foundational Literacy Level (n = 340)*

Variables Correlated to Learners' Foundational Literacy Level	x^2	df	p	Decision	Remark
Sex	8.84	1	.003	Reject H_{o2}	Significant
English performance	103	4	<.001	Reject H_{o2}	Significant
Math performance	96.4	4	<.001	Reject H_{o2}	Significant
Income	8.27	3	.041	Reject H_{o2}	Significant
Educ. Attainment of Mothers	24.6	3	<.001	Reject H_{o2}	Significant
Educ. Attainment of Fathers	17.1	3	<.001	Reject H_{o2}	Significant

Chi-Square Test at 0.05 Level of Significance

Findings indicate that female learners consistently outperform their male counterparts in reading. In recent years, girls have generally performed better in academic contests such as story retelling and oral reading in English. This may be because girls often enjoy bonding in the library through reading storybooks, whereas boys tend to prefer physical activities. As a result, girls achieve more in reading than boys (Manu et al., 2023). This conclusion aligns with Thomas et al. (2024), who found that since kindergarten, girls have consistently excelled in pre-reading and reading skills. Similarly, Jabbar et al. (2023) observed that girls engage in reading more frequently than boys, and Keller et al. (2022) found that female learners tend to have stronger reading skills, while male learners demonstrate greater proficiency in mathematics.

The gender gap is most pronounced in speaking performance, with female learners demonstrating higher language proficiency (Alkhawaldeh & Khasawneh, 2023). Research by Ludewig et al. (2022) and Santocildes and Guanzon (2024) further supports this trend, showing that female learners consistently achieve higher reading scores. The study also reveals that learners who excel in English and math tend to achieve higher literacy scores. Yang and Wang (2022) found that learners with strong vocabulary and reading skills are more likely to perform well in English. Similarly, Aksan (2021) and Birgin et al. (2022) noted that high-achieving math learners also demonstrate strong literacy performance.

Furthermore, the findings suggest that higher family income and parental education have a significant contribution to better literacy outcomes. Parents with higher incomes can afford to buy reading materials such as storybooks, magazines, and newspapers for their children. They also have the financial capacity to hire tutors to assist their children with homework assigned by teachers. Additionally, educated parents are more capable of teaching their children how to read at home after work, compared to uneducated parents who may have difficulty reading themselves. Susetyo (2024) reported that higher parental income correlates with stronger language skills in children. Similarly, Holmquist et al. (2024) found that 75% of children from high-income families developed strong literacy skills, whereas children from low-income backgrounds were at a higher risk of reading difficulties. Shero et al. (2024) and Villegas (2024) also emphasized the substantial influence of socioeconomic status on reading proficiency.

3.5 Relationship between the Profile of the Grade Three Learners and Their Primary Numeracy Skills

The results indicate that only the English performance ($p < .001$) and Math performance ($p < .001$) of the learners are significantly related to their primary numeracy skills. Meanwhile, learners' sex ($p = 0.092$), family income ($p = 0.947$), and the educational attainment of both mothers ($p = 0.141$) and fathers ($p = 0.282$) are not significantly

related to their primary numeracy and math skills. Table 5 examines the relationship between learners' profiles and their primary numeracy and math skills. The results indicate that only English performance ($p < .001$) and Math performance ($p < .001$) are significantly related to primary numeracy and math skills, suggesting that learners who excel in English and Math tend to develop stronger numeracy skills.

Table 5. *Relationship between the Profile of the Grade Three Learners and Their Primary Numeracy Skills (n = 340)*

Variables Correlated to Learners' Primary Numeracy and Mathematics Level	x^2	df	p	Decision	Remark
Sex	2.83	1	.092	Fail to reject H_{o3}	Not significant
English performance	82.00	4	<.001	Reject H_{o3}	Significant
Math. performance	88.70	4	<.001	Reject H_{o3}	Significant
Income	0.369	3	.947	Fail to reject H_{o3}	Not significant
Educ. Attainment of Mothers	5.46	3	.141	Fail to reject H_{o3}	Not significant
Educ. Attainment of Fathers	3.81	3	.282	Fail to reject H_{o3}	Not significant

Chi-Square Test at 0.05 Level of Significance

These findings align with Gesuelli et al. (2025), who found that learners with higher reading achievement and stronger math skills tend to perform better in mathematics. Similarly, Birgin et al. (2022) reported a moderate positive relationship between overall academic performance and mathematics achievement. Liu et al. (2025) further emphasized that early numeracy is a strong predictor of later mathematical success, reinforcing the importance of foundational numeracy skills in long-term academic achievement. Shone et al. (2024) highlighted that learners' perceptions of mathematics have a significant influence on their performance. This is further supported by Aksan (2021), who found that learners with strong foundational skills and positive attitudes achieved higher levels of success in mathematics. Birgin et al. (2022) also noted that second-grade learners performed best in counting skills, emphasizing the role of early numeracy development in shaping mathematical competence.

On the other hand, the study found that learners' sex ($p = 0.092$), family income ($p = 0.947$), and the educational attainment of both mothers ($p = 0.141$) and fathers ($p = 0.282$) are not significantly related to primary numeracy and mathematics skills. This suggests that demographic and socioeconomic factors do not strongly influence learners' ability to acquire basic mathematical competencies. These results contradict the findings of Shone et al. (2024) and Tseer et al. (2025), who reported that sex influences mathematics performance, with male learners achieving higher scores than females. Similarly, Hidayatullah et al. (2024) found that male learners tend to exhibit greater confidence in their mathematical abilities than their female counterparts. However, Egara and Mosimege (2024) challenged this claim by demonstrating that in a blended learning environment, female learners outperformed male learners, suggesting that gender differences in mathematics achievement may be influenced more by instructional methods than by inherent ability. In contrast, the findings of this study align with Mabena et al. (2021), who argued that learners' difficulties in mathematics are primarily attributed to internal factors such as ill-discipline, language barriers, and negative attitudes, rather than demographic or socioeconomic influences. This supports the idea that internal and behavioral factors may have a greater impact on mathematics performance than external demographic characteristics.

4.0 Conclusion

This study highlights the strong connection between reading and basic math skills in Grade 3 learners, demonstrating that good literacy is essential for building math abilities. It shows that learners who excel in reading are more likely to perform well in math, suggesting the importance of fostering literacy to improve numeracy. However, some learners still struggle with reading unfamiliar words and solving complex subtraction problems, which can hinder their overall academic progress. Factors such as gender, academic performance, family income, and parents' education influence reading skills, indicating the need for schools and policymakers to provide equal learning opportunities and encourage parental involvement. The study also finds that strong math skills are closely tied to performance in English and Math, emphasizing the importance of quality teaching in these subjects. This research contributes to existing knowledge by confirming the significant link between literacy and numeracy, reinforcing previous findings that reading skills play a crucial role in enhancing math performance. It suggests that strengthening reading abilities can have a positive impact on students' mathematical capabilities. Future research should focus on evaluating the effectiveness of specific interventions that aim to improve both reading and math skills. In particular, studies could explore how socio-economic factors and teaching strategies impact the development of these foundational skills, offering valuable

insights for educators and policymakers.

5.0 Contributions of Authors

Dr. Agripina S. Jabanes contributed to the writing and gathering of data, while Dr. Maria Chona Z. Futalan was responsible for editing and data analysis.

6.0 Funding

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7.0 Conflict of Interests

No conflict of interest.

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Implementation of Disaster Risk Reduction and Management in a Philippine Public Elementary School

Michelle B. Bongayon*[1], Mydee O. Gervacio[2], Mary Grace D. Padilla[3], Aries B. Ventura[4]
[1]Ifugao State University–Lagawe Campus, Lagawe, Ifugao, Philippines
[2]Quirino State University, Diffun, Quirino, Philippines
[3]Saint Mary's University–Senior High School, Bayombong, Nueva Vizcaya, Philippines
[4]Rizal Elementary School, Diffun, Quirino, Philippines

*Corresponding Author Email: michelle.binwag@gmail.com

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Abstract. This study aimed to determine the status of the implementation of disaster risk reduction and management (DRRM) in a mega public school. Specifically, the respondents were 58 teachers from Cauayan South Central School, Cauayan City, Isabela. The respondents' profiles included sex, position, highest educational attainment, and the number of relevant trainings attended. The structured questionnaire used was modified and adapted from the Department of Education's School Disaster Risk Reduction and Management Manual. The results revealed that DRRM coordination and information management protocols were "well-implemented" as evinced by (M = 3.437). The activities in school disaster management were also rated as "well-implemented" (M = 3.339), while key indicators of education facilities (M = 3.147), learning environments (M = 3.190), and risk reduction and resilience education (M = 3.207) were rated as "implemented." The study found no significant differences in DRRM implementation based on sex (p = 0.064), position (p = 0.061), or highest educational attainment (p = 0.065). However, the number of relevant training sessions attended showed a significant difference (p = 0.001), with higher training attendance correlating with better DRRM implementation. Additionally, the study identified that some of the key challenges, according to the respondents, are shortages or lack of material resources (M = 3.138) and insufficient training programs (M = 3.034) being conducted at the school level. The study concluded that while DRRM measures are generally implemented, there should be targeted training and resource allocation to further improvements.

Keywords: Disaster management; Disaster risk reduction; Philippines; Public school.

1.0 Introduction

The Philippines, due to its geography and geology, is uniquely exposed to disasters and hazards. Among the prevalent disasters and hazards are hydro-meteorological events such as recurrent typhoons and floods, accounting for over 80% of the natural disasters in the country, earthquake-induced disasters, volcanic eruptions, and human-induced disasters (i.e., armed fighting, war). On average, the country experiences about 20 tropical cyclones entering the Philippine Area of Responsibility (PAR), with approximately 8 or 9 typhoons making landfall and causing damage to people and properties. According to Yusuf and Francisco (2009) and the 2017 Philippine Climate Change Assessment by Cruz et. Al (2017), the most vulnerable regions to tropical cyclones in the country are the National Capital Region (NCR), Southern Tagalog, Cagayan Valley, Central

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Luzon, the Cordillera Administrative Region, and Bicol Province. Consequently, damages to the people, animals, and livelihoods cause millions or billions every time a typhoon strikes. In addition, the Philippines, being situated in the Pacific Ring of Fire, experiences frequent earthquakes and volcanic eruptions. The Philippine Institute of Volcanology and Seismology (Phivolcs) reports that about 100 to 150 earthquakes hit the country every year. On the other hand, of about 300 volcanoes in the country, 24 were listed as active by Phivolcs.

To mitigate the impacts of these disasters on the country, Republic Act 10121 or the Philippine Disaster Risk Reduction and Management (PDRRM) Act was enacted and paved the way for the need to "adopt a disaster risk reduction and management approach that is holistic, comprehensive, integrated, and proactive in lessening the socio-economic and environmental impacts of disasters including climate change, and promote the involvement and participation of all sectors and all stakeholders concerned, at all levels, especially the local community" (RA 10121, 2010). Then, in compliance with the Act, the National Risk Reduction and Management (NDRRM) Framework was developed with the vision of attaining a "safer, adaptive and disaster-resilient Filipino Communities towards sustainable development". This framework provided for a pro-active and participatory disaster risk reduction process, highlighting the need for effective and coordinated disaster response to save lives and protect the more vulnerable groups during and after disasters (Comighud & Tizon, 2020).

Unfortunately, one of the most vulnerable sectors during these hazards and disasters is the education sector. These disasters threaten the lives of young children and their families, depriving them of their right to a safe environment and disrupting quality education. Reducing these disaster risks is therefore very important, as further stipulated in the Department of Education's Comprehensive DRRM in Basic Education Framework, disseminated in DepEd Order No. 37, series of 2017. It mandated the schools to institutionalize their DRRM structures, systems, protocols, and practices. They shall be guided by the three pillars, such as safe learning facilities, school disaster management, and DRR in education (School Disaster Risk Reduction and Management Manual, n.d.). With such directives, it is expected that all divisions and schools have DRRM practices in place and shall warrant an evaluation of the status of their implementation to identify gaps, challenges, or best practices. Reducing hazards remains a critical concern; however, limited research explores its direct impact on educational safety, particularly in enhancing school preparedness, infrastructure resilience, and student well-being. Thus, this study aims to describe the profile of the respondents, the disaster risk reduction and management measures and practices of Cauayan South Central School, and the challenges encountered in the implementation of disaster risk reduction and management.

2.0 Methodology

2.1 Research Design

The study employed a quantitative research design, using both descriptive and inferential statistics. Specifically, a survey method was conducted, which involved the administration of a questionnaire to the participants via Google Forms. It assessed the implementation of disaster risk reduction and management in a public school setting as perceived by the teachers.

2.2 Research Locale

The study was carried out in Cauayan South Central School, a mega-school and the biggest elementary school in Cauayan City, Isabela, in Region 2, Philippines. This school was selected due to its size, diverse student population, and strategic location in a disaster-prone area, especially since Cauayan City experiences frequent disasters such as typhoons and floods. It is also perfect for evaluating successful DRRM implementation in a basic education setting because, as a mega school, it has better resources than smaller schools and takes disaster preparedness more seriously.

2.3 Research Participants

The study utilized a total population sampling method, where all 79 permanent teaching personnel, consisting of teachers and master teachers of Cauayan South Central School, were invited to participate. However, 21 teachers were excluded, with 11 due to incomplete survey responses, and 10 who failed to respond. As a result, the final sample consisted of 58 respondents, representing 73.42% of the total teaching population, who are actively engaged in DRRM practices within the school.

2.4 Research Instrument

This study used a structured questionnaire that was adopted from the School Disaster Risk Reduction and Management Manual (DRRM) developed by the Department of Education to serve as a common template for localization, contextualization, and adaptation in the sub-national context. It has three parts wherein part I pertains to the profile, part II is on the disaster risk reduction and management measures and practices, and part III is the challenges in the implementation of disaster risk reduction and management. The questions were evaluated using the Likert scale.

2.5 Data Gathering Procedure

The authors first sought approval from the school administration before conducting the study. Upon approval, a structured questionnaire adapted from the Department of Education's School Disaster Risk Reduction and Management Manual was distributed to the respondents via Google Forms. Clear instructions were provided to ensure accurate and honest responses. The collected data were then organized, analyzed, and interpreted using appropriate statistical tools. Ethical guidelines, including informed consent and data confidentiality, were strictly followed throughout the process.

2.6 Ethical Considerations

This research study followed ethical guidelines. Informed consent was obtained from all respondents, ensuring their voluntary participation. Confidentiality and anonymity were strictly maintained by protecting personal information and ensuring that data were used solely for research purposes. The study also complied with institutional and ethical guidelines, ensuring fairness, transparency, and the responsible handling of research findings.

3.0 Results and Discussion

3.1 Demographic Profile of Respondents

Table 1 shows the demographic profile of the respondents. It revealed that most of the respondents are female (49 = 84.50%) and majority of them are Teacher III position (43 = 74.10%). Moreover, there is a greater number of respondents who have MA units (37 = 63.80%) and have attended 1-3 (54 = 93.10%) training relevant to the implementation of disaster risk reduction and management.

Table 1. *The Demographic Profile of the Respondents*

Profile		Frequency	Percentage
Sex	Male	9	15.50
	Female	49	84.50
	N = 58		
Position	Teacher I-II	11	19.00
	Teacher III	43	74.10
	Master Teacher	4	6.90
Highest Educational Attainment	Bachelor's degree	6	10.30
	With MA units	37	63.80
	Master's degree	12	20.70
	With Doctorate units	3	5.10
Relevant Trainings Attended	1-3	54	93.10
	4-6	4	6.90

3.2 Implementation of the DRRM Measures and Practices

Table 2 reveals the level of implementation of disaster risk reduction and management coordination, and information management protocol. It showed that all the statements have means higher than 3.25, which indicates that the disaster risk reduction and management coordination and information management protocols were "well-implemented" except for item no. 4 stating "Provide capacity building activities for teachers, non-teaching staff and learners on DRRM." As such, the grand mean of 3.437 presented that the DRMM coordination and information management protocols were "well-implemented". The study by Dela Cruz et al. (2022) highlights the successful implementation of safe learning facilities and environments in the Alfonso Lista District under the Schools Division of Ifugao. Moreover, a school-based Disaster Risk Reduction and Management (DRRM) team was organized and maintained, providing a systematic approach to disaster preparedness. Additionally, the integration of the DRRM program into the curriculum has contributed to the well-being of students, school personnel, parents, and other stakeholders involved in the school community.

Table 2. *Level of Implementation of the DRRM Coordination and Information Management Protocol*

Indicators	Mean	Interpretation
1. Ensure the establishment of an Early Warning System (i.e. bulletin board for weather advisories, bell/siren emergency signal and the like).	3.41	Well-Implemented
2. Conduct an annual student-led risk identification and mapping within and around the school premises to ensure a safe environment that is conducive to teaching and learning.	3.25	Well-Implemented
3. Maintain close coordination with local DRRM Council on the conduct of preparedness activities and on response needs, among others.	3.60	Well-Implemented
4. Provide capacity building activities for teachers, non-teaching staff and learners on DRRM.	3.19	Implemented
5. Maintain, disseminate, and post relevant and updated emergency hotlines in strategic locations throughout the school.	3.37	Well-Implemented
6. Post safety and preparedness measures and evacuation plans.	3.39	Well-Implemented
7. Conduct disaster preparedness measures, including but not limited to quarterly multi-hazard drills applicable to the school's identified hazard such as earthquake, fire and flood.	3.43	Well-Implemented
8. Maintain the safekeeping of vital school records and learning materials.	3.51	Well-Implemented
9. Organize school DRRM team to support the implementation of preparedness and response measures.	3.55	Well-Implemented
10. Ensure the availability of updated baseline education data of the school.	3.39	Well-Implemented
11. Integrate DRRM in regular school programs and activities and school improvement plan (SIP)	3.43	Well-Implemented
12. Pre-identify possible Temporary Learning Spaces (TLS) and alternative delivery modes of education.	3.32	Well-Implemented
13. Monitor the effects of hazards, including the use of the school as evacuation center.	3.41	Well-Implemented
14. Track all school personnel during disasters and/or emergencies.	3.44	Well-Implemented
15. Prepare and submit reports on the effects of any hazard.	3.51	Well-Implemented
16. Ensure implementation of DepEd Order No. 43, s. 2012 or the "Guidelines on the Implementation of Executive Order No. 66 s. 2012 (Prescribing Rules on the Cancellation or Suspension of Classes and Work in Government Offices Due to Typhoons, Flooding, Other Weather Disturbances, and Calamities)".	3.60	Well-Implemented
17. Conduct rapid assessment of damages after every hazard and submit RADaR within 72 hours via SMS.	3.53	Well-Implemented
18. Facilitate immediate resumption of classes to track learners.	3.51	Well-Implemented
19. Monitor recovery and rehabilitation interventions being implemented in the school.	3.36	Well-Implemented
Overall Result	**3.43**	**Well-Implemented**

3.3 Implementation of the Three Pillars of the Comprehensive DRRM in Basic Education

Table 3 shows the level of implementation of the key indicators of education facilities that are conducive to the physical well-being of learners. It can be gleaned from the table that majority of the indicators were "implemented" except for items no. 3, 8 and 9 stating that "The school is accessible to all, regardless of physical ability", "Basic health and hygiene are promoted in the learning environment" and "Adequate sanitation facilities are provided, considering age, gender and special education needs and considerations", respectively, which were all rated "well-implemented". Hence, the grand mean presented that the key indicators for education facilities that are conducive to the physical well-being of learners were assessed as "implemented". Table 4 demonstrates the level of implementation of the key indicators of learning environments that are secure and promote the protection and mental and emotional well-being of learners. As reflected in the table, most of the items under key indicators of learning environments that are secure and promote the protection and mental and emotional well-being of learners were rated "implemented", while the two items (1 and 2) were rated "well implemented". Thus, the grand mean revealed that key indicators of learning environments that are secure and promote the protection and mental and emotional well-being of learners were evaluated as "implemented".

Table 5 describes the level of implementation of the activities in school disaster management. It can be seen from the table that all the indicators were rated "well-implemented" except for item no. 2, which states that "Activities in the School Disaster Management ensure the availability of validated education information and monitoring and evaluation (M&E) results. As such, the grand mean presented that the activities in the school disaster management are "well-implemented". Table 6 unveils the level of implementation of the activities in risk reduction and resilience education. It appeared that the majority of the statements are "well-implemented" except for items no. 3 and 6 stating "The classroom teaching of DRRM are complemented by various co-curricular activities such as poster making, slogan and essay writing, multi-hazard drills, solid waste management and posting of hazard maps" and "The National Greening Program (NGP) is implemented to serve as food basket/main source of commodities and as a prevention and mitigation strategy that could make

schools contribute to resilience building" respectively. In essence, the grand mean score indicates that the activities in risk reduction and resilience education were "Implemented".

Table 3. *Level of Implementation on Pillar I – Sub I*

Indicators	Mean	Interpretation
1. National and provincial hazard maps are prepared and displayed in the strategic place/s in the school.	2.94	Implemented
2. School administrators, teacher and students can identify the different hazards and know how to assist the risks.	3.12	Implemented
3. The school is accessible to all, regardless of physical ability.	3.29	Well-implemented
4. The learning environment is marked by visible boundaries and clear signs, as appropriate.	3.17	Implemented
5. The school grounds have adequate space for classes and administration, recreation, and sanitation facilities.	2.98	Implemented
6. Class space and seating arrangements are according to the prescribed ratio of space per learner and teacher, at all grade levels, to facilitate participatory methodologies and learner-centered approaches.	3.03	Implemented
7. Communities participate in the construction and maintenance of the school.	3.12	Implemented
8. Basic health and hygiene are promoted in the learning environment.	3.37	Well-implemented
9. Adequate sanitation facilities are provided, considering age, gender and special education needs and considerations.	3.29	Well-implemented
10. Adequate quantities of water for safe drinking and personal hygiene are available at the learning site	3.12	Implemented
Overall Result	**3.14**	**Implemented**

Table 4. *Level of Implementation on Pillar I – Sub II*

Indicators	Mean	Interpretation
1. School and other learning environments are near the populations they serve.	3.36	Well-implemented
2. Access routes leading to the school are safe and secure for all.	3.37	Well-implemented
3. The learning environment is free from dangers that may cause harm to learners	3.19	Implemented
4. Training programs for teachers, learners and the community are in place to promote safety, security, and protection.	3.05	Implemented
5. Teachers and other education personnel are provided with the skills to give psychosocial support for the learners' emotional wellbeing.	3.10	Implemented
6. The community is involved in decisions concerning the location of the learning environment, and in establishing systems and policies to ensure that learners are safe and secure.	3.19	Implemented
7. The nutrition and short-term hunger need of learners are addressed to allow for effective learning to take place at the learning site.	3.05	Implemented
Overall Result	**3.19**	**Implemented**

Table 5. *Level of Implementation on Pillar II*

Indicators	Mean	Interpretation
1. Facilitates the harmonization of various efforts of DRRM in Education, externally and internally.	3.41	Well-implemented
2. Ensures the availability of validated education information and monitoring and evaluation (M&E) results.	3.20	Implemented
3. Ensures that weather advisories and emergency updates are communicated.	3.53	Well-implemented
4. Focuses on systems, standards, and processes that should be established to improve the implementation of DRRM in school.	3.32	Well-implemented
5. Ensures education in emergency interventions is appropriately implemented (e.g. psycho-social support, temporary learning spaces, ensuring protected and safe spaces for children, reunification).	3.27	Well-implemented
6. Ensures the availability of resources and/or interventions to support affected areas and establishes the mechanism to guide education partners in channeling their assistance during disaster response and recovery.	3.27	Well-implemented
Overall Result	**3.33**	**Well-implemented**

Table 6. *Level of Implementation on Pillar III*

Indicators	Mean	Interpretation
1. DRRM Integration in the K to 12 Curriculum Based on the new K to 12 curriculum	3.43	Well-implemented
2. DRR and CCA are integrated from kindergarten to Grade 10 in subject areas such as Health, Social Studies, and Science.	3.31	Well-implemented
3. The classroom teaching of DRRM is complemented by various co-curricular activities such as poster making, slogan and essay writing, multi-hazard drills, solid waste management and posting of hazard maps.	3.24	Implemented
4. Psychosocial support is also integrated in the learning process of students as a recovery mechanism.	3.32	Well-implemented
5. Co-curricular activities are incorporated in DRR like local activities and events that may be relevant (World Environment Day and Safe Kids Week in June; the National Disaster Consciousness Week)	3.32	Well-implemented
6. The National Greening Program (NGP) is implemented to serve as a food basket/main source of commodities and as a prevention and mitigation strategy that could make schools contribute to resilience building.	2.60	Implemented
Overall Result	**3.20**	**Implemented**

3. 4 Agreement on the Challenges in the Implementation of DRRM

Table 7 discloses the level of agreement on the challenges in the implementation of disaster risk reduction and management. Elaborately, the grand mean of 2.881 revealed that the respondents agreed with all the identified common challenges.

Table 7. *Level of Agreement on the Challenges in the Implementation of DRRM*

Indicators	Mean	Interpretation
1. Shortage of material resources / physical facilities	3.13	Agree
2. Limited training on hazard identification	3.08	Agree
3. Uncooperative environment/neighborhood/surroundings	2.84	Agree
4. Deficient measures of safety and security in the area	2.93	Agree
5. Insufficient training programs on disaster risk reduction and management	3.03	Agree
6. The absence of nutrition classes focused on disaster management	2.94	Agree
7. Inadequate conduct of monitoring and evaluation activity	2.82	Agree
8. Deficient education in emergencies	2.87	Agree
9. Insufficient topics integrated into the curriculum	2.74	Agree
10. Limited conduct of co-curricular activities related to DRRM	2.87	Agree
11. Partial implementation of the NGP	2.82	Agree
12. Teachers, staff, and students are not participative in the endeavors of the DRRM	2.43	Agree
Overall Result	**2.88**	**Agree**

3.5 Difference in the Level of Implementation of DRRM According to Selected Profile Variables

Table 8 shows the significant difference in the level of implementation of disaster risk reduction and management according to respondents' sex. It disclosed that four statements under the nineteen identified protocols were significant. However, this reflects that there is no significant difference (p-value = .064) in the level of implementation of disaster risk reduction and management according to the sex of respondents.

Table 8. *Differences in the Level of Implementation of DRRM According to Sex*

Indicators	t	p
1. Ensure the establishment of an Early Warning System (i.e. bulletin board for weather advisories, bell/siren emergency signal, and the like).	-2.05	.045*
3. Maintain close coordination with the local DRRM Council on the conduct of preparedness activities and response needs, among others.	-2.30	.025*
4. Provide capacity-building activities for teachers, non-teaching staff, and learners on DRRM.	-2.12	.038*
7. Conduct disaster preparedness measures, including but not limited to quarterly multi-hazard drills applicable to the school's identified hazards such as earthquakes, fire, and flood.	-2.27	.047*
Overall Result	**-1.89**	**.064**

*significant at .05 level

Table 9 reflects the significant difference in the level of implementation of disaster risk reduction and management according to respondents' highest educational attainment. It revealed that among the nineteen identified protocols, items 7 and 18 were significant, which states that conduct disaster preparedness measures, including but not limited to quarterly multi-hazard drills applicable to the school's identified hazards such as

earthquake, fire, and flood, and facilitate the immediate resumption of classes to track learners respectively. Nevertheless, this suggests that there is no significant difference (p-value = .065) in the level of implementation of disaster risk reduction and management according to the highest educational attainment of respondents. In the study of Reynoso and Cabigan (2021), it was found that there are significant relationships between school preparedness and disaster risk reduction management capacity in disaster mitigation, relating to the school heads and coordinators who perform disaster management, wherein they strictly and persistently perform their undertakings and capacities.

Table 9. *Differences in the Level of Implementation of DRRM According to Highest Educational Attainment*

Indicators	F	p
7. Conduct disaster preparedness measures, including but not limited to quarterly multi-hazard drills applicable to the school's identified hazards such as earthquakes, fire, and flood.	2.97	.039*
18. Facilitate immediate resumption of classes to track learners.	3.10	.034*
Overall Result	**2.55**	**.065**

*significant at .05 level

Table 10 illustrates the significant difference in the level of implementation of disaster risk reduction and management according to respondents' number of relevant training courses attended. It showed that all nineteen identified protocols were significant. Thus, this shows that there is a significant difference (p-value =.001) in the level of implementation of disaster risk reduction and management according to several relevant trainings attended by the respondents.

Table 10. *Difference in the Level of Implementation of DRRM According to the Number of Relevant Training Attended*

Indicators	F	p
1. Ensure the establishment of an Early Warning System (i.e. bulletin board for weather advisories, bell/siren emergency signal, and the like).	4.72	.000*
2. Conduct an annual student-led risk identification and mapping within and around the school premises to ensure a safe environment that is conducive to teaching and learning.	2.58	.013*
3. Maintain close coordination with the local DRRM Council on the conduct of preparedness activities and response needs, among others.	8.58	.000*
4. Provide capacity-building activities for teachers, non-teaching staff and learners on DRRM.	11.93	.000*
5. Maintain, disseminate, and post relevant and updated emergency hotlines in strategic locations throughout the school.	14.12	.000*
8. Maintain the safekeeping of vital school records and learning materials.	2.54	.014*
9. Organize the school DRRM team to support the implementation of preparedness and response measures.	3.68	.001*
11. Integrate DRRM in regular school programs and activities and school improvement plan (SIP)	15.70	.000*
12. Pre-identify possible Temporary Learning Spaces (TLS) and alternative delivery modes of education.	12.85	.000*
13. Monitor the effects of hazards, including the use of the school as an evacuation center.	3.28	.002*
14. Track all school personnel during disasters and/or emergencies.	4.91	.000*
15. Prepare and submit reports on the effects of any hazard.	2.89	.004*
16. Ensure implementation of DepEd Order No. 43, s. 2012 or the "Guidelines on the Implementation of Executive Order No. 66 s. 2012 (Prescribing Rules on the Cancellation or Suspension of Classes and Work in Government Offices Due to Typhoons, Flooding, Other Weather Disturbances, and Calamities)".	3.59	.001*
18. Facilitate immediate resumption of classes to track learners.	4.04	.000*
19. Monitor recovery and rehabilitation interventions being implemented in the school.	12.16	.000*
Overall Result	**3.56**	**.001***

*significant at .05 level

3.6 Differences in the Level of Implementation on the Three Pillars of the Comprehensive DRRM According to Selected Profile Variables

Table 11 displays the significant difference in the level of implementation on Pillar I – Sub I of the comprehensive disaster risk reduction and management according to respondents' position. It appeared that in ten identified key indicators of education facilities that are conducive to the physical well-being of learners, items 2 and 9 were significant stating that School administrators, teachers, and students can identify the different hazards and know how to assist the risks and adequate sanitation facilities are provided, considering age, gender and special education needs and considerations respectively. Yet, this reflects that there is no significant difference (p-value = 0.62) in the level of implementation of Pillar I–Sub I on the comprehensive disaster risk reduction and management according to the position of the respondents.

Table 11. *Difference in the Level of Implementation on Pillar I – Sub I of the Comprehensive DRRM According to Position*

Indicators	F	p
School administrators, teachers, and students can identify the different hazards and know how to assist the risks.	4.38	.017*
Adequate sanitation facilities are provided, considering age, gender and special education needs and considerations.	4.07	.022*
Overall Result	**2.94**	**.061**

*significant at .05 level

Table 12 displays the significant difference in the level of implementation on Pillar I – Sub I of the comprehensive disaster risk reduction and management according to several relevant trainings attended by the respondents. It emerged that all ten identified key Indicators of education facilities that are conducive to the physical well-being of learners were all significant. Hence, this indicates that there is a significant difference (p-value = .003) in the level of implementation of Pillar I–Sub I on the comprehensive disaster risk reduction and management according to several relevant trainings attended by the respondents. This coincides with the study of Bacus (2020) in which the level of knowledge by the school personnel is only "fair," while the level of implementation is at "low extent" only. Furthermore, the insufficient awareness of different DRR measures leads to its implementation not being an impressive one, which is attributed to various challenges and barriers that hinder its effective implementation. To add, they were not as familiar with their roles and responsibilities as the actors in the program were.

Table 12. *Difference in the Level of Implementation on Pillar I – Sub I of the Comprehensive DRRM According to the Number of Relevant Training Attended*

Indicators	t	p
1. National and provincial hazard maps are prepared and displayed in the strategic place/s in the school.	7.63	.000*
2. School administrators, teacher and students can identify the different hazards and know how to assist the risks.	2.79	.007*
3. The school is accessible to all, regardless of physical ability.	2.07	.043*
4. The learning environment is marked by visible boundaries and clear signs, as appropriate.	10.87	.000*
5. The school grounds have adequate space for classes and administration, recreation, and sanitation facilities.	3.00	.004*
6. Class space and seating arrangements are according to the prescribed ratio of space per learner and teacher, at all grade levels, to facilitate participatory methodologies and learner-centered approaches.	3.19	.002*
8. Basic health and hygiene are promoted in the learning environment.	4.19	.000*
9. Adequate sanitation facilities are provided, considering age, gender and special education needs and considerations.	2.89	.005*
10. Adequate quantities of water for safe drinking and personal hygiene are available at the learning site	9.84	.000*
Overall Result	**3.12**	**.003***

*significant at .05 level

Table 13 exhibits the significant difference in the level of implementation of Pillar I – Sub II of the comprehensive disaster risk reduction and management according to respondents' position. It showed that in the seven identified key indicators of learning environments that are secure and promote the protection and mental and emotional well-being of learners, two items were significant. These training programs for teachers, learners, and the community are in place to promote safety, security, and protection, and the nutrition and short-term hunger needs of learners are addressed to allow for effective learning to take place at the learning site. As such, this reflects that there is a significant difference (p-value = .048) in the level of implementation of Pillar I–Sub II on the comprehensive disaster risk reduction and management according to the position of the respondents. This further supports the conclusion of Cabigan and Reynoso (2021) that there are significant relationships between school preparedness and disaster risk reduction management capacity as to disaster preparedness which indicates that school heads and DRRM coordinators are experts in disaster preparedness and disaster risk reduction management like making an outline plan for disaster management that can be used as framework, develop communication plans for disaster, develop whole school approaches to health and safety, identify available support agencies and list of directives during disaster and conduct planning meeting to determine school needs.

Table 13. *Difference in the Level of Implementation of Pillar I – Sub II of the Comprehensive DRRM According to Position*

Indicators	F	p
1. The learning environment is free from dangers that may cause harm to learners	3.66	.032*
2. Training programs for teachers, learners and the community are in place to promote safety, security, and protection.	3.26	.046*
3. The nutrition and short-term hunger needs of learners are addressed to allow for effective learning to take place at the learning site.	3.37	.042*
Overall Result	**3.21**	**.048***

*significant at .05 level

Table 14 presents the significant difference in the level of implementation of Pillar I – Sub II of the comprehensive disaster risk reduction and management according to respondents' highest educational attainment. It explained that in the seven identified key indicators of learning environments that are secure and promote the protection and mental and emotional well-being of learners, item 3, "The learning environment is free from dangers that may cause harm to learners," was significant. Nevertheless, this shows that there is no significant difference (p-value = 0.97) in the level of implementation of Pillar I–Sub II on the comprehensive disaster risk reduction and management according to the highest educational attainment of the respondents.

Table 14. *Difference in the Level of Implementation on Pillar I – Sub II of the Comprehensive DRRM According to Highest Educational Attainment*

Indicators	F	p
1. The learning environment is free from dangers that may cause harm to learners	3.01	.038*
Overall Result	**2.21**	**.097**

*significant at .05 level

Table 15 shows the significant difference in the level of implementation of Pillar I – Sub II of the comprehensive disaster risk reduction and management according to several relevant trainings attended by the respondents. It emerged that all seven identified key indicators of learning environments that are secure and promote the protection and mental and emotional well-being of learners were all significant. Therefore, this indicates that there is a significant difference (p-value = .001) in the level of implementation of Pillar I – Sub II on the comprehensive disaster risk reduction and management according to several relevant trainings attended by the respondents.

Table 15. *Difference in the Level of Implementation of Pillar I – Sub II of the Comprehensive DRRM According to the Number of Relevant Training Attended*

Indicators	t	p
1. School and other learning environments are near the populations they serve.	4.03	.000*
2. Access routes leading to the school are safe and secure for all.	3.18	.002*
3. The learning environment is free from dangers that may cause harm to learners	4.32	.000*
4. Training programs for teachers, learners, and the community are in place to promote safety, security, and protection.	9.54	.000*
5. Teachers and other education personnel are provided with the skills to give psychosocial support for the learners' emotional well-being.	3.11	003*
6. The community is involved in decisions concerning the location of the learning environment, and in establishing systems and policies to ensure that learners are safe and secure.	3.64	.018*
7. The nutrition and short-term hunger needs of learners are addressed to allow for effective learning to take place at the learning site.	2.86	.006*
Overall Result	**3.49**	**.001***

*significant at .05 level

As a summary, there are notable significant differences in the level of implementation on the Three Pillars of the Comprehensive Disaster Risk Reduction and Management, specifically on Pillar I – Sub I, when respondents were grouped according to selected profile variables such as position, number of relevant trainings attended, and highest educational attainment. Hence, these give light to address the critical need for policymakers to focus on the design and improvement of existing school infrastructure to safeguard students and teachers during disasters. Also, it highlights the importance of collaboratively developing comprehensive emergency plans and scenarios in coordination with local institutions and disaster response organizations to enhance resilience and self-efficacy in crises. This initiative encompasses school authorities, teachers, and other personnel, providing them with professional development programs centered on emergency response, disaster management, and strategic approaches to school-based disaster preparedness and recovery (Shah et al., 2020).

Table 16 demonstrates the significant difference in the level of implementation of Pillar II of the comprehensive disaster risk reduction and management according to respondents' position. It can be gleaned from the table that among the seven identified activities in school disaster management, item 2, "Ensures the availability of validated education information and monitoring and evaluation (M&E) results," was significant. However, this indicates that there is no significant difference (p-value = 0.77) in the level of implementation of Pillar II of the comprehensive disaster risk reduction and management according to the position of the respondents.

Table 16. *Difference in the Level of Implementation of Pillar II of the Comprehensive DRRM According to Position*

Indicators	F	p
2. Ensures the availability of validated education information and monitoring and evaluation (M&E) results.	4.15	.021*
Overall Result	**2.69**	**.077**

*significant at .05 level

Table 17 describes the significant difference in the level of implementation of Pillar II of the comprehensive disaster risk reduction and management according to respondents' highest educational attainment. It can be seen from the table that among the seven identified activities in school disaster management, item 1, "Facilitates the harmonization of various efforts of DRRM in Education, externally and internally," was significant. Yet, this reveals that there is no significant difference (p-value = .196) in the level of implementation of Pillar II of the comprehensive disaster risk reduction and management according to the highest educational attainment of the respondents.

Table 17. *Difference in the Level of Implementation of Pillar II of the Comprehensive DRRM According to Highest Educational Attainment*

Indicators	F	p
1. Facilitates the harmonization of various efforts of DRRM in Education, externally and internally.	3.22	.029*
Overall Result	**1.62**	**.196**

*significant at .05 level

Table 18 illustrates the significant difference in the level of implementation of Pillar II of the comprehensive disaster risk reduction and management according to several relevant trainings attended by the respondents. It appeared that among the six identified activities in school disaster management, five were significant. Hence, this signifies that there is a significant difference (p-value = .001) in the level of implementation of Pillar II of the comprehensive disaster risk reduction and management according to several relevant trainings attended by the respondents.

Table 18. *Difference in the Level of Implementation of Pillar II of the Comprehensive DRRM According to the Number of Relevant Training Attended*

Indicators	t	p
2. Ensures the availability of validated education information and monitoring and evaluation (M&E) results.	12.40	.000*
3. Ensures that weather advisories and emergency updates are communicated.	3.60	.001*
4. Focuses on systems, standards, and processes that should be established to improve the implementation of DRRM in school.	3.17	.002*
5. Ensures education in emergency interventions is appropriately implemented (e.g. psycho-social support, temporary learning spaces, ensuring protected and safe spaces for children, reunification).	12.84	.000*
6. Ensures the availability of resources and/or interventions to support affected areas and establish the mechanism to guide education partners in channeling their assistance during disaster response and recovery.	13.25	.000*
Overall Result	**6.74**	**.001***

*significant at .05 level

As a summary, there are notable significant differences in the level of implementation of the Three Pillars of the Comprehensive Disaster Risk Reduction and Management, specifically on Pillar II, when respondents were grouped according to selected profile variables such as position, highest educational attainment, and number of relevant training attended. This aligns with the perspective of Imperiale and Vanclay (2021), who argue that crises and disasters present valuable opportunities for learning and transformation, thereby enhancing disaster risk reduction (DRR) and resilience. However, the implementation of effective DRR and resilience-building strategies is often impeded by an inadequate understanding of community resilience and the social dimensions of risk. Likewise, the lack of a structured methodology for community engagement and empowerment, along with continued reliance on traditional approaches, poses significant challenges to the successful execution of sustainable DRR initiatives.

Table 19 reveals the significant difference in the level of implementation of Pillar III of the comprehensive disaster risk reduction and management according to respondents' sex. It disclosed that among the six identified activities in risk reduction and resilience education, item 4, "Psychosocial support is also integrated into the learning process of students as a recovery mechanism," was significant. Nonetheless, this connotes that there is no significant difference (p-value = .194) in the level of implementation of Pillar III of the comprehensive disaster risk reduction and management according to the sex of the respondents.

Table 19. *Difference in the Level of Implementation of Pillar III of the Comprehensive DRRM According to Sex*

Indicators	t	p
4. Psychosocial support is also integrated in the learning process of students as a recovery mechanism.	-2.08	.042*
Overall Result	**-1.31**	**.194**

*significant at .05 level

Table 20 unveils the significant difference in the level of implementation of Pillar III of the comprehensive disaster risk reduction and management according to respondents' positions. It divulged that among the six identified activities in risk reduction and resilience education, items 2 and 6 were significant which state that DRR and CCA are integrated from kindergarten to Grade 10 in subject areas such as Health, Social Studies, and Science and The National Greening Program (NGP) is implemented to serve as food basket/main source of commodities and as a prevention and mitigation strategy that could make schools contribute to resilience building respectively. Even so, this means that there is no significant difference (p-value = .092) in the level of implementation of Pillar III of the comprehensive disaster risk reduction and management according to the position of the respondents.

Table 20. *Difference in the Level of Implementation of Pillar III of the Comprehensive DRRM According to Position*

Indicators	F	p
2. DRR and CCA are integrated from kindergarten to Grade 10 in subject areas such as Health, Social Studies, and Science.	3.51	.037*
6. The National Greening Program (NGP) is implemented to serve as a food basket/main source of commodities and as a prevention and mitigation strategy that could make schools contribute to resilience building.	5.64	.006*
Overall Result	**2.49**	**.092**

*significant at .05 level

Table 21 discloses the significant difference in the level of implementation of Pillar III of the comprehensive disaster risk reduction and management according to several relevant trainings attended by the respondents. It revealed that among the six identified activities in risk reduction and resilience education, items 1, 2, and 3 were significant. Thus, this indicates that there is a significant difference (p-value = .001) in the level of implementation of Pillar III of the comprehensive disaster risk reduction and management according to several relevant trainings attended by the respondents. As a summary, there are notable significant differences in the level of implementation of the Three Pillars of the Comprehensive Disaster Risk Reduction and Management, specifically on Pillar III, when respondents were grouped according to selected profile variables such as sex, position, and number of relevant training attended.

Table 21. *Difference in the Level of Implementation of Pillar III of the Comprehensive DRRM According to the Number of Relevant Trainings Attended*

Indicators	t	p
1. DRRM Integration in the K to 12 Curriculum Based on the new K to 12 curriculum	3.22	.002*
2. DRR and CCA are integrated from kindergarten to Grade 10 in subject areas such as Health, Social Studies, and Science.	13.51	.000*
3. The classroom teaching of DRRM is complemented by various co-curricular activities such as poster making, slogan and essay writing, multihazard drills, solid waste management, and posting of hazard maps.	4.40	.000*
Overall Result	**3.38**	**.001***

*significant at .05 level

3.7 Relationship between and among the Selected Variables

Table 22 reveals the relationship among the selected variables (profile, level of implementation of policies and practices, and level of agreement on the identified challenges). It can be gleaned from the table that there is a negative correlation between the DRRM measures and practices, and several relevant trainings attended by the respondents. However, it is significant with a p-value of .008 with a moderately strong correlation (-.300), which is statistically notable. Likewise, respondents' position is negatively associated with the implementation of Pillar I–Sub I, Pillar I–Sub II, Pillar II, and Pillar III, with all having p-values of .020, .018, .033, and .022 accordingly. Further, these have moderate strength of relationship (CC = -.258; CC = -.264; CC = -.242 and CC = -.255). In addition, respondents' highest educational attainment is negatively correlated with the implementation of Pillar I–Sub I, Pillar I–Sub II, and Pillar II, with all having p-values of .032, .033, and .036, respectively. Supplementary, these have all CCs of -.233, indicating a moderate strength of relationship, which is statistically noteworthy. Furthermore, respondents' number of relevant training attended has a negative moderate strength of relationship with the implementation of Pillar I – Sub I, Pillar I – Sub II, Pillar II, and Pillar III (CC = -.317; CC = -.317; CC = -.337 and CC = -.304). Nevertheless, these have significant relationships with p-values of .006, .006, .004, and .008, respectively.

Table 22. *Relationship between and among the Selected Variables*

		DRRM Measures and Practices	Pillar 1 (Sub1)	Pillar 1 (Sub 2)	Pillar 2	Pillar 3
Position	Correlation Coefficient[1]	-.18	-.25	-.26	-.24	-.25
	Sig	.08	.02*	.01*	.03*	.02*
Highest Educational Attainment	Correlation Coefficient[1]	-.18	-.23	-.23	-.23	-.19
	Sig	.08	.03*	.03*	.03*	.07
Number of Relevant Training	Correlation Coefficient[2]	-.30	-.31	-.31	-.33	-.30
	Sig	.00*	.00*	.00*	.00*	.00*

[1]Corelation is calculated through Kendall's tau-b; [2]Correlation is calculated through Spearman's rho; *significant at .05 level; Correlation is significant at the 0.05 level (2-tailed). CC* Correlation Coefficient 0.6 – 1.00 High strong correlation, 0.2 – 0.6 Moderate strong correlation 0 – 0.2 Low/weak correlation

These results further trail the study of Samera (2022) in which there is importance of the extent of incident command system challenges of public schools on disaster risk reduction management, wherein the level of perception of school heads on the schools' disaster risk reduction management was challenged to the attention of the educational community members. Hence, there is a significant relationship between the level of importance of incident command system challenges in public schools on disaster risk reduction management. Further, there is a significant relationship between the level of importance of incident command system challenges in public schools on disaster risk reduction management and the extent of challenges of school heads on the school's preparedness. Besides, the disaster risk reduction management (DRRM) program in public schools is well implemented, in public schools are also very capable of responding to hazards in the occurrence of disasters. Thus, there is a significant relationship between the status of DRRM implementation and the level of capabilities among public school administrators (Tabilon-Tizon & Comighud, 2020).

4.0 Conclusion

This study illuminated the scenario of the call of nature, specifically on the status of implementation of disaster risk reduction and management in a public school. The identified profile variables contributed to the remarkable differences and relationships in the implementation of disaster risk reduction and management policies and practices, including the three pillars of comprehensive disaster risk reduction and management in basic education. The higher the schools' level of implementation of disaster risk management practices, the higher their level of readiness for disasters. To include, the respondents agree on the challenges in the implementation of disaster risk reduction and management. Finally, the addition of relevant profile variables may be incorporated for future study and may look at the potential strategies in preparation for disaster and to combat the aftermath of the instance.

5.0 Contributions of Authors

All authors contributed equally to all aspects of the research, including conceptualization, design, data collection, analysis, writing, and revision of the manuscript. Each author played an integral role in ensuring the study's accuracy, coherence, and overall quality.

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7.0 Conflict of Interests

There are no conflicts of interest in this study. The authors declare that they have no financial or non-financial competing interests that could have influenced the research.

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Knowledge and Challenges of Grade 11 Students in Learning Basic Business Math

Hannah Mae C. Jacosalem*, Maria Chona Z. Futalan
Foundation University, Dumaguete City, Negros Oriental, Philippines

*Corresponding Author Email: hannahmae.jacosalem@foundationu.com

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Abstract. The study aimed to identify students' perceived knowledge of Basic Business Math topics, the challenges they encountered, and the relationship between these factors. The researchers employed a descriptive-correlational design and utilized a stratified sampling technique. The respondents were 245 Grade 11 students. A validated questionnaire was used to collect data, which was analysed using mean, percentage, and Spearman's rho. The results revealed that, in general, students perceived their knowledge of Basic Business Math as very satisfactory in the following topics: simple and compound interest, simple and general annuities, stocks and bonds, and business and consumer loans. However, approximately 10% of students rated their knowledge as only satisfactory. The study further indicated that students experienced moderate challenges related to basic knowledge, learning interest, lesson retention, and time allocation. On average, around 20% of students reported facing these challenges to a high or very high extent. Moreover, the data showed a significant relationship between students' overall level of knowledge and the challenges related to basic knowledge and time allocation. Conversely, no significant relationship was found between students' overall knowledge level and the challenges associated with learning interest and lesson retention.

Keywords: Basic Business Math; General Math; Mathematics education; Financial literacy.

1.0 Introduction

The decline in student learning outcomes in Mathematics has become a significant challenge for academic institutions worldwide (Bennett, 2023). The latest findings from the Program for International Student Assessment (PISA) 2022 indicate a concerning trend: the average international math score has dropped by 15 points compared to 2018. The most significant declines were observed in Albania, Jordan, Iceland, Norway, and Malaysia, with each country experiencing a decrease of over 30 points. Additionally, significant drops of more than 20 points were noted in Baku (Azerbaijan), Denmark, Finland, France, Germany, Greece, Montenegro, the Netherlands, Poland, Portugal, the Slovak Republic, Slovenia, Sweden, and Thailand (Organization for Economic Co-operation and Development [OECD], 2023). Research conducted in Malaysia also revealed that students still struggle with selecting and applying appropriate problem-solving strategies (Abdullah et al., 2019). This issue is not confined to one region; for instance, U.S. students continue to perform below the global average in mathematics, a concern shared by many countries worldwide (Camera, 2019).

The Philippines reflects this global trend of declining math performance, as evidenced by PISA results from 2018 and 2022. Despite a slight improvement in math scores—from 353 in 2018 to 355 in 2022—the Philippines still ranked sixth lowest in mathematics among 81 countries (Chi, 2023). Consequently, the effectiveness of the spiral

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progression approach in the K to 12 curriculum (DepEdPH, 2024) has been questioned due to persistent low achievement scores and implementation challenges (Perez et al., 2020). Additionally, Jaudinez (2019) found that students demonstrate weak performance in content and procedural knowledge, computational skills, visualization, and problem-solving. These deficiencies are largely attributed to a lack of mastery in fundamental skills, persistent stigma, and language barriers. These findings highlight the urgent need to address the underlying issues in mathematics education to improve student outcomes.

Senior high school students are required to take all core subjects, including General Mathematics in Grade 11. However, math lessons in Grades 7–10 primarily focus on Patterns and Algebra, Geometry, and Statistics and Probability. As a result, students may struggle with learning gap when encountering new concepts and terminologies in Basic Business Math topics under General Mathematics. This misalignment makes it challenging for them to connect their prior knowledge with the new material. Futalan and Mamhot (2018) found that this disconnect contributes to increased mathematical anxiety among learners. Similarly, Alvarez (2022) affirmed that learning gaps emerge when concepts are not adequately pre-spiraled. Additionally, Yap (2019) noted that students' inability to grasp foundational concepts hinders their ability to master subsequent competencies, making learning gaps inevitable.

Previous studies have primarily focused on the difficulties associated with teaching General Mathematics. In contrast, the current study examines students' knowledge and the challenges they encounter in learning General Mathematics, particularly in Basic Business Math topics, which are relatively new to them. Identifying students' knowledge levels and learning challenges could serve as a foundation for addressing existing learning gaps. Furthermore, this study aligns with several Sustainable Development Goals (SDGs). Specifically, SDG 4 (Quality Education) is addressed by identifying gaps in students' knowledge and learning experiences, while SDG 8 (Decent Work and Economic Growth) is supported by fostering financial literacy, empowering students to make informed financial decisions, and contributing to future economic development.

Given this premise, the researchers aimed to assess students' perceived knowledge levels in key Basic Business Math topics, including simple and compound interest, simple and general annuities, stocks and bonds, and business and consumer loans. Additionally, the study sought to examine the challenges students face in terms of basic knowledge, learning interest, lesson retention, and time allocation. Moreover, it aimed to explore the relationship between students' basic knowledge and the learning challenges they encounter.

2.0 Methodology

2.1 Research Design

The study utilized a descriptive-correlational design to comprehensively examine the learning dynamics of Grade 11 students. It utilized a descriptive approach to determine the level of knowledge in learning Basic Business Math topics within General Mathematics and to assess the challenges encountered. Additionally, it employed a correlational design to explore potential relationships between students' level of knowledge and the challenges they encounter while mastering these topics during the Second Quarter of General Mathematics.

2.2 Research Participants

The respondents in this study are the Grade 11 students from Bais City National High School-Senior High School for School Year 2024-2025. Using Yamane's formula with a 0.05 degree of error, 245 out of 629 students were randomly selected from the 18 organized sections in BCNHS-SHS. One section was used for the reliability test (n=30). The respondents were selected using a stratified random sampling technique to ensure that the sample represents the entire Grade 11 population at BCNHS-SHS.

2.3 Research Instrument

The study utilized a validated survey questionnaire composed of three parts. The first part presented the Disclosure Statement, which outlined the study's objectives, emphasized the voluntary nature of participation, and assured respondents of the confidentiality of their responses. The second part assessed students' perceived levels of knowledge across Basic Business Math topics, based on the General Mathematics Curriculum Guide (SHS Core Subjects MELCs, n.d.). These topics included simple and compound interest, simple and general annuities, stocks and bonds, and business and consumer loans. Participants were instructed to evaluate their knowledge by selecting a corresponding percentage range that best reflected their perceived proficiency.

The third part measured the extent of challenges students encountered while learning Basic Business Math. The items were derived from feedback gathered from both students and teachers, as well as a review of relevant literature and publications. These inputs were considered in refining the questionnaire. This section employed a five-point Likert scale, where 1 corresponded to "Very Low" and 5 to "Very High," to assess challenges in four key areas: basic knowledge, learning interest, lesson retention, and time allocation.

The entire questionnaire was evaluated by three Mathematics experts to ensure content validity and alignment with the specific objectives of the study. Feedback from these experts was carefully considered to refine the questionnaire items. Subsequently, a trial run was conducted with a sample of 30 Grade 11 students to assess item reliability. The reliability of the items was tested using Cronbach's alpha, chosen for its suitability in survey research where responses may vary. Cronbach's alpha gauges the internal consistency reliability of the items, with values ranging from 0 to 1, where higher values indicate greater reliability. A value of 0.70 or higher is considered acceptable. The results of the reliability testing indicate that all values are equal to or greater than 0.70, confirming that the items are statistically reliable.

2.4 Data Gathering Procedure

Following the design hearing, the researchers meticulously incorporated all corrections and suggestions provided by the panel members. Subsequently, a formal request to conduct the study was submitted to the Schools Division Superintendent of Bais City, endorsed by the Dean of the Graduate School at Foundation University. Upon receiving signed approval, the researchers presented the authorization to the school principal of Bais City National High School - Senior High School through the assistant school principal assigned in the Senior High School curriculum. During questionnaire distribution, the researchers provided the students with a clear explanation of the research's purpose and significance. Questionnaire retrieval occurred immediately after completion by students. The data collected were tallied using MS Excel, followed by thorough analysis and interpretation.

2.5 Data Analysis Procedure

The researchers employed several tools for data analysis, including the use of mean in getting the perceived level of knowledge and the extent of the challenges experienced by the students in learning Basic Business Math topics in the General Mathematics subject. The percentage was used in getting the portion of students who rated their perceived level of knowledge in Basic Business Math as Fairly Satisfactory, and the portion of students who experienced High to Very High challenges in learning Basic Business Math topics. Spearman's Rank Order Correlation Coefficient. This was utilized to identify the degree of relationship between the perceived level of knowledge and the extent of the challenges experienced by the students in learning Basic Business Math topics in Gen Mathematics subject. This test was selected since the data are on an ordinary scale.

2.6 Ethical Considerations

Research ethics are rigorously upheld during the study's execution. Before commencement, ethical approval was sought from the Ethical Committee of the Foundation University Research Office. Furthermore, all individual respondents were provided with comprehensive information about the study and asked to provide informed consent before participation. Key ethical principles, including the right to self-determination, confidentiality, and anonymity, as well as the potential benefits and risks of participation, were emphasized and respected throughout the research process.

3.0 Results and Discussion

3.1 Knowledge of Students in Basic Business Math Topics

Table 1 presents that students generally have a very satisfactory perceived knowledge of simple and compound interest, as reflected in the composite rating of 89.06%. This indicates that students have developed fundamental knowledge and skills in these areas. However, on average, 9.90% of students rated their competency as only fairly satisfactory. This finding aligns with Tañola and Lomibao (2024), who found that students generally grasp complex mathematical concepts. Nevertheless, despite the overall positive perception, some students still rate their competency as fairly satisfactory, indicating room for improvement. Moreno et al. (2021) emphasize that understanding simple interest is crucial in financial mathematics, as it serves as the foundation for more advanced concepts. However, students often encounter difficulties in mastering this topic. Supporting this,

Cavalcante et al. (2024) highlight that many secondary teachers struggle to explain simple and compound interest beyond standard formulas. Since students' understanding is influenced by their teachers' knowledge and instructional methods, this may contribute to the learning challenges observed.

Table 1. *Level of Knowledge of the Students in Basic Business Math Topics (n = 245)*

Competencies	$\bar{x}$	VD	SD	% (FS Rating)
Simple and Compound Interests				
1. illustrate simple and compound interests.	89.54	O	6.09	10.20
2. distinguish between simple & compound interests.	88.90	VS	6.04	10.20
3. compute interest, maturity value, future value, and present value in simple interest and compound interest environment.	89.05	VS	5.88	9.39
4. solve problems involving simple and compound interests.	88.74	VS	5.91	9.80
Composite	89.06	VS	5.98	9.90
Simple and General Annuities				
1. illustrate simple and general annuities.	89.23	VS	5.77	8.57
2. distinguish between simple and general annuities.	88.54	VS	5.79	10.61
3. find the future value and present value of both simple annuities and general annuities	88.82	VS	5.79	9.80
4. calculate the present value and period of deferral of a deferred annuity.	88.62	VS	5.87	9.80
Composite	88.81	VS	5.80	9.69
Stocks and Bonds				
1. illustrate stocks and bonds.	89.06	VS	5.82	6.94
2. distinguish between stocks and bonds.	88.69	VS	5.83	10.20
3. describe the different markets for stocks & bonds.	88.92	VS	5.85	8.98
4. analyze the different market indices for stocks & bonds.	88.53	VS	5.60	8.98
Composite	88.80	VS	5.77	8.78
Business and Consumers Loans				
1. illustrate business and consumer loans.	88.72	VS	5.96	8.16
2. distinguish between business and consumer loans.	88.50	VS	5.84	8.57
3. solve problems involving business and consumer loans (amortization, mortgage).	88.21	VS	5.84	10.61
Composite	**88.47**	**VS**	**5.88**	**9.12**

90% - 100% (Outstanding, O), 85% - 89% (Very Satisfactory, VS), 80% - 84% (Satisfactory, S), 75% - 79% (Fairly Satisfactory, FS)

Table 1 also reveals that, collectively, students rated their perceived knowledge as very satisfactory in simple and general annuities as reflected in the composite rating of 88.81%. This indicates that students have developed fundamental knowledge and skills in these areas. However, on average, 9.69% of students rated their competency as only fairly satisfactory. These results are consistent with the study by Farm Bureau Financial Services (2023), which highlights that the inherent complexity of annuities poses a challenge for some individuals, including students. A study published by Lusardi (2019) highlights the complexity of financial products, including annuities, and the challenges they pose for individuals' financial literacy. Additionally, research by Meadows and Mejri (2021) found that a significant portion of students lacked knowledge in personal finance, including understanding financial products like annuities.

Table 1 also shows that, in general, students rated their perceived knowledge as very satisfactory in stocks and bonds, as reflected in the composite rating of 88.80%. This indicates that students have developed fundamental knowledge and skills in these areas. However, on average, 8.78% of students rated their competency as only fairly satisfactory. These findings align with the study conducted by Arena et al. (2023) emphasized that students often struggle with understanding different types of securities, such as stocks and bonds. However, they also identified that financial knowledge significantly impacts students' stock market investing behaviors. On the contrary, Gupta et al. (2023) found that students who have knowledge and experience about the stock market tend to make smarter financial decisions and have a better understanding of personal finance.

Lastly, Table 1 exhibits that most of the students also rated their perceived knowledge as very satisfactory in business and consumer loans, as reflected in the composite rating of 88.47%. This indicates that students have developed fundamental knowledge and skills in these areas. However, on average, 9.12% of students rated their competency as only fairly satisfactory. These findings support Moschini and Phelan (2024), who found that some students have low levels of financial literacy, particularly regarding business and consumer loans. However, financial education courses can improve students' understanding and management of loans (Zhang & Fan, 2022). This improvement is beneficial as students' financial literacy significantly impacts their financial behaviors and decision-making (Robb & Chy, 2023).

Overall, the results suggest that while the majority of students feel confident in their understanding of these topics, a significant portion of students continue to struggle. This generalization emphasizes the need for specialized instructional methods to support students who face challenges in financial mathematics. Teachers should employ more interactive and application-based teaching approaches to strengthen students' comprehension and practical application of these concepts. Addressing this problem will ensure that all students, regardless of their initial competency levels, develop a solid foundation in financial literacy, which is essential for real-world decision-making.

The table further displays the standard deviation (SD) of students' knowledge levels. SD measures the amount of variation or dispersion in a dataset. The SD values for the four Basic Business Math topics range from 5.60 to 5.98, indicating a similar level of variability in students' knowledge across the topics. These figures suggest that students' scores are somewhat spread out from the mean, reflecting differences in individual performance. These findings have important implications for educational practice. The differences in performance suggest that some students need extra support to catch up. This is where regular check-ins, like short quizzes or class discussions, can help spot where students are struggling. Teachers might also benefit from using tools that adjust to each student's learning pace. Making financial literacy part of everyday lessons—not just in math, but across other subjects too- can show students why these skills matter in real life. When lessons are more relatable and personalized, students are more likely to stay engaged and remember what they've learned.

3.2 Challenges that Students Experienced in Learning Basic Business Math Topics

In Basic Knowledge

Table 2 reflects that students generally experience moderate challenges in their basic knowledge of Basic Business Math, as indicated by the composite mean of 2.89, with 18.53% experiencing high to very high levels of difficulty on average. This suggests that students occasionally struggle with grasping key concepts, aligning with the studies of Ross (2022) and Junaid et al. (2023), which highlight deficiencies in foundational math skills as a common challenge in learning mathematics.

Table 2. *Challenges in Basic Knowledge that Students Experienced in Learning Basic Business Math Topics (n = 245)*

	Basic Knowledge Indicators	$\bar{x}$	VD	SD	% (H-VH Rating)
1.	Incomplete mastery of number facts: My understanding and fluency with basic arithmetic operations are not fully developed or mastered.	3.04	M	0.81	20.00
2.	Incomplete understanding of math language: I don't fully understand all the words and phrases used in math.	2.88	M	0.85	20.00
3.	Computational weakness: I struggle performing mathematical calculations efficiently or accurately.	2.91	M	0.87	18.78
4.	Difficulty transferring knowledge: I find it difficult to apply what I've learned to different situations.	2.85	M	0.87	17.14
5.	Inadequate learning resources: I don't have enough helpful materials to learn from.	2.76	M	0.88	16.73
Composite		**2.89**	**M**	**0.85**	**18.53**

4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)

Specifically, students face moderate challenges in mastering number facts ($\bar{x}$=3.04), with 20% experiencing high to very high levels of difficulty. This indicates that while most students have some difficulty understanding basic math concepts, a significant portion struggles considerably, requiring repeated instruction and guidance. Their fluency in fundamental arithmetic operations remains underdeveloped, which is a key factor affecting performance in higher-level mathematics (Opitz, 2016; Jandayan et al., 2021). Additionally, students report moderate challenges in understanding mathematical language ($\bar{x}$=2.88), with 20% experiencing high to very high difficulties. This means that while most students have some difficulty interpreting mathematical phrases and sentences, one-fifth frequently struggle and require extensive support in translating words into mathematical expressions. This finding is consistent with Carey and Jacobson (2020), who emphasized that understanding word problems involves linking language to mathematical symbols, a process that many students find challenging.

Furthermore, the data depict moderate difficulties in (a) computation ($\bar{x}$=2.91), (b) transferring knowledge ($\bar{x}$=2.85), and (c) adequacy of learning resources ($\bar{x}$=2.76). This suggests that students occasionally struggle with performing mathematical calculations, applying learned concepts, and accessing sufficient learning materials. Notably, around 18% of students experience high to very high levels of difficulty in these areas, underlining the

need for extensive support and guidance. These results support the findings of Moore and Hatten-Roberts (2024), who reported that students often struggle with mathematical fluency, particularly in quick and accurate recall of math facts. They also align with Tanudjaya and Doorman (2020), who found that many students struggle to apply their knowledge in different contexts and demonstrate information literacy skills. Additionally, the findings affirm Waswa and Al-Kassab (2023), who identified insufficient educational resources as a major barrier to mathematics learning.

In summary, the results suggest that even when students encounter only moderate difficulties, these challenges can accumulate over time and negatively impact their overall understanding of the material. This emphasizes the need for teachers to move beyond traditional lecture-based instruction and adopt more engaging, student-centered strategies, such as group activities, real-life financial scenarios, and hands-on tasks. Simple formative assessments—like short quizzes or classroom reflections—can help identify areas that require further attention. Encouraging peer collaboration and providing additional support to struggling students can also lead to significant improvements. When instruction is more flexible and tailored to students' actual needs, they are more likely to grasp key concepts and apply them in real-world contexts.

In Learning Interest

Table 3 also points out that students experience moderate challenges in maintaining their learning interest in Basic Business Math, as indicated by the composite mean of 2.73. Additionally, 16.94% of students experience high to very high levels of difficulty on average. To point out, they moderately perceive Math as difficult ($\bar{x}$ = 2.98), meaning they sometimes struggle to understand the concepts of the subject. However, 25.31% of students report high to very high perceptions of difficulty, which diminishes their interest in Business Math. This suggests that a portion of students exhibit low to very little enthusiasm for learning the subject.

Table 3. *Challenges in Learning Interest that Students Experienced in Learning Basic Business Math Topics (n = 245)*

	Learning Interest Indicators	$\bar{x}$	VD	SD	% (H-VH Rating)
1.	Perception of difficulty towards math: I feel like math is hard for me to understand.	2.98	M	1.01	25.31
2.	Lack of real-life situation examples: My teacher doesn't have enough examples from real life to help me understand.	2.56	L	0.91	11.43
3.	Limited use of engaging teaching methods: My teacher doesn't use various interesting strategies to teach that keep me engaged.	2.67	M	0.91	13.88
4.	Absence of interactive learning experiences: I don't get to participate in activities where I can learn by doing things myself.	2.72	M	0.93	17.14
Composite		**2.73**	**M**	**0.94**	**16.94**

4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)

These findings align with Bacong et al. (2023), who noted that many students perceive mathematics as difficult, obscure, and uninteresting. Additionally, Midlarsky (2024) emphasized that viewing math as challenging can negatively impact motivation and engagement, further complicating the learning experience. Moreover, students' moderate level of interest may be attributed to the limited use of engaging teaching methods ($\bar{x}$=2.67) and the absence of interactive learning experiences ($\bar{x}$=2.72). This suggests that while students are sometimes engaged, their motivation fluctuates. According to Robertson and Padesky (2019), interest-based instruction, which considers students' individual and situational interests, can help sustain engagement during lessons.

However, students also acknowledge that their teachers provide real-life examples to aid understanding ($\bar{x}$=2.56), marking this as the least challenging aspect of their learning experience. This implies that students' challenges are not primarily due to teaching methods but rather stem from foundational knowledge gaps and personal interest. This contradicts Serin (2023), who argued that students often struggle with math due to a lack of real-world applications in instruction. Meanwhile, Hagan et al. (2020) emphasized that, despite its complexity, students recognize their responsibility to learn and understand that math difficulty increases as they progress through higher grade levels.

Generally, these findings highlight the importance of paying closer attention to students' motivation and confidence in the classroom. When students consistently struggle with a subject, it is natural for their interest to decline. Therefore, it is essential to foster a learning environment where students feel safe to make mistakes and ask questions without fear of judgment. Enhancing the engagement level of Business Math can be achieved by connecting lessons to real-life contexts that are meaningful to students, such as budgeting for desired items, understanding utility bills, or planning personal savings. Incorporating varied instructional strategies, such as

educational games, collaborative group projects, and hands-on activities, can help maintain student interest and curiosity. By making lessons more relevant and relatable, educators can increase students' confidence and help them perceive mathematics not as a source of anxiety, but as a practical and valuable life skill.

In Lesson Retention

Table 4 unveils that students experience moderate challenges in lesson retention when learning Basic Business Math, as reflected in the composite mean of 2.94, with 22.20% experiencing high to very high levels of difficulty on average. This indicates that while students occasionally retain lessons, they benefit significantly from review sessions. Specifically, the data show that students struggle with retention due to difficulty connecting new knowledge with prior learning ($\bar{x}$=3.00), slow comprehension of concepts ($\bar{x}$=3.08), lack of reinforcement through practice ($\bar{x}$=2.93), ineffective study strategies ($\bar{x}$=2.56), and insufficient feedback on performance ($\bar{x}$=2.82).

Table 4. *Challenges on Lesson Retention that Students Experienced in Learning Basic Business Math Topics (n = 245)*

	Lesson Retention Indicators	$\bar{x}$	VD	SD	% (H-VH Rating)
1.	Failure to connect new knowledge with prior learning: I find it hard to connect what I'm learning now with what I learned before.	3.00	M	0.90	24.90
2.	Slow in grasping concepts: It takes me some time to understand new concepts.	3.08	M	0.86	26.94
3.	Lack of reinforcement through practice: I don't get enough chances to practice what I learn to remember it better.	2.93	M	0.82	20.41
4.	Ineffective study strategies: I don't have effective ways to study that help me understand better.	2.89	M	0.89	19.59
5.	Insufficient feedback on performance: I don't get enough feedback which can guide me on how to improve my learning.	2.82	M	0.91	19.18
Composite		**2.94**	**M**	**0.88**	**22.20**

4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)

The findings emphasize the importance of foundational skills and prior learning in preparing students for new concepts. This supports Agustiani's (2022) argument that prior learning experiences are crucial in determining a student's readiness to acquire new knowledge. Additionally, the study highlights students' difficulty in understanding new concepts, reinforcing the need for more time to absorb and process information. These results are consistent with Metiksari et al. (2019), who found that some learners, particularly those who struggle with comprehension, require additional study time to recall mathematical ideas and perform arithmetic operations effectively.

Moreover, the findings stress the significance of reinforcement through practice, as students express that their limited time for practice affects their ability to retain lessons. This aligns with Junaid et al. (2023), who identified inconsistent practice habits and unfamiliarity with modern learning tools as challenges in high school mathematics education. Similarly, Pizzie and Kraemer (2023) noted that ineffective study habits hinder students from reaching their full potential in math classes. The results also further stipulate the use of effective study strategies, as students report moderate challenges in this area, suggesting a need for additional reinforcement and support. This finding mirrors Biwer et al. (2020), who emphasized that lasting learning outcomes are best achieved through active strategies such as practice testing and spaced study sessions, yet many students continue to rely on passive techniques like rereading or highlighting.

In addition, the study highlights the role of performance feedback in improving students' learning. These findings support Yang et al. (2021), who argued that effective feedback utilization enhances academic performance. Likewise, Fyfe and Brown (2020) emphasized that basic feedback can be particularly beneficial when instructors help students set clear expectations for success. Although students generally encounter moderate difficulties in lesson retention, 22.20% report high to very high levels of struggle, indicating that a significant portion faces considerable challenges in recalling and applying mathematical concepts. This finding underlines the need for reinforcement activities, personalized learning strategies, and continuous feedback to strengthen students' retention skills. Similarly, Ogoke and Okigbo (2021) emphasized that mathematics retention improves through consistent practice, interactive discussions, hands-on learning, linking new concepts to prior knowledge, addressing misconceptions, and incorporating concrete materials in teaching.

Overall, the results emphasize the importance of being more intentional in helping students retain what they learn. It is not sufficient to cover a topic only once; students need regular opportunities to review and apply their knowledge through brief recaps, practice activities, or by connecting new lessons to previously learned concepts. Teachers also play a vital role in helping students develop effective study habits, such as using visual aids,

summarizing lessons in their own words, or spacing out review sessions over time. Providing timely and specific feedback allows students to recognize both their strengths and areas for improvement. Ultimately, lessons should go beyond rote memorization and aim to foster a deep understanding of core concepts. When learning is well-structured and meaningfully connected, students are far more likely to retain and apply their knowledge over the long term.

In Time Allocation

Table 5 reveals that students experienced moderate challenges in time allocation for learning basic business math topics, as indicated by a composite mean of 3.05, with 19.92% experiencing high to very high levels of difficulty on average. Specifically, students faced moderate difficulties due to their teachers' fast-paced instruction ($\bar{x}$=2.84), with 17.55% encountering challenges to a high or very high extent. These findings suggest that a fast instructional pace may overwhelm some students, creating gaps in learning, particularly for those who require more time to process new information. This teaching approach can also limit student engagement and retention, as learners may struggle to keep up without sufficient reinforcement or practice.

Table 5. *Challenges on Time Allocation that Students Experienced in Learning Basic Business Math Topics (n = 245)*

	Time Allocation Indicators	$\bar{x}$	VD	SD	% (H-VH Rating)
1.	Fast-paced instruction: My teacher goes through lessons quickly, and sometimes it's hard for me to keep up.	2.84	M	0.90	17.55
2.	School Intervening Activities: I often find that various school activities disrupt our classroom lessons, making it harder for me to focus and learn.	2.91	M	0.85	16.73
3.	Multiple Commitments outside of school: I have many things to do outside of school that take up my time and attention.	2.87	M	0.90	21.63
4.	Overwhelming workload in other subjects: I have too much work to do for my other classes, which makes it hard for me to keep up.	2.87	M	0.89	20.41
5.	Lack of time management skills: I find it difficult to understand the lessons because I struggle with managing my time effectively.	2.90	M	0.95	23.27
Composite		**3.05**	**M**	**0.90**	**19.92**

4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)

These findings align with Güner (2020), who emphasized that prioritizing curriculum completion over effective instruction poses challenges for high school students. Similarly, Ferlazzo (2021) highlighted the importance of balancing urgency in learning with adequate wait time, ensuring students have enough opportunities to think and process information without experiencing undue anxiety.

The table also signifies that students experienced moderate challenges due to school-intervention activities ($\bar{x}$=2.91), though 16.73% faced high to very high levels of difficulty in this area. This suggests that various school-related activities interrupt classroom learning, making it harder for some students to stay focused and absorb lessons effectively. These findings support Ordway's (2021) research, which demonstrated that disruptions in education, whether planned or unexpected, can have both immediate and long-term effects on student learning from kindergarten through high school.

Additionally, the data reveal that students encountered moderate difficulties balancing multiple commitments outside school ($\bar{x}$=2.87) and managing an overwhelming workload in other subjects ($\bar{x}$=2.87). However, 21.63% of students reported experiencing these challenges to a high or very high degree. This indicates that juggling academic and extracurricular responsibilities often results in time constraints, reduced focus on Business Math, and difficulties in grasping and retaining lessons. The significant proportion of students struggling with these issues suggests that academic fatigue and stress could negatively impact their overall performance. These findings are consistent with Thi and Duong (2024), who identified heavy course loads as a major contributor to academic burnout, leading to emotional exhaustion, depersonalization, and a diminished sense of achievement. Rahmatpour et al. (2019) further noted that students experiencing burnout tend to withdraw from class participation, struggle with learning new material, and feel a lack of motivation and purpose.

Furthermore, the data reflect that students faced moderate challenges in time management ($\bar{x}$=2.90), with 23.37% experiencing high to very high levels of difficulty in this aspect. This suggests that many students struggle to balance school responsibilities with commitments outside of academics, often leading to overwhelm and inefficiency. Developing effective time management skills is crucial, as poor scheduling can negatively impact both academic performance and overall well-being. These findings align with the study by Murray et al. (2022), which found that students juggling multiple responsibilities often experience high levels of anxiety, making it

difficult to complete academic tasks effectively and maintain a sense of control over their workload.

Reflecting on the results, the findings indicate that teachers should consider adjusting their instructional methods to better match the needs of their students. Slowing down when covering complex topics, checking for understanding more frequently, and providing extra time for practice could help students keep pace with the lessons. Offering recorded lectures, additional practice exercises, or other learning resources would also allow students to review material at their speed. By creating a more flexible and supportive learning environment, teachers can help students build stronger foundations in business math and improve their overall academic performance.

3.6 Relationship between Knowledge and Challenges

Table 7 exposes the correlation between students' overall knowledge and the challenges they experience in learning Basic Business Math topics. Using Spearman's Rank Order Correlation, the findings reveal a significant relationship between the overall level of knowledge and challenges related to basic knowledge (r_s=0.141, p=0.028) and time allocation (r_s=0.157, p=0.007). These results suggest that as students' perceived knowledge improves, their difficulties in these areas slightly decrease, or conversely, as their knowledge declines, their challenges intensify. This emphasizes the importance of a strong foundational understanding and adequate time allocation in addressing difficulties when learning basic business math topics. Strengthening students' knowledge and ensuring they have ample time to master the competencies can directly alleviate some of the obstacles they face in their learning experience.

Table 7. *Relationship between the Perceived Overall Level of Knowledge and the Challenges Experienced by the Students (n = 245)*

Variables	r_s	p	Decision	Remark
Overall Level of Knowledge and Challenges Experienced in Basic Knowledge	.14	.028	Reject H_o	Significant
Overall Level of Knowledge and Challenges Experienced in Learning Interest	.10	.104	Fail to reject H_o	Not significant
Overall Level of Knowledge and Challenges Experienced in Lesson Retention	.11	.072	Fail to reject H_o	Not significant
Overall Level of Knowledge and Challenges Experienced in Time Allocation	.15	.007	Reject H_o	Significant

Spearman's Rank Order Correlation (r_s) at 0.05 Level of Significance

These findings support the study by Zheng and Gupta (2020), which found that prior knowledge significantly influences cognitive load when solving mathematics problems. A solid grasp of fundamental concepts reduces cognitive strain and enhances learning outcomes. Similarly, Jandayan et al. (2021) affirm that students with weak foundational math skills tend to struggle with more advanced topics. Moreover, recent research highlights the critical role of instructional time in mathematics. Effective management of learning time is widely recognized as a key factor in enhancing students' academic performance (Liu et al., 2023). The TIMSS 2019 report indicates that the amount of instructional time devoted to mathematics significantly impacts student achievement, emphasizing the need for adequate time allocation to improve learning outcomes (Mullis et al., 2020). Additionally, a study by Burgess et al. (2022) found that students achieve higher math scores when more class time is dedicated to individual practice and assessment.

Conversely, no significant relationship was found between the overall level of knowledge and challenges related to learning interest (rs=0.104, p=0.104) and lesson retention (rs=0.116, p=0.072). This suggests that factors affecting students' interest and ability to retain lessons may be independent of their perceived knowledge. These findings contrast with those of Ogoke and Okigbo (2021), who argued that improved achievement or knowledge supports the retention of mathematical concepts. Valderama and Oligo (2021) also noted that retained mathematical knowledge tends to diminish over time, indicating that retention is more closely linked to how information is processed and reinforced rather than the initial level of knowledge. Recent studies support the importance of learning interest. Herpratiwi and Tohir (2022) found that learning interest significantly influences learning motivation, which is crucial for academic success. Additionally, Kumar (2025) emphasizes that sparking and sustaining interest in learning can transform mundane lessons into engaging experiences, thereby enhancing student engagement and motivation.

In synthesis, the findings suggest that helping students succeed is not just about making sure they understand the material; it is also about keeping them interested and helping them remember what they learn. Since students' interest and ability to retain lessons do not seem to depend only on how much they know, teachers need to find ways to make learning more engaging and meaningful. Using real-world examples, group projects, and regular practice sessions can help students stay motivated and remember important concepts. It is also a

good idea to build in chances for students to revisit and recall what they have learned over time, not just cram everything at once. By focusing on both what students know and how they stay interested and confident, teachers can create a learning environment where students are more likely to succeed and hold onto what they have learned in basic business math.

4.0 Conclusion

Education must uphold the principle that no child is left behind, particularly for students who have only a basic grasp of Basic Business Math or face significant challenges in learning the subject. While many students demonstrated substantial mastery of key financial topics, a notable portion struggled, especially with foundational knowledge and time allocation, both of which were significantly linked to overall knowledge. These students are at greater risk of falling behind, as their limited understanding may intensify the difficulties they encounter.

The challenges faced by this minority of students can lead to decreased confidence and motivation, further widening the learning gap. Ensuring that all students grasp fundamental concepts promotes an inclusive learning environment and reinforces the commitment that no student should be left behind, aligning with SDG 4 on quality education. By addressing these struggles, educators can help students develop not only numerical proficiency but also essential problem-solving skills, supporting their personal and professional growth and contributing to SDG 8 on decent work and economic growth. Recognizing knowledge as a key determinant of learning challenges, educators must take these findings as a call to action. While improving time management and minimizing classroom disruptions can help students stay focused, the goal is to ensure that all students, regardless of their initial proficiency, develop the confidence and skills necessary for academic and financial success.

Based on the findings, it is recommended that teachers integrate real-life financial scenarios into their lessons and emphasize the importance of topics such as stocks and bonds to strengthen students' financial literacy and economic awareness. Teachers are also encouraged to use assessment results as a foundation for designing specific interventions and refining the curriculum. For school administrators, it is recommended to advocate for curriculum updates that make business math topics more practical and engaging. Furthermore, administrators should ensure that teachers receive ongoing professional development in the latest instructional strategies and tools to better support students. Additionally, administrators could explore partnerships with local businesses and organizations to enhance students' financial literacy. Finally, providing parents with resources to support their children's learning at home could further reinforce students' success.

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The authors confirm their equal contribution to every part of this research. All authors reviewed and approved the final version of this paper.

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7.0 Conflict of Interests

This study has no conflict of interest of any sort.

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Mindfulness and Metacognitive Beliefs as Predictors of Students' Coping Strategies in Learning Filipino

Greaza Peñaflorida*, Marilou Y. Limpot
University of Mindanao, Davao City, Philippines

*Corresponding Author Email: greazap290@gmail.com

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Abstract. Learning Filipino as a subject has concerned college students, leading to academic stress due to a lack of proficiency in the subject. This implies the need to investigate factors that can mitigate academic stress in learning Filipino, as it directly affects their performance. This study aimed to identify the relationship between mindfulness and metacognitive beliefs as predictors of students' coping strategies in learning Filipino. A quantitative descriptive-correlational design was utilized to investigate the relationship and influence of the independent variables on the dependent variable. The participants of the study were 200 college students from a private school selected through random sampling. The study used adapted questionnaires for data collection and employed mean, Pearson r, and regression analysis to interpret the data. The findings indicated that students exhibited a high level of mindfulness and metacognitive beliefs, suggesting that these traits are often present. In contrast, their coping strategies for learning Filipino were moderate, implying that these strategies were used occasionally. A significant relationship was found between mindfulness and metacognitive beliefs; however, no such relationship was observed between these variables and students' coping strategies. Moreover, mindfulness and metacognitive beliefs did not significantly affect students' coping strategies in learning Filipino, suggesting that they are not predictors of the dependent variable. Overall, the study found no strong evidence of a direct effect between mindfulness, metacognitive beliefs, and students' coping strategies. Considering these findings, further investigation into additional factors that may significantly influence coping strategies is recommended to address academic stress.

Keywords: Filipino subject; Language learning; Metacognitive beliefs; Philippines.

1.0 Introduction

Learning poverty in the Philippines continues to hinder students' performance in local, national, and international assessments. Furthermore, many students across all educational levels express concerns about the Filipino language, which adds to their academic stress. A lack of proficiency in Filipino significantly impacts their academic success. Moreover, college students face challenges in participating effectively in classroom discussions due to difficulties in using Filipino as a medium of instruction and communication (Ancheta & Napil, 2022). Despite these obstacles, many students are employing various strategies to cope with the challenges of learning Filipino. However, not all of these strategies prove effective, highlighting the need to explore methods to facilitate and enhance Filipino language learning across diverse educational levels. To reduce academic stress, a coping strategy must be employed, as it helps address the problem and improves students' proficiency in the subject. Exploring mindfulness and metacognitive beliefs is recognized as a factor

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that can foster effective coping strategies in learning Filipino as a subject, given their significant impact on educational outcomes.

Mindfulness, as defined by Liang et al. (2024), involves being aware of a person's thoughts, emotions, and physical sensations without judgment. In terms of coping, it relates to effectively regulating emotions and reducing stress among Filipinos. Furthermore, mindfulness fosters metacognitive awareness, enabling individuals to explore their thoughts more deeply and manage their emotions effectively (Guendelman et. al, 2017). Meanwhile, metacognitive beliefs refer to how individuals process and control their thoughts, which affects their stress management and emotional regulation (Solem et al., 2015). Individuals with higher metacognitive beliefs tend to adopt coping strategies such as problem-solving and seeking social support, demonstrating a strong capacity to manage their thoughts and emotions (Fernie et al., 2009). Those with greater metacognitive awareness can organize and adjust their thought patterns, which is crucial for employing effective coping strategies. Overall, mindfulness, metacognitive awareness, and metacognitive beliefs highlight their importance in developing effective coping strategies.

Coping strategies encompass a variety of approaches, including analysis, seeking help, emotional responses, religiosity, endurance, overcompensation, leisure activities, and vices. These strategies are rooted in the experiences of Filipinos, fostering an understanding of how they manage stress and recognizing their strengths in overcoming it (Rilveria, 2018). All these strategies yield a wide range of responses—from analytical methods and emotional expressions to seeking social support and engaging in leisure activities. These responses represent effective ways to cope with challenges. Filipinos demonstrate remarkable strength and resilience when facing difficulties, reflecting their perseverance and faith. Bandura's Social Cognitive Theory and the Cognitive-Affective Processing System support the connection between mindfulness and students' coping strategies in learning Filipino (Bandura, 2020). The theory explains that we do not passively react to our surroundings; rather, we actively shape our actions. Our thoughts and emotions, external environmental factors, and past experiences or learned behaviors influence our behavior.

Many studies have shown different elements or influences that lessen academic stress. However, further exploration of mindfulness and metacognitive beliefs as predictors of coping strategies for learning the Filipino language is essential to address these issues. As a result, this study aims to describe the relationship and influence of mindfulness and metacognitive beliefs on coping strategies. Specifically, it seeks to determine the level of mindfulness and metacognitive beliefs among students, assess the utilization of various coping strategies, identify the significant relationship between mindfulness and metacognitive beliefs concerning coping strategies, and determine which of the two factors has the greatest influence on students' coping strategies.

This study expands knowledge for future researchers by providing relevant literature on mindfulness, metacognitive beliefs, and coping strategies. The findings may benefit various institutions, including schools, by aiding counselors and teachers in supporting stressed students. The Department of Social Welfare and Development (DSWD) may also utilize this study as a guide for offering mental and emotional assistance. The education sector can leverage this research to enhance students' coping skills, thereby contributing to Sustainable Development Goal (SDG) No. 4, which promotes inclusive, quality education. By improving students' coping strategies, this study establishes a foundation for quality education and inclusive learning in the Philippines.

2.0 Methodology

2.1 Research Design

This study utilized a descriptive-correlational survey design, which aimed to examine the relationship between two or more variables (Ancheta & Napil, 2022). In this study, the independent variables are mindfulness and metacognitive beliefs, while the dependent variable is coping strategies. Furthermore, the primary objective of descriptive-correlational research is to describe relationships between variables rather than infer causation. This type of study is valuable as it shows how one event is related to another, particularly when researchers have no direct control over the independent variable or its assumed causes or effects on the dependent variable. Accordingly, this study aims to determine the relationship between mindfulness and metacognitive beliefs and their influence on students' coping strategies (Lappe, 2000).

2.2 Research Participants

The study participants consisted of 200 college students enrolled in a Filipino course during the second semester. The Raosoft Sample Size Calculator was used to determine the appropriate number of respondents needed to collect reliable responses. Participants could voluntarily join without risking penalties or losing benefits. Opting out carried no repercussions or fines. They could withdraw their consent at any time without facing penalties. Their rights and benefits remained intact throughout the study.

2.3 Research Instrument

The research utilized questionnaires divided into three sections, sourced from reputable sources. The first section includes an adapted version of the Toronto Mindfulness Scale developed by Lau et al. (2006), which comprises two indicators: curiosity and loss of focus. The second section assesses students' metacognitive beliefs based on the study of James Carmody, covering positive and negative metacognition. Lastly, the Filipino Coping Strategies Scale from Rilveria aims to identify varying levels of coping strategies related to different aspects of student learning, such as analysis, seeking help, emotional responses, religiosity, endurance, emotional expression, overcompensation, leisure activities, and vices. A five-point scale with five descriptive levels- very high, high, moderate, low, and very low- indicates the degree of agreement or disagreement among respondents regarding each item. This structured assessment ensures a systematic evaluation of students' mindfulness, metacognitive beliefs, and coping strategies in learning Filipino.

2.4 Data Gathering Procedure

The data collection process involved several steps. First, relevant questionnaires related to the study were gathered. Second, the research adviser validated these questionnaires to assess their effectiveness and determine whether any revisions were necessary. Third, modifications were made based on the adviser's recommendations. Fourth, the panelists re-evaluated the revised questionnaire to ensure its validity. Fifth, it was submitted to the University of Mindanao Ethics Review Committee. All necessary documents were gathered and resubmitted to UMERC for final approval. A permission letter was prepared and approved by the research adviser and the Dean of Professional Schools. After receiving UMERC's approval, the letter was sent to the president of the study's local area, who subsequently confirmed acceptance. Following this, data collection was conducted using printed questionnaires, which were analyzed afterward with the study's statistical tools. In analyzing the data, each variable was assessed by calculating its mean and standard deviation. To examine the relationship between the independent and dependent variables, Pearson's r (product-moment correlation) was used. Multiple regression analysis was then employed to test and identify predictors for the dependent variable.

2.5 Ethical Considerations

This research guarantees compliance with ethical standards, including voluntary participation, privacy, confidentiality, informed consent, recruitment, risk and benefit assessment, prevention of plagiarism, avoidance of fabrication and falsification, management of conflicts of interest (COI), minimization of deception, institutional approval, and integrity in authorship. The participation of respondents is voluntary; they can join without penalties or loss of benefits. They are free to opt out at any time without incurring fines. Their rights and benefits, as well as the protection of their research data, were ensured throughout the study. As proof of compliance, the study received official certification from the University of Mindanao Ethics Review Committee (UMERC), reference number UMERC-2023-298, which was approved on June 23, 2023.

3.0 Results and Discussion

3.1 Mindfulness

Table 1 shows that curiosity has the highest mean score of 4.18 (SD=0.59), demonstrating that it is often observed among college students. Conversely, loss of focus has the lowest mean of 3.66 (SD=0.60), implying that it is frequently noted in the participants. Overall, the level of mindfulness among college students is high, with a mean of 3.87 (SD=0.52), suggesting that it is commonly observed in them.

Table 1. *Level of Mindfulness*

Indicator	Standard Deviation	Mean	Descriptive Level
Curiosity	0.59	4.08	High
Loss of Focus	0.60	3.66	Moderate
Overall	**0.52**	**3.87**	**High**

The study's findings indicate that students possess a high level of curiosity, suggesting that they are actively engaged in learning and seeking knowledge through various experiences. This strong interest aligns with previous research by Lau et al. (2006), who asserted that this indicator is essential for student engagement and reflects a proactive approach to education. This willingness to learn through a range of experiences can vastly enhance cognitive development and foster a deeper understanding of the subject matter.

On the other hand, the moderate level of less focus indicates that while students are generally curious, they also face distractions that can impede their learning process. This research suggests that these instances of distraction are not constant but occur occasionally, implying that lapses in focus may affect learning outcomes depending on the situation. Guendelman et al. (2017) explored the relationship between self-awareness and emotion detection. Their findings show that students' experiences influence their awareness and emotional responses, affecting focus and concentration. This reveals a complex dynamic in which heightened interest can divert attention from responsibilities.

The study's findings support Bandura's Social Cognitive Theory, which proposes that student mindfulness affects behavior through personal, contextual, and behavioral factors. The Cognitive-Affective Processing System concurs, asserting that these domains interact in complex ways to influence behavioral and emotional regulation (Bandura, 2020). This indicates that cognitive and environmental factors shape students' behavior, making it essential to employ coping strategies.

3.2 Metacognitive Beliefs of Students

Table 2 reveals students' metacognitive beliefs, measured through both positive and negative metacognition. Negative metacognition has a mean of 3.69 (SD=0.60), indicating a high-level description that suggests students often experience it in various situations. In contrast, positive metacognition has the lowest mean of 3.41 (SD=0.59), implying a moderate level and suggesting that students encounter it occasionally when given the chance. Overall, it recorded a mean of 3.73 (SD=0.43), indicating that students frequently express metacognitive thoughts across different contexts.

Table 2. *Metacognitive Beliefs of Students*

Indicator	Standard Deviation	Mean	Descriptive Level
Positive Metacognition	0.59	3.41	Moderate
Negative Metacognition	0.60	3.69	High
Overall	0.43	3.73	High

The results indicate that positive metacognition is moderate, while negative metacognition is high. This aligns with the findings of Safari and Yousefpoor (2022), which show that the mean score for negative metacognition surpasses that of positive metacognition. The study's findings suggest that negative metacognition is prevalent among students, as they often procrastinate on tasks, leading to increased stress levels.

The results support Bandura's social cognitive theory, which asserts that metacognitive beliefs reflect an individual's capacity to control and manage their behavior. This suggests that mental and emotional processes interact in intricate ways to regulate behavioral and emotional control (Bandura, 2020). It also indicates that cognitive and environmental factors significantly influence students' behavior, underscoring the importance of metacognition in managing their learning processes. The study of Villaruz and Palma (2024) also emphasizes the necessity of metacognitive awareness for personal growth, promoting critical thinking, and enhancing the ability to learn Filipino in various contexts.

3.3 Coping Strategies

Table 3 shows the level of coping strategies among students, evaluated based on analysis, seeking help, response, religiosity, endurance, overindulgence, leisure, and vices. Among all measures, leisure had the highest mean of 4.37 (SD = 0.66), indicating that students consistently utilize this coping technique. Similarly, religion, with a mean of 4.33 (SD = 0.97), and reaction, with a mean of 4.31 (SD = 0.99), demonstrate very high levels, suggesting that students commonly apply these strategies across various settings.

The evaluation of coping strategy levels indicates that many strategies, including analysis, overindulgence, seeking help, and endurance, are frequently utilized, suggesting that students depend on them in various

situations. Meanwhile, religiosity, with a mean score of 4.33 (SD=0.97), remains relatively high, showing that students consistently employ it as a coping method. In contrast, vices had a very low mean of 1.78 (SD=0.97), indicating that students do not rely on them for stress coping.

Table 3. *Level of Coping Strategies*

Indicator	Standard Deviation	Mean	Descriptive Level
Analysis	0.74	3.92	High
Seeking Help	1.04	3.62	High
Response	0.99	4.31	Very High
Religiosity	0.97	4.33	Very High
Endurance	0.79	3.36	High
Overindulgence	1.08	3.66	High
Leisure	0.66	4.37	Very High
Vices	0.97	1.78	Very Low
Overall	0.37	3.28	Moderate

The lower levels of vices as coping mechanisms are particularly significant because they signify a societal rejection of maladaptive behaviors in favor of more constructive responses to stress. This aligns with Bandura's Social Cognitive Theory, which asserts that individuals are shaped not only by their environment but also by their conscious choices regarding coping. It reflects the internalization of cultural values that promote adaptive coping over destructive behaviors (Bandura, 2020). Therefore, fostering awareness and skill development regarding coping strategies is essential, especially as students continue to face academic and personal pressures. Interventions aimed at enhancing adaptive coping techniques while reducing tendencies toward overindulgence could significantly improve student well-being and academic success.

3.4 Relationship between Mindfulness, Metacognitive Beliefs, and Coping Strategies

Table 4 highlights the significant relationship between the independent variables—mindfulness and metacognitive beliefs—and the dependent variable, coping strategies in learning Filipino. The correlation between mindfulness and metacognitive beliefs, with a p-value of .273** (significant at the 0.01 level), indicates a positive relationship.

Table 4. *Correlation between Mindfulness, Metacognitive Beliefs, and Coping Strategies*

	Mindfulness	Metacognitive Beliefs	Coping Strategies
Mindfulness	1	.273**	.125
Metacognitive Beliefs	.273**	1	-.015
Coping Strategies	.125	-.015	1

Correlation is significant at the 0.01 level (2-tailed).

This result leads to the rejection of the null hypothesis and the acceptance of the alternative hypothesis, which asserts that there is a significant relationship between students' mindfulness and metacognitive beliefs. This suggests that as students' levels of mindfulness increase, their metacognitive beliefs also tend to rise. Meanwhile, the correlation between mindfulness and coping strategies (p-value = .125) is positive but not significant at the 0.01 level, indicating inadequate evidence to establish a strong relationship between the two variables. Similarly, the relationship between metacognitive beliefs and coping strategies (p-value = -0.015) is non-significant, which supports the prediction that there is no substantial relationship between metacognitive beliefs and coping mechanisms.

This study aligns with previous research on variable correlations, including the findings of Keng et al. (2018) and Liang et al. (2024), who identified a substantial positive relationship between mindfulness and metacognitive beliefs. However, the absence of a strong connection between mindfulness and coping strategy is in line with the findings of Freligh (2020), who reported a negative correlation between these variables. Additionally, the lack of a significant relationship between metacognitive beliefs and coping strategies aligns with the findings of Kooren et al. (2024), who found a negative correlation. These results reinforce Bandura's Social Cognitive Theory, which asserts that independent variables can affect dependent variables, implying that personal, contextual, and other external factors shape behavior. The findings suggest that environmental conditions and individual differences influence both mindfulness and metacognitive perspectives.

This perspective is supported by cognitive-affective processing theory, which suggests that cognitive and emotional processes interact in intricate ways to regulate behavior and emotional responses (Bandura, 2020).

This implies that students' mental and situational contexts influence not only their behavior but also their need for coping strategies. Additionally, interventions aimed at enhancing coping could benefit from a dual focus on improving mindfulness and refining metacognitive skills. Therefore, addressing these cognitive and emotional dimensions could foster a more adaptive coping framework for students.

3.5 Influence of Mindfulness and Metacognitive Beliefs on Coping Strategies

Table 5 illustrates the overall significant influence of the independent variables (mindfulness and metacognitive beliefs) on the dependent variable (coping strategies in learning Filipino). Multiple regression analysis assessed whether mindfulness and metacognitive beliefs significantly impact coping strategies. The results indicate that neither variable has a significant effect.

Table 5. *Overall Significant Influence of Mindfulness and Metacognitive Beliefs on Coping Strategies*

	B	Std. Error	Beta	t	Sig.
Constant	3.01	0.21		14.15	.000
Mindfulness	0.09	0.05	0.13	1.89	.060
Metacognitive Beliefs	-0.02	0.03	-0.05	-0.71	.473

Note: R = 0.135, F = 1.817, R^2 = 0.018, p = .165

The results indicate a significant influence of mindfulness and metacognitive beliefs on coping strategies. The regression coefficient for mindfulness is 0.097, suggesting a positive relationship; however, the p-value of 0.060 shows that this relationship is marginally insignificant at the 0.05 level. This implies that while there may be a tendency for increased mindfulness to slightly enhance coping strategies, the evidence is not strong enough to draw a definitive conclusion about its effect. In contrast, the regression coefficient for metacognitive beliefs is -0.028, indicating a minor negative impact on coping strategies. The high p-value of 0.473 further verifies that this relationship is not statistically significant. The results emphasize that as metacognitive beliefs increase, they do not significantly improve coping strategies and may even decline; however, the evidence remains insufficient to support a strong relationship.

The correlation coefficients (R-value = 0.135 and R^2 = 0.018) indicate a weak relationship between the analyzed variables. The R^2 result shows that mindfulness and metacognitive beliefs have minimal influence on coping techniques, explaining only 1.8% of the variance. Other important factors, such as social and emotional support and the stress levels of students, can significantly impact these strategies. In conclusion, the findings align with previous research, which indicated that mindfulness and metacognitive views do not significantly influence coping mechanisms (Freligh, 2020; Kooren et al., 2024). This underscores the need for further research into additional factors that may influence coping techniques, highlighting the complexities of coping processes among students.

4.0 Conclusion

The results of the study revealed that college students exhibit a high level of mindfulness and metacognitive beliefs, indicating that these traits are often observed in them. However, their coping strategies for learning Filipino are moderate, suggesting that these strategies are seldom employed. Some indicators have peaked, emphasizing the potential for improvement through practice, which could further enhance students' mindfulness and metacognitive beliefs. A significant correlation exists between mindfulness and metacognitive beliefs, although not with coping strategies. Furthermore, mindfulness and metacognitive beliefs exert minimal influence on coping strategies, indicating they are not predictive factors. This research supports Bandura's Social Cognitive Theory by demonstrating how cognitive and emotional processes shape behavior and emotional regulation while also emphasizing the importance of coping strategies for students.

The researcher recommends implementing learning programs to enhance mindfulness and metacognitive beliefs by minimizing distractions. These programs should include workshops on time management and mindfulness, along with activities that focus on self-reflection, self-regulation, and goal-setting activities. Counseling sessions must reinforce Filipino coping strategies focused on problem-solving and decision-making designed according to the needs of the students. Peer support initiatives should encourage mutual support among students. Resilience and stress management training will boost students' ability to face challenges. Awareness campaigns should address undesirable behaviors like excessive indulgence and addiction, offering counseling for those affected. Integrating metacognition into the curriculum requires programs that develop these skills while positively influencing attentional control. Comprehensive programs aimed at enhancing metacognitive skills

and coping strategies must be established, with regular assessments of intervention effects for ongoing improvement. While mindfulness training may not be significantly influential, it can still positively impact students' coping strategies. Workshops to enhance metacognitive skills should be introduced, as they are crucial for the learning process.

5.0 Contributions of Authors

Greaza Penaflorida – writing, editing
Marilou Y. Limpot – supervising, editing

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Authors have declared that there is no funding for this research.

7.0 Conflict of Interests

Authors have declared that no competing interests exist.

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The Ordeals of Mountaineering Responders in Santa Cruz, Davao del Sur: A Phenomenological Study

Khezziah Bianca Araña*, Roel Jr. D. Apas
Davao Del Sur State College, Digos City, Philippines

*Corresponding Author Email: khezziahbianca@gmail.com

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Abstract. This phenomenological study explored the lived experiences, coping mechanisms, and memorable insights of eight mountaineering responders from Barangays Astorga and Darong in Santa Cruz, Davao del Sur. Through the process of personal experience description, listing of textual description, grouping relevant topics, writing textual description, writing structural description, and identifying the essence of the phenomenon, the collected data was examined and deduced. A data analyst assisted the development of key subjects, and the results show that the lived experiences of the Astorga Mountaineer Ecological Conservation Club and Rescue Team (AMECC ART) in dealing with disaster include being equipped to respond to various situations and trained to serve people. Moreover, the coping mechanism of the AMECC ART, as a responsive responder, emphasizes the need to join training and workshops, apply various strategies or techniques, and trust fellow responders. In addition, the memorable insights/training programs of the AMECC ART responder's journey as a responsible responder are teammates, personal goals, learning from the pro, and overcoming difficulties at times. It is recommended that an Ordinance be implemented for the Municipal Disaster Risk Reduction Management Office (MDRRMO) of Santa Cruz, Davao del Sur, proposing a budget identifying the needs, equipment, and financial subsidy for better disaster resources and response. Additionally, a leadership training will be provided for the Officials of the AMECC ART.

Keywords: Mountaineering responders; Responder experiences; Responder training and coping strategies.

1.0 Introduction

A disaster is the result of an accident or a natural catastrophe that causes loss of life or significant damage to non-living and living things. It does not exempt any social status or race; therefore, it is everybody's business. However, as reality sets in and reveals that not everyone possesses the capacity for so-called bravery. The flaming volunteerism in this matter depends on the specified eagerness and confidence to overcome this situation. And as it ends with "R," comes the word, 'RESPONSIVENESS.' In this manner, the volunteered responders should have and must be equipped with such knowledge and exemplary skills to respond efficiently and effectively during emergencies, such as disasters. Moreover, the so-called resources, such as first-aid kits and other relevant emergency response materials, were also the most vital and challenging ones.

In many nations, voluntary first response plays a significant role in prehospital care for medical emergencies, especially cardiac arrest. To respond to medical emergencies in their community, the Emergency Medical Services mobilize volunteers, known as Community First Responders (CFRs). They consist of both professional

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and lay responders, such as general practitioners, firefighters, and police officers. Numerous elements, including leadership, counseling, recognition, and learning opportunities, are believed to encourage CFRs to enroll in and stay involved in Voluntary First Response programs. It truly influenced how Voluntary First Response programs are planned and executed, including hiring, training, and psychological support procedures. CFRs, paramedics, emergency physicians, patients, and the public are among the many stakeholders who gain from this (Heffernan et al., 2020). This was just a problem for them to continue and be a responsible responder in prolonging life.

Moreover, the need to have sufficient training was a must, just like what happened in Typhoon Haiyan, which struck portions of the Philippines last November 2013. The medical facilities suffered significant damage due to the typhoon, resulting in numerous fatalities and injuries. Although health professionals play a vital part in the immediate disaster response system, little is known about their experiences working during and immediately following a natural catastrophe. Participating in the response system while also being a disaster survivor was a complex, potent, and confusing experience. The event included social components, stress-coping techniques to strike a balance between acceptance and control, personal beliefs, and altruistic motivations, which led to other recommendations for disaster response and training (Hugelius et al., 2017).

Additionally, the Davao Region in the Philippines is prone to a variety of calamities due to its unique geological, morphological, and climatic features. As stated by Bilao et al. (2024), natural disasters occur when unexpected events happen, requiring prompt rescue and relief efforts. During calamities and disasters, rescuers are crucial because they ensure that public safety is their top priority. They handle a variety of rescue missions, and it was clear that they have encountered difficulties in responding to crises and disasters. The phenomena caused them psychological suffering, which had an emotional impact on rescuers and has been a significant study topic in disaster supervision aimed at strengthening the resilience of rescuers in our society.

With a thorough understanding and identification of different factors affecting the responsiveness of responders in terms of disaster preparedness and their own lived experiences in the Municipality of Santa Cruz, Davao del Sur, it was undeniably and surely the core indicator of this study, as it valued and determined their essence as primary volunteers. To cope with their experiences, such as floods, Fires, road crashes, vehicular accidents, landslides, and Earthquakes, the need for training programs and resources would build a strong foundation for them to help preserve life through volunteerism, as the highest act of service for humanity.

2.0 Methodology

2.1 Research Design

The study employed a qualitative design to gather data through an inductive method, in line with the principles of phenomenology. The phenomenological approach reflects on an individual's lived or pre-reflective experiences. The researcher gained a better understanding of the significance of people's lived experiences with the aid as the method. In addition, the researcher investigated the respondents' actual experiences to gain insights into their viewpoints, perceptions, and level of responsiveness, using Creswell's Phenomenological Analysis (2013). The analysis has six phases, each serving as a step to collect data from participants that aligns with the study's design. It aims to determine the responders' level of responsiveness based on their lived experiences, coping mechanisms, and memorable insights on their journey as responsive responders in catastrophe situations, and the interview was conducted, with the specified questions being asked.

2.2 Research Locale

The study was carried out in Santa Cruz, Davao del Sur, between 125 degrees 24' east longitude and 6 degrees 50' north latitude. It is in Davao del Sur's northern region, bordered to the north by Davao City and to the south by Digos. Around 27,960 hectares of land remained after multiple political subdivisions, accounting for 6.7% of Davao del Sur's total land area. And sixty percent of the territory is covered by forest land; the remaining eight barangays are along the coast.

2.3 Research Participants

The main participants in this study were the actively trained and voluntarily responding members of the AMECC ART, who reside in the Municipality of Santa Cruz, in the province of Davao del Sur, Region 11. Moreover, the total number of participants in the study was only eight; four active members from Barangay

Astorga and four active members from Barangay Darong. These participants were selected based on these following reasons: first (1) they were residents of the municipality of Santa Cruz, Davao del Sur, particularly from Barangay Astorga and Darong; second (2) those who were actively trained volunteers of the AMECC ART organization and third (3) those who have successfully helped the community with their specified service/s in responding such disaster.

2.4 Research Instrument

The participants in this study were actively trained volunteers/members of the AMECC ART, with a sample consisting of only eight individuals, representing the population. First-hand recollections of the individuals' perspectives were given in these interviews. A purposive sampling method, namely a stratified random approach, was utilized in this study to purposefully select a sample based on the researchers' knowledge, ensuring that the participants align with the investigation's goals. The researcher specifically selected these individuals because they possessed qualities and attributes related to the research subject, using a validated questionnaire developed by experts.

Table 1. *Interview Guide-Questions*

Main Questions	Probing Questions
1. What is/are the lived experiences you have successfully attended or actively participated, in responding such disaster?	1.1. What is/are the training/s all about? 1.2. How did these training/s made you more equipped as a responder? 1.3. Why did you choose to be in that training/s?
2. How is/are these experience/s becomes a coping mechanism and help you to be a responsive responder?	2.1. What techniques or strategies are applicable in dealing with disaster? 2.2. Why is it important for you to apply those techniques and strategies when responding? 2.3. How was the experience as a responsive responder?
3. What is/are the most memorable insights/training programs in your journey as a responsive responder?	3.1 Who is/are with you during that time? 3.2 How did you react on that situation? 3.3 What are the strategies you have applied?

2.5 Data Gathering Procedure

This study employed specific research questions to assess the responsiveness of responders during disasters. Genuine information from the research participants must be obtained to respond to these. Thus, in-depth interviews with the participants above were used to gather information. To ensure a seamless interview, the researcher adhered to pre-, during, and post-procedures. Before the interview, the experts validated the semi-structured interview questions that guide the in-depth interview questions. Once validated, the researcher sent the letter of permission to the chosen organization which was the AMECC ART. Then, the researcher selects the participants using stratified sampling. The researcher inquired for their contact information so that they could be easily contacted. Once the data have been transcribed, they are ready to be shared and clarified with them.

During the interview, the time and setting are determined by the availability of the participants. The researcher ideally conducted the interview, which lasted for almost twenty minutes, in a vacant room. However, if none was available, it was conducted in a wide and comfortable setting, as preferred. Additionally, a bond would be established to ease informants into the interview process. Of course, with the participants' permission, the researcher records audio and use field notes to capture the responses, prior to the interview proper. After the interview, the informants' responses were promptly transcribed, and a copy was provided to them. They also receive a gesture of appreciation from the researcher for their involvement and participation, which is a key component of the study.

2.6 Ethical Considerations

This research study adhered to ethical guidelines that considered several factors involving the participants in this study. Informed consent was obtained from the participants, allowing them to inquire about their voluntary participation. In this way, the participants were aware of the study's facts, and the researcher guaranteed the subject's interest in the study based on the participant's answer and their informed consent. It is just one of the ethical standards that the participants are subjected to, which is the subject of this investigation. The researcher also restricted the use of participants' information, especially the most sensitive data that must be kept private. It is because the participant has the right to manage their personal information, and so, they can protect and limit the dissemination of individual information about themselves. As a result, the volunteers in this study were safe

and innocent the entire time. Also, as the participant is essential to the effectiveness of the research and observation, the researcher will place a high value on the secrecy of the participant's information. The participant's true name will be replaced with a pseudonym to protect the privacy of the study's subjects. It is for the participant's benefit and their happiness with the study's researcher, as one of the study's key ethical principles. In completing this study, the researcher speaks the truth without bias or favoritism. Any information that the participants provide to the researcher will automatically be considered when determining the likelihood of this problem occurring. It suggests that the researcher was being honest about how the participants' facts and information were handled to solve this challenge. The authenticity and significance of this work will be enhanced by its veracity. The researcher addresses and implements all ethical concerns to ensure complete participant engagement, conduct the study, and identify any issues that may arise.

3.0 Results and Discussion

The information collected from the participants was categorized and organized using the recurring themes that emerged from their comments during these interviews. Figure 1 visually represents the categorized data, providing an organized summary of the study's problem statement. To enhance the comprehension of the study's findings, the researcher also provided thorough justifications and references to relevant literature.

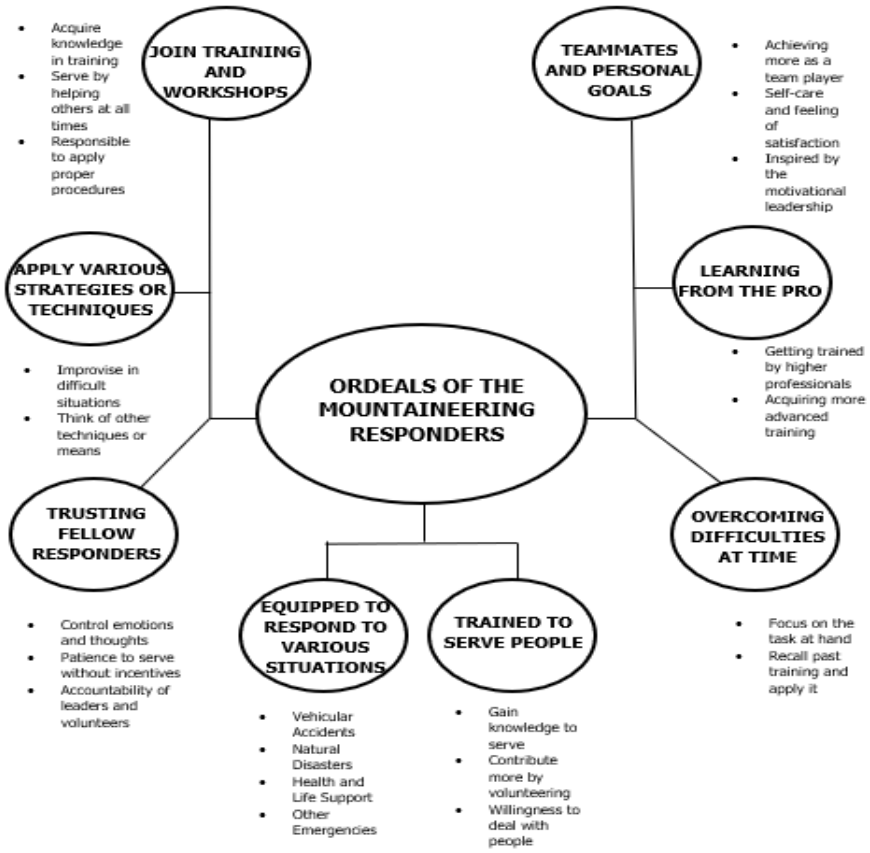

Figure 1. *Themes and core ideas of the overall lived experiences of mountaineering responders*

3.1 Lived Experiences

The participants' responses reveal their experiences in dealing with disasters and their preparedness to respond to various situations, as well as their training to serve the people with their primary and ideal concepts in this section. Figure 2 illustrates the thematic analysis of the lived experiences of the Astorga Mountaineer Ecological Conservation Club and Rescue Team (AMECC ART) in responding to disasters. It presents two major themes on the lived experiences of the AMECC ART in dealing with disaster which include (1) equipped to respond to

various situations along with its four subthemes vehicular accidents; natural disasters; health and life support and other emergencies; and the second (2) theme which is trained to serve people along with its three subthemes gain knowledge to serve; contribute more by volunteering and willingness to deal with people.

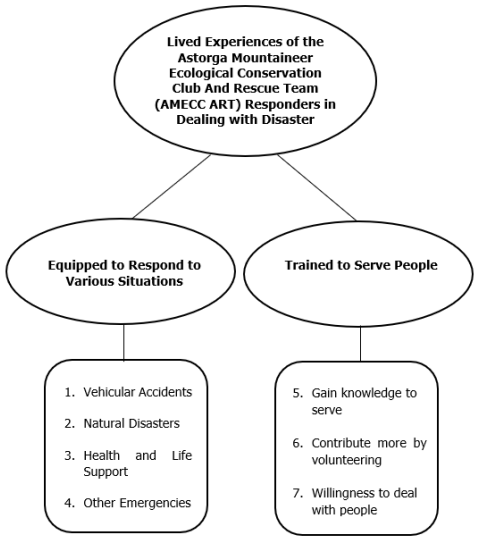

Figure 2. *Themes and core ideas on the lived experiences of mountaineering responders*

Equipped to Respond to Various Situations

The first theme that came forth and emerged from the responses of the participants is the Equipped to Respond to Various Situations. Four subthemes emerged from the responses of the participants: (1) vehicular accidents, (2) natural disasters, (3) health and life support, and (4) other emergencies. The first subtheme under this theme pertains to vehicular accidents with its four codes: (1) the vehicular accident itself, (2) the road crash, (3) an incident, and (4) an accident that happened at the crossing, which was near the responder's location. The specific responses provided by the participants under the generated subtheme are listed below. All the participants unanimously agreed to this subtheme. According to Matisziw et al. (2020), utilizing response resources is essential, as enhanced emergency responses to incidents can reduce the susceptibility of stratum schemes to disruptions in transportation structures and increase their flexibility. A positioning model strategy was given upon finding the state where appropriate reactions and responses over time will be utilized, based on the sites of recognized fates and response etiquettes over time. To investigate the resilience of transportation networks to disruptions caused by automobile accidents.

The second subtheme under this theme is the natural disasters, with its two codes: (1) the flash flood to monitor the level of the water, and (2) the monsoon wave. According to Enerlan (2023), the Philippines is one of the world's most vulnerable nations to natural disasters, primarily due to storms, intense rainfall, and flooding. These calamities typically have a confined effect, mainly affecting the various regions of the nation. Furthermore, in recent years, the ASEAN countries have shown signs of rapid economic progress and population increase. Additionally, witnesses described large natural disasters causing damage each year, with storms and floods occurring rather frequently. By investing in disaster risk reduction, ASEAN countries are pursuing proactive measures to mitigate the enormous harm caused by natural disasters. The said approaches were diverse, which include prior cautionary systems, the exchange of disaster information, and the use of disaster prevention technology (Ikeda et al., 2024).

The third subtheme under this theme is the health and life support with its eight codes (1) and lately they have responded a suicide incident., (2) the basic life support, (3) the search-and-rescue, (4) the first-aid and bandaging, (5) a responder has been into pre-hospital care, (6) wounded persons, (7) the sick individuals, and (8) the environmental sanitation about dengue awareness. Palliative care in the Philippines is expected to grow due to the rising prevalence of chronic diseases, increasing public awareness, aging populations, government support, and technological advancements. The patient's immediate family provides palliative care when an

expert palliative care team is not available (Corpuz, 2023).

The fourth subtheme under this theme is the other emergencies with its seven codes: (1) water safety, (2) the water search-and-rescue, (3) high-angle search-and-rescue, (4) the swift-water rescue, (5) firefighter training, (6) the mountain search-and-rescue, and (7) any disaster. In conclusion, being equipped to respond to various situations greatly affected the citizens' lives, but they strove through the dedication and wisdom of the mighty AMECC ART volunteers. In addition, practitioners choose to handle public health emergencies and disaster victims by combining a variety of ethical approaches (Khorram-Manesh et al., 2024).

Trained to Serve People

The second theme that emerged from the participants' responses is 'Trained to Serve People.' Three subthemes emerged from the participants' responses: (1) gaining knowledge to serve, (2) contributing more through volunteering, and (3) willingness to interact with people.

The first subtheme states about gaining knowledge to serve with its seven codes (1) specific trainings and seminars to respond and become a certified responder, (2) the knowledge and wisdom will not be stagnant, (3) First, is the BLS. Second, is the Water Safety. Then, Swift Water. The Fire, Fire Training. Also, Rappelling and Rope Manship was present in my training experiences, (4) being an officer or member of the AMECC ART, (5) it impacted that much in you, especially in the circle of your family, within your home, (6) gained a lot of learnings that the self-applied, and (7) the different formations of the team when responding. According to Ross et al. (2023), social learning is a process of mutual development and knowledge sharing through iterative reflections on experience, which is essential to transforming the traditional linear logic-based, reactive framework for disaster risk reduction (DRR) and building community resilience to shocks from disasters. Major obstacles in the transmission of knowledge and learning were recognized, including the dominance of technical knowledge, operational, cultural, and educational/training silos, and weak policy frameworks. Therefore, it is essential to support the development of transdisciplinary perspectives, transformative practices, and the balancing of technical knowledge with social science (Ross et al., 2023).

The second subtheme is to contribute more by volunteering along with its five codes (1) joining that training to learn while contributing to your community, (2) let it spread out to my family and the community. To help my family and the community, you have no right to skip or exclude anyone from the training programs. All of it should be joined and learned by you, (4) the need to develop it further because the performance was not good before, and (5) joining training to add the acquired learnings and the knowledge will be refreshed. Increased past participation in participation behaviors and better self-efficacy views for specific leadership tasks were found to be significant predictors of increased engagement in leadership behaviors. Higher levels of self-efficacy and stronger identification as environmental volunteers also predicted more involvement behaviors and a younger age. It also revealed the crucial role of organizational elements in enhancing leaders' self-efficacy recognition (Gulliver et al., 2022).

The third subtheme is the willingness to deal with people along with its nine codes (1) you should know how to deal with your people, (2) willingness to try and join the trainings, (3) learn to boost your patience towards your patients, (4) the willingness and passion to help in a specific and own ways, (5) follow what your heart dictates and says, (6) initiate helpful actions, (7) learnings about how to save life, indeed, (8) deal all the patients correctly, and (9) having the wisdom and knowledge to pursue the duty and respond within the community. The specific responses provided by the participants under the generated subtheme are listed below. In conclusion, gaining knowledge to serve, contributing more through volunteering, and being willing to deal with people are essential elements that need to be trained and developed in volunteers as they serve the people. A valuable human resource is imperative to match volunteers with volunteer duties in the wake of natural hazard events, thereby fully utilizing their abilities and enhancing the performance of the volunteers (Jaime et al., 2023).

3.2 Coping Mechanism

The figurative representation of the thematic analysis visualizing their possible coping mechanism was shown in Figure 3. It presents three major themes on the coping mechanism of the AMECC ART as a responsive responder which include first (1) join training and workshops along with its three subthemes acquire knowledge in training; serve by helping others at all times and responsible to apply proper procedures; the second (2) theme which is apply various strategies or techniques along with its two subthemes improvise in difficult situations

and think of other techniques or means; and the third (3) theme which is trusting fellow responders along with its three subthemes control emotions and thoughts; patience to serve without incentives and accountability of leaders and volunteers.

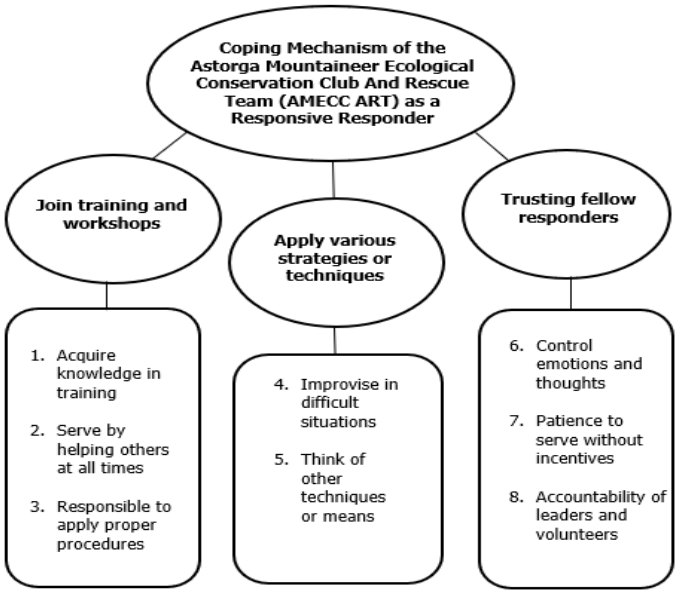

Figure 3. *Themes and core ideas on the coping mechanism of mountaineering responders*

Join Training and Workshops

The first theme in the responders' responses on what are the possible coping mechanisms of the AMECC ART, as a responsive responder, is Joining Training and Workshops. Three subthemes emerged from the responses of the participants: (1) acquire knowledge in training, (2) serve by always helping others, and (3) be responsible for applying proper procedures.

The first subtheme is to acquire knowledge in training with its nine codes (1) knowledgeable before attending in any instances/situation, (2) trainings and seminars are very important to the responders, (3) all of the things that have undergone in training should be applied, (4) grasp the knowledge and wisdom gained in trainings about certain incident, (5) all of the trainings that have joined will be helpful and became harmless towards another individuals, (6) trained to be responsible, (7) essential techniques were taught in trainings, (8) the experience itself is the most excellent knowledge, and (9) the resources or supplies are also essential to acquire. Empirical evidence shows that the process of internalizing and externalizing tacit knowledge (awareness and sharing) acts as a significant mediating factor between the socialization and experimentation of implicit knowledge (acquisition) and its ultimate combination (knowledge in action). Furthermore, it can happen successfully whether it is conscious or unconscious. Nevertheless, it also demonstrated the more decisive influence of conscious tacit knowledge on innovation. Consequently, managing independent, informal, and highly contextualized tacit knowledge within an organization is beneficial and can lead to a significant competitive advantage. The acquisition of implicit knowledge is influenced by the national environment (Kucharska & Erickson, 2023).

The second subtheme is to serve by helping others at all times with its nine codes (1) spread help with your knowledge on how to rescue, (2) being a volunteer never expects any monetary in return instead in God's blessing, (3) patients should be addressed and catered immediately, (4) being self-equipped means ready to respond anytime, (5) being a responder/personal caretaker of the household, (6) by helping leads the way to happiness, (7) the wisdom will be shared to the people who needed it of having, (8) put love on everything that you're doing, and (9) help other people at all times. According to Lee et al. (2023), volunteers are viewed as essential resources by nonprofit organizations, which compete with one another for scarce resources. The management competencies necessary for volunteer usage can significantly change in chaotic situations,

indicating that volunteer use and organizational holistic resource management competencies are inextricably linked.

The third subtheme is responsible for applying proper procedures, as outlined in two key codes: (1) being mindful of your actions while helping, and (2) carefully and correctly applying all procedures while helping. In conclusion, participating in training and workshops helps the AMECC ART acquire knowledge, serve others by aiding, and be responsible for applying proper procedures. National and international policy frameworks place a strong emphasis on the role that volunteers play in lowering the risk of disaster. It emphasizes that striking a balance between a program that allows for flexibility in addressing contextual challenges and promotes community ownership, and a prescriptive, standardized approach that minimizes creativity and self-initiative is a crucial challenge. It highlights that volunteers with technical training emphasize the need for soft skills training in areas such as communication, coordination, and local activity facilitation. Regional emergency management organizations fortify and aspire to recruit volunteers as essential to Good and Ready's viability (Dé et al., 2024).

Apply Various Strategies or Techniques

The second theme that emerged from the participants' responses is the application of various strategies or Techniques. Two subthemes emerged from the responses of the participants: (1) improvise under challenging situations, and (2) think of other techniques or means. The first subtheme states about the improvisation under challenging situations with its two codes: (1) improvise medical supplies, and (2) use self-made techniques and strategies. Johansson (2024) demonstrates that such emergence is not only preconditioned by the institutions of social life but also spontaneous. To comprehend how disaster volunteers are assembled, it was crucial to have access to resources, trust, and local networks.

The second subtheme is to think of other techniques or means with its two codes (1) strategies and techniques are essential, especially in unexpected scenario/s, and (2) never forget the basic life support. The necessity to concentrate on disaster prevention and mitigation capabilities has grown due to the rise in the frequency of natural disasters. Following a disaster, all parties must take the necessary steps to minimize losses and offer help. Of them, volunteers are a relatively new but significant force in rescue; nevertheless, due to their voluntary and dispersed nature, which sets them apart from traditional rescue organizations, volunteer distribution becomes a crucial issue in modern times. Create a volunteer assignment method that considers several factors, including the volunteers' willingness to visit the disaster site, their ability to perform the task, the needs of the disaster site, the victims' satisfaction with their time, etc. (Xue et al., 2024).

In conclusion, applying various strategies or techniques involves improvising under challenging situations and considering alternative techniques or means, which serve as a map and guide for the AMECC ART responders. Due to their proximity to the scene of an occurrence, informal volunteers often serve as first responders in emergencies, alerting experts and initiating rescue attempts. However, there are concerns about the possibility that many of these unofficial volunteers could unintentionally cause harm due to a lack of necessary training. In the field of disaster response, there is a growing need to comprehend the dynamics of collaboration between government officials and unorganized volunteers to examine different collaboration strategies and evaluate their effects on the response rates of victims of disasters while considering various disaster factors related to citizens, responders, and logistics (Kirac et al., 2024).

Trusting Fellow Responders

The third theme that emerged from the participants' responses is Trusting Fellow Responders. Three subthemes emerged from the responses of the participants: (1) controlling emotions and thoughts, (2) patience to serve without incentives, and (3) accountability of leaders and volunteers. The first subtheme states about the control emotions and thoughts with its three codes (1) upgrading nervousness into strength to enjoy and learn a lot from the activity/training, (2) being a wise and not an impulsive decision-maker in every problem or disaster to be encountered, and (3) don’t panic to think clearly and correctly.

The major abilities emphasized during disasters are staying composed, being an effective communicator, finding safe places to evacuate, trusting and working with professionals, and minimizing damage. It also lays a strong emphasis on practical skills, including attending assembly locations, climbing stairs, knowing first aid, exchanging information effectively, and averting dangerous circumstances. Together, it is expected of residents

to concentrate on fundamental skills such as supporting search and rescue teams, attending assembly locations, fostering good communication and coordination, remaining composed and optimistic, and cooperating with search and rescue teams both during and after disasters (Karacaoğlu, 2024).

The second subtheme states about the patience to serve without incentives, with its two codes (1) no salary or monetary return expected from the patients/victims, and (2) extending help towards one another means satisfaction. Practitioners' opinions regarding financial incentives were divided throughout COVID-19. Financial incentives, according to some, are necessary to keep long-term providers engaged, while others said they would diminish the value of volunteering. Most practitioners did, however, acknowledge that their sense of obligation to help during the pandemic drove them to volunteer (D'Souza et al., 2024).

The third subtheme states about the accountability of leaders and volunteers with its eight codes (1) trust in yourself and with the teammates, (2) do believe with one another, (3) volunteers save lives, (4) the heart feels so good when spreading and sending help in the name of volunteerism. Also, with the family because it's for God, instilled as a Christian, to do good with others, (5) you should be responsible, as a responder, (6) utilize cooperation as one of the techniques, (7) depend in yourself, and (8) be open-minded and continue to fill the cup with trainings and learnings. In conclusion, trusting fellow responders involves controlling emotions and thoughts, exercising patience in serving without incentives, and holding leaders and volunteers accountable are among the coping mechanisms of the AMECC ART responders, who spread help in the name of volunteerism. It is often believed that practical emergency cooperation entails a happy transition to confidence and trust. When mistrust and terror are eliminated, an organization is said to be cooperative. Thus, it appears that negative or depressing emotions such as rage, fear, contempt, despair, or frustration are hostile to emergency cooperation (Sage et al., 2023).

3.3 Memorable Insights and Trainings

The data visualization's theme analysis, represented metaphorically, illustrates the possible memorable insights and training programs of the AMECC ART responder's journey as a responsive responder, as shown in Figure 4. It presents three major themes on the memorable insights/training programs of the AMECC ART responder's journey as a responsive responder which include first (1) teammates and personal goals along with its three subthemes achieving more as a team player; self-care and feeling of satisfaction; and inspired by the motivational leadership; the second (2) theme which is learning from the pro along with its two subthemes getting trained by higher professionals and acquiring more advanced training; and the third (3) theme which is overcoming difficulties at time along with its two subthemes focus on the task at hand and recall past training and apply it.

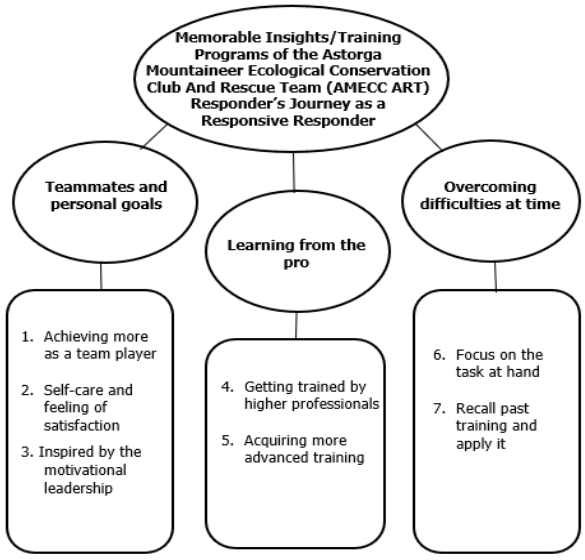

Figure 4. *Themes and core ideas on the memorable insights and trainings of mountaineering responders*

Teammates and Personal Goals

The first theme in the responders' responses is what the possible memorable insights or training programs of the AMECC ART responder's journey as a responsive responder are, which include Teammates and Personal Goals. Three subthemes emerged from the responses of the participants: (1) achieving more as a team player, (2) self-care and feeling of satisfaction, and (3) inspired by the motivational leadership.

The first subtheme is to achieve more as a team player with its four codes: (1) teammates are present during that time, (2) it consists of volunteers from our Barangay, BDRRMC of ours, and all the AMECC ART members, (3) do what's best to do. Cooperate with your colleagues, and (4) colleagues and teammates in the AMECC ART who were in the training. Three interconnected practices are identified as supporting well-being: "action" (providing opportunities for volunteer work); "reflection" (facilitating debriefing and discussion processes); and "connection" (establishing physical spaces and activities to improve social interactions) (Nissen et al., 2022).

The second subtheme is self-care and feeling of satisfaction with its five codes (1) it's satisfaction when you face and embrace your fears successfully, (2) finishing the activity with the satisfaction of having the meal in the end, (3) a volunteer must be healthy, a strong one and cares for their self to be ready in the first place, (4) a responder must be brave and challenging to respond in all situation, and (5) the best part was being able to send help and retrieving the patient. According to Levkovich and Labes (2024), volunteers' labor gave them a great sense of fulfillment and purpose, which aided in their development on both a personal and professional level. It highlights the value of professional supervision, social and family networks, and other support systems in overcoming these obstacles.

The third subtheme is inspired by the motivational leadership along with its three codes: (1) Mr. President, Sir Julius, (2) the Training Director, Barangay Councilor, Ryan Adalim, and (3) the officials of Team AMECC ART. In conclusion, teammates and personal goals help the AMECC ART achieve more as a team player, promote self-care, and foster a feeling of satisfaction and inspiration through motivational leadership. Xue et al. (2024) emphasize that natural disasters are occurring more frequently these days due to several variables, including global climate change, environmental degradation, and human activity. These factors pose a significant threat to people's safety and property. The need to focus on disaster preparedness and response, as well as disaster prevention and mitigation, has increased due to the rising frequency of natural disasters. Of them, volunteers are a relatively new but significant force in rescue; nevertheless, due to their voluntary and dispersed nature, which sets them apart from traditional rescue organizations, volunteer distribution becomes a crucial issue in modern times. As a result, it must develop a method for assigning volunteers that considers several variables, including the volunteers' willingness to visit the disaster site, the competency of their varied skills, the need of the disaster site for the task, the victims' satisfaction with their time, etc. (Xue et al., 2024).

Learning from the Pro

The second theme that emerged from the participants' responses is 'Learning from the Pro.' Two subthemes emerged from the participant's responses: (1) receiving training from higher professionals, and (2) pursuing more advanced training.

The first subtheme states about getting trained by higher professionals with its six codes (1) the more the speakers, the more it brings different knowledge and learnings to be instilled, (2) more than one Training Director means a lot to the responders/volunteers, (3) Department of Health (DOH)/Medical Professionals, (4) Bureau of Fire, Santa Cruz, (5) the BDRRMC of Barangay Darong and the volunteers of Barangay Astorga & so the other trainers, and (6) the Coastguard. Both international and national policy frameworks highlight the value of public involvement and volunteers' contributions to disaster risk reduction, particularly about how officialdom can engage in calamity hazard supervision to assist unpaid helpers in spearheading and directing specific areas to lessen disaster perils, highlighting the need of providing volunteers with technical training while also emphasizing the necessity for soft skills training in areas like communication, coordination, and local activity facilitation. It necessitates comprehending and fulfilling the expectations and motives of volunteers, and strengthening relationships with regional emergency management organizations would support such a program (Dé et al., 2024).

The second subtheme is acquiring more advanced training with its four codes: (1) upgrading of the Basic Life Support training, (2) including Basic Fire Fighter training, (3) the HASAR, High-Angle Search and Rescue, and

(4) the WASAR, Water Search and Rescue. Shaw et al., (2024) examines the factors that affect spontaneous volunteer groups' (SVGs') capacity to continue operating. Sustainability is the goal of helping impacted communities support one another, not only during the initial stages of a disaster but also during the phases of recovery and mitigation, which allows them to become more resilient to future shocks. The four themes that comprise the drivers of SVG sustainability are as follows: (1) evaluation of continuing needs; (2) organization of resources to satisfy that need; (3) leadership and followership producing a weight of operational capabilities; and (4) influence of political will. It reveals essential elements for creating a sustainable SVG system, such as social capital and reliable leadership, by examining these forces.

In conclusion, learning from the pros includes being trained by higher professionals and acquiring more advanced training, which provides a silver lining and guidance for AMECC ART responders to be responsive throughout their journey. In disaster risk reduction, it is crucial to address the human aspect when natural hazards increase in frequency and intensity due to climate change and other factors. People who receive individualized instruction and training are better equipped to handle the various stages of a crisis. Comprehending and enhancing personal and community readiness may result in improved disaster management, reduced fatalities, lessened financial harm, increased community resilience, optimal resource allocation, and more effective long-term recovery processes. Community volunteers, local governments, and schools can all play a crucial role in helping people receive training. Including community planning workshops or incorporating disaster preparedness into school curricula necessitates tight coordination and participation from all stakeholders, including individuals, communities, governments, and professional associations (Fazeli et al., 2024).

Overcoming Difficulties at Times

The third theme that emerged from the participants' responses is Overcoming Difficulties at Times. Two subthemes emerged from the responses of the participants: (1) focus on the task at hand, and (2) recall past trainings and apply them.

The first subtheme states about how to focus on the task at hand with its eight codes (1) also, just listen to what they have instructed and apply it. If you find it that much difficult then, just rely on the techniques that they have made easy to be understood by everyone, (2) just cooperate and took the situation seriously, (3) don't let the cowardness in you reign, (4) be strong face different and real-life battles, (5) don't be distracted, focus, (6) keep the love on what you're doing, (7) of course, the first thing, you must not be untrue to all, and (8) be calm. Since the 1950s, academics have been studying volunteerism in disaster situations, and the discipline has been continuously evolving ever since. However, there is a dearth of theoretically informed research on emergent groups despite the long tradition and considerable number of studies conducted. To comprehend how disaster volunteers are assembled, it was crucial to have access to resources, trust, and local networks (Johansson, 2024).

The second subtheme discusses how to recall past training and apply it with its unique code (1), incorporating all the techniques learned from previous trainings, making it easier to deal with everything. Assessing individual variations in these behaviors and validating disaster preparedness theories depend heavily on the use of reliable and proficient readiness measures. Still fewer are valid and reliable. Few personal preparedness strategies are suitable for all kinds of disasters. Based on disaster theories, it is believed that it is related to other dimensions (such as perception of disaster threat and self-efficacy for emergency preparedness) (Talisman et al., 2024).

In conclusion, overcoming difficulties at times involves focusing on the task at hand, recalling past training, and applying it, which are some of the key insights and training programs from the AMECC ART in their journey as responsive responders. Volunteers for disaster aid need to possess specific cognitive and psychological traits, including knowledge, practical skills, and the right attitude, like those of disaster volunteers. Regarding knowledge and functional skills, this effect remained consistent over time (Amini et al., 2024).

4.0 Conclusion

The study on the lived experiences of the responders revealed that they are both equipped and trained to serve in various emergencies. Being equipped refers to their readiness to respond to vehicular accidents, natural disasters, health-related incidents, and other emergencies. Their training emphasizes gaining knowledge,

volunteering, and a strong willingness to assist others. As responsive responders, their coping mechanisms include participating in training and workshops to gain knowledge and apply correct procedures, using improvisation and alternative strategies during challenges, and placing trust in fellow responders, manifested through emotional control, patience, and accountability. Furthermore, their most memorable insights stem from teamwork and personal goals, learning from experienced professionals, and overcoming difficulties by staying focused and applying past training. These experiences collectively shape their resilience and commitment to serving their community effectively.

5.0 Contributions of Authors

Khezziah Bianca Araña – writing, data analysis, encoding, etc.
Roel Jr. D. Apas, MPA – editing & supervising

6.0 Funding

The author's own money.

7.0 Conflict of Interests

None at all.

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Reflections on School Governance: The Lived Experiences of School Heads

Agnes M. Almagro*, Angela Gabrielle B. Bacang, Erlinda N. Calumpang
Foundation University, Dumaguete City, Philippines

*Corresponding Author Email: agnes.almagro@deped.gov.ph

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Abstract. Effective school governance is a critical foundation for achieving quality education, particularly in resource-constrained environments prevalent in many regions of the Philippines. However, the experiences of school heads in these challenging contexts remain inadequately explored. This phenomenological study investigated the lived experiences of six elementary school heads from Siaton Districts 1, 2, 3, and 4 in the Division of Negros Oriental to understand better the leadership challenges they encounter. Participants were selected through purposive and snowball sampling, ensuring a strong alignment with the research focus. Data were gathered using semi-structured interviews conducted between December 2024 and February 2025 and analyzed using Colaizzi's seven-step method to extract significant statements, formulate meanings, and identify overarching themes. The findings revealed that school heads confronted multifaceted barriers, including limited physical resources, multi-grade instructional demands, administrative burdens, and struggles to establish authority among older teaching staff. Despite these challenges, participants demonstrated resilience through continuous professional development, strategic adaptability, mentorship engagement, and collaborative leadership practices. Their narratives underscored the importance of sustained training, supervisory support, and community partnerships in enhancing the effectiveness of governance. This study highlights the pressing need for comprehensive interventions, including structured leadership training, mentorship programs, policy reforms, and improved resource allocation, to empower school heads in marginalized communities. By addressing these gaps, educational policymakers and institutions can strengthen the leadership capacities of school heads, ensuring that they are better equipped to manage schools effectively, promote inclusive learning environments, and contribute to long-term educational improvement, particularly in underserved areas.

Keywords: Resource-constrained schools; School governance; School head; School leadership.

1.0 Introduction

Leadership is recognized globally as a fundamental pillar of educational success, shaping both the organizational climate and learner outcomes within schools (Bush, 2021). Effective school governance is crucial for maintaining high-quality education and operational efficiency. However, school heads across the world face immense challenges in balancing instructional leadership, administrative duties, and community engagement while adapting to evolving educational demands. Supriadi et al. (2021) emphasize that school leaders today are expected to be visionaries, instructional guides, and resource managers capable of building external partnerships to advance school performance. Valmores (2021) similarly asserts that competencies in strategic decision-making, instructional supervision, and stakeholder collaboration are critical for enhancing educational

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outcomes. The integration of these leadership models is essential for creating resilient, inclusive, and high-performing school systems worldwide.

In the Philippine context, school heads operate in a particularly complex environment marked by socio-economic disparities, resource limitations, and evolving educational policies. The Department of Education (DepEd) acknowledges the vital role of school leadership in improving teacher performance and student outcomes. Nevertheless, Filipino school heads often find themselves overwhelmed by the need to balance administrative tasks with instructional leadership, especially in schools characterized by large class sizes, scarce resources, and heightened community expectations. Manolong et al. (2024) highlight the bureaucratic and financial challenges that rural school heads face when implementing programs, securing necessary resources, and maintaining stakeholder participation. These realities underscore the urgent need for responsive, context-sensitive leadership strategies that empower school heads operating in resource-constrained settings.

Despite extensive research on school leadership, a significant gap persists in understanding the lived experiences of Filipino school heads, particularly those working in rural and under-resourced environments. Much of the existing literature tends to focus on leadership models within urban, well-funded schools (Kinkley, 2019; Piyaman et al., 2017; Shaked, 2021), often neglecting the realities of those leading in marginalized communities. Furthermore, while leadership styles and policy compliance have been widely examined, few studies have explored how cultural values such as bayanihan (community cooperation) and malasakit (compassion) are embedded in governance practices. Addressing this gap requires a research approach that prioritizes the voices and experiences of school heads themselves, going beyond prescriptive leadership models. Therefore, this study employs a transcendental phenomenological approach to uncover the essence of school governance as experienced by school leaders in resource-constrained Philippine schools.

The need for this study is further magnified by the global educational commitment embodied in Sustainable Development Goal 4 (SDG 4), which aims to ensure inclusive and equitable quality education for all. School governance plays a crucial role in achieving this goal, as effective leadership has a direct impact on teacher motivation, student learning, and overall school sustainability. By focusing on the authentic experiences of school heads, this study aims to capture how leadership is exercised amidst systemic limitations and cultural contexts, providing insights that quantitative measures alone cannot reveal. The use of phenomenology ensures that the study foregrounds the human dimensions of leadership—resilience, adaptability, and values-based decision-making—thus offering a richer and more nuanced understanding of governance in rural educational settings.

Ultimately, this study seeks to explore the lived experiences of elementary school heads in the 3rd Congressional District of Negros Oriental, specifically in Siaton Districts 1, 2, 3, and 4. By adopting a phenomenological lens, this research captures the meanings that school heads assign to their leadership journeys, highlighting their challenges, triumphs, and values in managing schools under difficult circumstances. Beyond its academic contribution, this study aims to amplify the voices of rural school leaders, inform leadership development programs, and advocate for policy reforms that support sustainable, equitable, and culturally rooted school governance. In doing so, it aspires to make a meaningful contribution to the advancement of quality education for all Filipino learners.

2.0 Methodology

2.1 Research Design

The study employed a qualitative, descriptive, transcendental phenomenological approach to explore the lived experiences of school heads in school governance. Colaizzi's seven-step method was utilized for data analysis, ensuring a systematic and comprehensive understanding of the participants' perspectives.

2.2 Research Participants

The participants in this study were six school heads from the Siaton District, each with a minimum of eight years of experience in school governance. They were purposefully selected to ensure extensive knowledge and experience relevant to the study. Data saturation was achieved when no new themes emerged, confirming the completeness of the data set.

2.3 Research Instrument
Data collection was primarily conducted through semi-structured interviews, which were designed to gather in-depth insights into participants' experiences in school governance. The interviews were recorded using the Voice Memos application to ensure secure and accurate data storage for analysis.

2.4 Data Gathering Procedure
Data were gathered between December 2024 and February 2025. After obtaining formal authorization, the researcher coordinated with district supervisors to identify participants. Informed consent was obtained from all participants before the interviews, which were scheduled at convenient times and conducted in a comfortable setting. Each interview lasted between 20 and 30 minutes and was audio-recorded for accuracy.

2.5 Data Analysis Procedure
The data analysis followed Colaizzi's phenomenological method, beginning with verbatim transcription of the interviews. Significant statements were extracted, formulated into meanings, and categorized into themes. These themes were refined through iterative processes, with participant validation ensuring accuracy and relevance in capturing their lived experiences.

2.6 Ethical Considerations
The study followed ethical guidelines by informing participants about the study's purpose, their rights, and the assurance of confidentiality. Informed consent was obtained, ensuring voluntary participation and the right to withdraw without consequence. The researcher minimized biases through bracketing and reflexivity, providing privacy and accurately representing the participants' experiences.

3.0 Results and Discussion
After a thorough analysis of the transcripts, significant statements, and formulated meanings, the researcher identified an emergent theme encapsulating the lived experiences of school heads in governance. This theme highlights the various factors influencing their leadership, decision-making processes, and administrative challenges within the Siaton school districts. The findings provide a deeper understanding of the complexities of school governance, offering insights into how school heads navigated, balanced, and adapted to the demands of their multifaceted roles.

Emergent Theme: The Journey of a Trailblazer
This theme illustrates the progression of school heads as they transition from classroom teachers to administrative leaders, confronting new demands and expectations. Participants described the challenges they encountered in managing schools in remote areas, emphasizing the necessity for resilience, adaptability, and collaborative leadership. Through in-depth interviews, the study revealed that school heads consistently faced the task of balancing instructional leadership with administrative management while ensuring the delivery of quality education in environments characterized by limited resources. Participants emphasized the crucial role of training, mentorship, and ongoing learning in enhancing their leadership capabilities and refining their governance skills. Within this emergent theme, there are four sub-themes: a) Navigating the Leadership Horizon, b) The Unwavering Pursuit of Knowledge, c) Braving the Storms of Early Leadership, and d) Pillars of Wisdom and Influence.

Theme 1: Navigating the Leadership Horizon
This theme highlights the complex transition from being a classroom teacher to assuming the role of a school head, emphasizing the need for resilience, adaptability, and continuous professional development. Participants faced significant challenges, including managing inadequate school facilities and handling diverse staff personalities, which required them to develop strong and flexible leadership strategies. Through these experiences, they recognized that effective leadership extended beyond administrative efficiency to fostering collaboration, humility, and a supportive learning environment.

Participant 1 reflected on his initial experience as a school head in Olambid Elementary School:
"Our problem before was the school building. Our school building, which were makeshifts used as classrooms, are in our area. We have a DepEd with two classrooms, a one-story building, where I'm teaching Grades 1 and 2. So, Grades 3 and 4 are combined, and 5 and 6 are also combined. I'm handling two grades, Grade 3 and Grade 4, even though I'm a school

head."

Participant 2 shared her struggle in transitioning from a teacher to a school principal. She said:
"And then, speaking of leadership style and how I manage my school, it takes a village to make everyone-or rather, everybody in the school—follow you, right? Because we are managing different kinds of personalities. They have different characteristics—some will oppose you, some will support you, and some will remain neutral."

Similarly, Participant 6 shared his experience in transitioning from a classroom teacher to a school head in a hinterland school. He narrated:
"When I first joined DepEd, I was immediately assigned as a school head. Imagine preparing to be a classroom teacher and suddenly managing an entire school in a remote area. I had to learn from my fellow school heads, and they provided valuable input on how to manage a school. I learned a lot from them—how to be humble, open to teachers' suggestions, and how to handle challenges and problems in school leadership."

These statements from the participants highlight the challenges that school heads face, including infrastructure limitations, leadership transitions, and governance issues. The lack of adequate facilities has led to multi-grade setups, requiring school heads to manage both administrative and instructional roles. This finding aligns with those of Manolong et al. (2024) and Navarro (2024), who also found that resource constraints hinder school management, necessitating strategic planning and infrastructure improvements. Whang (2021) highlighted the uncertainty school heads face in balancing instructional and administrative responsibilities, while Jacobsen et al. (2023) emphasized the importance of mentorship and professional networks in fostering leadership resilience. Without proper support, school heads struggle with governance and instructional quality. Taole (2022) noted that teaching principals often find it challenging to balance administrative and instructional duties, while Valmores (2021) linked effective leadership to improved school performance and teacher efficiency. These findings underscore the importance of providing leadership training, adequate resources, and robust mentorship programs to support school heads in addressing these challenges.

Theme 2: The Unwavering Pursuit of Knowledge
This reflects the participants' dedication to continuous learning as they navigate the challenges of school leadership. Through professional training programs like NEAP trainings and school head capability building, they have gained valuable insights into effective administration. They also recognize that learning does not stop after assuming leadership roles, as they constantly seek new strategies applicable to their schools and rely on the mentorship of supervisors who provide both technical assistance and consistent follow-ups. These experiences reinforce that leadership is an ongoing process of growth, adaptation, and refinement.

Participant 1 shared his training experience and how it shaped his leadership. He said:
"Yes, and with the help of the supervisor, I was able to join NEAP training in Cebu, where I also received training in school head compatibility building. In a way, I was trained to be a school head."

Emphasizing the ongoing nature of learning, Participant 3 shares:
"But that's why I always keep looking for good strategies that apply to other schools as well, because I believe that a person's education-the learning of each individual-is continuous."

According to Participant 6, mentorship from supervisors played a crucial role in shaping his administrative role:
"That's where you feel challenged because they have a high standard. You can truly see them as a "working supervisor." That's how skilled they are. And of course, it's not just about providing technical assistance—after giving it, they follow up. It's not just a one-time thing where they give technical assistance and leave it at that. When they provide guidance, they say, "This is what needs to be done," and then they come back to check, "How is it going?" That's when you realize, "Ah, this is how it should be." It's not just about giving instructions and not following up."

These statements from the participants highlight the importance of training, continuous learning, and mentorship in school leadership. Leadership development programs, such as NEAP trainings and professional development initiatives, strengthen school heads' ability to lead effectively, preparing them for both administrative and instructional duties. However, leadership growth is an ongoing process, requiring school heads to seek new strategies and adapt to evolving challenges. This aligns with Jacobsen et al. (2023), who

emphasized that mentorship fosters leadership development, and Guillergan (2024), who found that supervisory guidance enhances leadership effectiveness. Similarly, Augusto (2019) highlighted that solution-focused supervision promotes continuous improvement, reinforcing the need for structured mentorship in school governance.

Furthermore, Lachica (2024) highlighted that school heads' leadership and supervisory skills are central to fostering a culture of continuous improvement and academic excellence, aligning with the participant's experience of seeking new strategies for school leadership. Tino (2024) emphasized that leaders who engage in continuous professional development and mentorship programs build stronger coping mechanisms, allowing them to navigate challenges more effectively. Additionally, Eyana et al. (2024) found that peer support networks contribute significantly to leadership resilience, as shared experiences help school heads develop problem-solving skills and adaptability.

Theme 3: Braving the Storms of Early Leadership

In this theme, one participant expressed the difficulty of overseeing much older teachers, noting the challenge of gaining their respect as a fresh graduate while also juggling teaching duties. Another participant emphasized the need for adaptability, stressing that maintaining a good relationship with subordinates requires open communication, motivation, and a willingness to accept new ideas. These insights demonstrate that effective leadership requires both resilience and humility to navigate authority effectively. At the same time, fostering collaboration highlights the challenges school heads face as young leaders, particularly in managing senior colleagues, balancing multiple roles, and navigating long-term leadership challenges.

Sharing the challenges of working with senior teachers and managing multiple responsibilities, Participant 4 stated:

"We are - we're about 7, all in all. To put it another way, I am the school head, and at the same time, I teach. So, during that time, being the school head, it's challenging, Ms. A. Why? You must consider that your colleagues and your parents are already over 40 years old. You, fresh, just graduated."

Participant 5 emphasized the importance of long-term adaptability in leadership.

"So, in leading a school and maintaining a good relationship with your subordinates, you need to have open communication. Motivate your teachers and colleagues and lead by example. You must also be open to feedback and new ideas from your teachers because no one has a monopoly on knowledge."

Leading a school while also teaching can be overwhelming, especially for new school heads working with more experienced teachers. Establishing authority and gaining respect from senior colleagues requires effective communication, motivation, and openness to collaboration. Additionally, leadership demands long-term adaptability, where school heads must maintain open communication, encourage feedback, and embrace new ideas to create a supportive work environment. This supports the conclusion of Whang (2021), who noted that young school leaders often struggle to balance instructional oversight with administrative duties, particularly when managing older colleagues. Similarly, Thompson (2021) found that building credibility among senior staff is a significant hurdle for new leaders, requiring strong interpersonal and leadership skills. Al Makhamreh & Stockley (2019) emphasized that effective school governance depends on transparent decision-making and collaboration, ensuring that leadership remains inclusive and adaptive. Tino (2024) stressed that continuous professional development strengthens school heads' coping mechanisms, allowing them to lead more effectively. These findings underscore the need for mentorship, leadership training, and a collaborative work culture to help school heads manage responsibilities, foster teamwork, and create an environment of mutual respect and continuous improvement.

Theme 4: Pillars of Wisdom and Influence

This illustrates the crucial role supervisors play in shaping school heads' leadership styles and guiding them through professional challenges. Participants highlighted key leadership qualities in their supervisors. A balanced approach enabled structured yet flexible teacher management, while a problem-solving mindset emphasized persistence, strategic planning, and stakeholder collaboration. Moreover, a results-driven style reinforced accountability and follow-through. These findings suggest that effective leadership relies on balance, strategy, and accountability to support continuous growth.

Participant 2 described her supervisor as balanced and practical, demonstrating the ability to maintain structure while remaining adaptable to a younger team, efficiently managing tasks, and ensuring positive outcomes. She narrated:
"Our supervisor is okay. She is neither too relaxed nor too strict. She goes with the flow, especially since most of her subordinates are younger. She knows how to manage people efficiently, ensuring that tasks are accomplished with positive results."

Participant 3 praised her supervisor for focusing on solutions, emphasizing effort, positivity, and stakeholder engagement to maximize resources, improve facilities, and support teachers. She narrated:
"I also admire him because he truly showed effort… The problem is, if you take the time, focus, and stay positive, you will realize that there are many ways to achieve something. If there is a way, you can accomplish it. That's why he visited our school and took the opportunity to observe. Maybe, from his perspective, I understand that he doesn't fully grasp my situation. However, I took his words to heart—that we must continually develop and engage with stakeholders to maximize our resources. At the same time, this will help us improve our school more quickly, especially our physical facilities, so that we can better support our teachers in delivering their lessons effectively to our students."

Moreover, Participant 6 found his supervisor's practical approach inspiring. He stated:
"She is a supervisor who is very practical and realistic—direct to the point. Whatever needs to be done must be accomplished. When he says, 'Gino, I will visit the school,' that means you must make sure everything is in order. Because when he comes back and nothing has changed, that's not acceptable—that's the kind of leader he is."

These statements from the participants highlight the impact of balanced, solution-focused, and practical supervision in school leadership. Effective supervisors maintain a balance between flexibility and authority, ensuring that tasks are completed while fostering a positive and collaborative work environment. A solution-focused approach helps school heads maximize resources, engage stakeholders, and enhance school operations, while a practical, results-driven style ensures accountability and continuous improvement.

This aligns with the conclusions of Al Makhamreh and Stockley (2019), who suggest that supervisors who strike a balance between leniency and strictness foster positive outcomes through transparent decision-making and collaboration. Similarly, Augusto (2019) highlighted that solution-focused supervision promotes professional growth, allowing school heads to develop leadership strategies that improve school governance. Jacobsen et al. (2023) stressed that mentorship from supervisors helps establish high standards and resilience in leadership, ensuring that school heads are well-supported. Guillergan (2024) found that supervisory leadership has a significant influence on school heads' effectiveness, particularly when it includes structured feedback and technical support. Stephen (2024) emphasized that resilient leadership is strengthened by proactive and engaged supervision, helping school heads navigate challenges effectively. Additionally, Eyana et al. (2024) found that peer support networks and professional collaboration contribute to leadership adaptability, reinforcing the importance of ongoing engagement between supervisors and school leaders.

4.0 Conclusions

This study provided a nuanced exploration of the lived experiences of elementary school heads navigating the complexities of school governance in resource-constrained environments. The journey, encapsulated through the emergent themes of Navigating the Leadership Horizon, The Unwavering Pursuit of Knowledge, Braving the Storms of Early Leadership, and Pillars of Wisdom and Influence, revealed that leadership development is a dynamic, continuous process marked by resilience, adaptability, and strong mentorship. The findings demonstrated that effective school governance extends beyond administrative competence; it is deeply rooted in relational leadership, cultural responsiveness, and moral stewardship. Filipino school heads embodied values such as bayanihan (community spirit) and malasakit (compassion), which shaped their decision-making and stakeholder engagement practices, offering a culturally grounded leadership model.

The study emphasizes the urgent need to institutionalize mentorship programs, leadership capability-building initiatives, and support mechanisms explicitly tailored for rural school contexts. Policymakers should prioritize equitable resource distribution, while leadership training programs should embed culturally responsive and values-driven approaches. Strengthening professional learning communities and supervisory mentorships is crucial in fostering leadership resilience and ensuring school sustainability.

These recommendations directly align with advancing Sustainable Development Goal 4 (SDG 4) by promoting inclusive and equitable quality education. Future research could explore longitudinal studies on the impact of mentorship and leadership development in various educational settings, or conduct comparative analyses across urban and rural contexts, to further refine leadership frameworks. Ultimately, this study reframes school leadership as a transformative journey of advocacy, stewardship, and moral courage. By amplifying the lived experiences of school heads, it makes a meaningful contribution to leadership scholarship. It offers actionable insights for policymakers, practitioners, and educational researchers committed to strengthening school governance in challenging environments.

5.0 Contributions of Authors

The authors have confirmed that each contributed fairly to the creation of this academic paper. They divided their responsibilities among themselves: the first author wrote the manuscript, the second author proofread and edited the paper for improved clarity and quality. In contrast, the third author provided guidance and suggestions to enhance the content.

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Elementary Teachers' Experiences with Challenges in Teaching Science

Helen G. Garcia
Foundation University, Dumaguete City, Negros Oriental Philippines

Author Email: helen.garcia007@deped.gov.ph

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Abstract. Science lessons in elementary schools are often hard to teach because classroom realities do not always match what the curriculum expects. Although science is essential for helping young students think critically and ask questions, there is little research that looks closely at what teachers experience when teaching it. This study aimed to address that gap by exploring how elementary teachers handle science instruction in their daily practice. Using Colaizzi's method and purposive sampling, the researcher interviewed six teachers from public schools in a district in Negros Oriental. The results showed that teachers faced many challenges. These included making complex science ideas easier to understand, meeting the needs of different learners, and working with limited teaching materials. Still, the study found that professional development helped teachers feel more confident and improved their teaching methods. Six emergent themes described their experiences: (1) Chained Potential showed the lack of materials; (2) The Rift of Comprehension explained how hard it was to make science clear to students; (3) Blindfolded Mentors revealed the lack of guidance and support; (4) The Alchemy of Teaching highlighted the creative ways teachers kept students engaged; (5) The Evolving Educator showed how teachers learned to adjust their methods; and (6) Beyond the Curriculum emphasized learning through real-life experiences. This study helped explain the difficulties teachers face in teaching science. It also recommended specific actions, such as giving teachers training that matches their real needs, providing enough teaching materials, and encouraging learning through hands-on activities. These measures can help enhance the way science is taught in elementary schools.

Keywords: Elementary teacher; Lived experiences; Phenomenological approach; Science education.

1.0 Introduction

Primary school teachers play a key role in building a strong foundation for learning and improving science literacy (Utami et al., 2024). Despite their strengths, many face challenges like a lack of confidence and limited subject knowledge (Davis et al., 2022). Professional development programs have been implemented globally to address these issues. In Ireland, a program designed to enhance teachers' confidence in teaching sustainability yielded positive outcomes, including increased self-confidence and the adoption of inquiry-based teaching approaches (Murphy et al., 2020). Similarly, Davidson et al. (2020) found that U.S. teachers involved in scientific research developed a stronger emotional connection to science, improving their teaching. In contrast, science education in Bangladesh remains largely teacher-centered, with limited student involvement (Rahman Talukder et al., 2021).

In the Philippines, research has also examined the efficacy of science teaching among educators. Walag et al. (2020) investigated personal science teaching efficacy and subject-specific confidence among primary and high

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school science teachers in Cagayan de Oro City. Their findings showed that while teachers exhibited satisfactory overall self-efficacy, their confidence varied across subjects, with physics being the most challenging due to its complexity and limited teaching experience. The country's K-12 science curriculum follows a spiral approach, in which students revisit topics at increasingly complex levels (Tirol, 2022). Antipolo et al. (2021) found that preservice teachers (PSTs) encountered minimal difficulties teaching K-12 science. They reported little struggle with subject knowledge, teaching methods, classroom management, lesson planning, assessment, community engagement, or professional development.

Despite these studies, a gap remains in research focusing on the real-life experiences of elementary teachers as they navigate the intricacies of science instruction. While Walag et al. (2020) examined science teaching confidence and subject-specific efficacy, their study did not fully explore the day-to-day challenges faced by elementary teachers. Similarly, Antipolo et al. (2021) focused on preservice teachers rather than in-service educators. This study seeks to fill that gap by qualitatively exploring elementary teachers' lived experiences in teaching science. By understanding their struggles, successes, and perspectives, the research aims to offer valuable insights that can inform teacher training, curriculum development, and policy improvements in elementary science education.

As a science coordinator and teacher, the researcher has observed firsthand the unique challenges elementary teachers face in delivering science lessons. These challenges include simplifying complex concepts, engaging diverse learners, and adapting to resource limitations. Through personal experience, the researcher has witnessed how teachers develop innovative strategies to overcome these difficulties. Similarly, Davidson et al. (2020) found that when teachers actively participated in scientific research, they created a deeper understanding of epistemic affect, which enhanced their ability to support student learning and engagement. However, the everyday insights and experiences of elementary teachers remain underrepresented in academic discussions. This study aimed to amplify their voices and contribute to a deeper understanding of science education at the elementary level. This study supports the United Nations Sustainable Development Goal (SDG) 4, specifically Target 4.1, which promotes access to quality primary and secondary education. Improving science teaching through teacher development directly enhances student achievement by fostering a more profound understanding, critical thinking, and engagement. By addressing instructional challenges, the study helps equip teachers to deliver more effective science education, contributing to the broader goal of quality education for all.

2.0 Methodology

2.1 Research Design

This study employed descriptive phenomenology, a qualitative research approach that gained prominence primarily through the work of Edmund Husserl (Drummond, 2022). Phenomenology aims to explore and understand individuals' lived experiences in their everyday contexts. As this research focused on the lived experiences of elementary teachers regarding the complexities of teaching science, a phenomenological approach was deemed most appropriate. For data analysis, Colaizzi's (1978) seven-step method was utilized to generate a comprehensive and accurate description of the phenomenon, grounded in participants' experiences and validated by their feedback (Gumarang Jr., 2021; Morrow & Rodriguez, 2015).

2.2 Research Locale

The study was conducted in selected schools within the Siaton 1 District, chosen for their significant role in providing foundational education in the region. These schools are among the largest in the district, with faculty sizes ranging from 16 to 18 teachers, and serve as key educational hubs. The decision to focus on these schools was based on their strategic importance in the district's educational system, their diverse teaching environments, and their ability to offer insights into the collaborative dynamics among educators. While they are easily accessible by motorized vehicles, the primary reason for selecting these schools lies in their capacity to provide a representative sample of the district's broader educational framework, supporting a dynamic and professional teaching environment.

2.3 Research Participants

The participants for this study were deliberately chosen based on specific eligibility criteria and the nature of the phenomenon being examined. In phenomenological research, smaller sample sizes are commonly used to facilitate an in-depth analysis of individuals' lived experiences (Alam, 2020). The number of participants

included in this study was determined by data saturation. Data saturation is achieved when no new themes or insights emerge, and responses become repetitive (Lincoln & Guba, as cited in Hossain, 2024). The researcher utilized purposive sampling to select the sample, a technique where participants are chosen based on their expertise or extensive familiarity with the subject matter. This approach ensures that the collected data aligns closely with research objectives, thereby enhancing the validity and reliability of findings (Thomas, 2022).

For this study, the participants were elementary school teachers currently teaching science at Ramon Ponce de Leon Elementary School, Lindy Pajunar Memorial School, and Inalad Elementary School in the Siaton 1 District. Eligible participants needed at least three consecutive years of teaching experience within the Department of Education, be 25 years old, and hold Civil Service Commission-approved Teacher I to III positions. Additionally, they were required to be bilingual in English and Cebuano. A total of six participants were interviewed until data saturation was reached, meaning no new categories, themes, or explanations emerged, and responses became redundant (Chitac, 2022).

2.4 Research Instrument

The primary method of data collection was a semi-structured interview. The interview questions, composed in English, were open-ended and designed to elicit meaningful insights from the participants regarding the research topic. These questions were developed based on a thorough review of relevant literature and expert input to ensure they were both appropriate and comprehensive. Additionally, the questions were pre-tested with a small group to validate their clarity and effectiveness. The interviews were recorded automatically using a mobile device, and access to the audio recordings was strictly limited to the researcher.

2.5 Data Gathering Procedure

Data collection took place between January and February 2025. Before conducting face-to-face, in-depth interviews, the researcher first sought formal authorization by addressing a letter to the dean of the Graduate School. After obtaining approval, a request was made to the Supervisor of Siaton 1 District for permission to identify suitable participants. With the Supervisor's endorsement, the request was then sent to the Principals of Ramon Ponce De Leon Elementary School, Lindy Pajunar Elementary School, and Inalad Elementary School, who helped identify potential participants. Before participation, individuals received a thorough explanation of the study's objectives and its strict confidentiality measures. They were assured that all information would remain confidential and were required to sign an informed consent form.

Additionally, participants were told that interviews would be recorded using a mobile phone for audio documentation. Each interview lasted between 20 and 30 minutes, depending on the participants' willingness to elaborate on their experiences. Clarifying questions were used when necessary to encourage participants to expand their responses, allowing for more detailed narratives (Creswell, 2007). Throughout the interviews, the researcher's primary role was to listen actively while only interrupting to seek clarification. The researcher also guided participants toward emerging themes, ensuring that questions remained open-ended and non-leading (Marable, 2011). To minimize potential bias, participants' verbal and non-verbal cues were documented. These observations, along with demographic details such as age and gender, were recorded in a journal. Finally, all recorded and transcribed interviews were carefully cross-checked to ensure the accuracy of the data.

2.6 Data Analysis Procedure

This study employed Colaizzi's phenomenological analysis method to examine the interview transcripts (refer to Serafica & Operiano, 2024, and Awal & Asaduzzaman, 2024, for recent discussions on phenomenological research). The researcher began by recording all interviews using a mobile phone and transcribing them verbatim. Key statements relevant to the research questions were then identified and highlighted. Significant excerpts were selected based on their relevance to the study topic and reworded from a third-person perspective to interpret their meaning. Next, themes were developed by organizing the interpreted meanings into thematic clusters. These were refined through multiple rounds of validation and cross-referencing with the original transcripts to ensure accuracy. Finally, the findings were synthesized into a comprehensive narrative, capturing the teachers' experiences with the complexities of science. To ensure the accuracy of the findings, the final description was presented to participants for validation. Their feedback was incorporated into the analysis, refining it to reflect their lived experiences better.

2.7 Ethical Considerations

Examining the lived experiences of elementary teachers concerning the complexities of science required careful attention to ethical considerations to protect participants' rights, well-being, and dignity. The Graduate School of Foundation University approved the study, with the endorsement of the Supervisor of Siaton District 1. Once approval was granted, the researcher sought permission from the principals of the three elementary schools involved in the study to identify potential participants. Detailed study protocols were thoroughly discussed with the school officials to ensure clarity and alignment in the research process. To uphold their rights and autonomy, participants' consent was secured. They received a clear explanation of the study's purpose, procedures, potential advantages, and any possible risks. This ensured they could make an informed choice about their participation.

Additionally, they were free to withdraw from the study at any point without providing a reason or facing any consequences. The privacy of participants was safeguarded throughout the study. Personal information and responses were carefully managed to ensure anonymity by removing identifying details. Data were securely stored, with access limited solely to the researcher, preserving confidentiality and upholding participants' trust. Most importantly, all data was thoroughly and permanently deleted in the presence of the researcher's adviser, who served as an official witness to ensure the integrity of the process. This deletion was executed using secure methods to guarantee that no retrievable remnants remained, thus upholding the highest standards of confidentiality and ethical research practices. Anonymity was maintained throughout the study to prevent any connection between participants and their responses. Personal identifiers were omitted, enabling participants to share their experiences freely and without concern for disclosure.

The study was carefully structured to prevent any harm or discomfort to participants. Efforts were made to respect their time and emotional well-being, with support available to address any concerns. This ensured a positive and considerate experience for all participants. The study aimed to support participants by exploring their experiences with the complexities of science. It aimed to generate insights that could enhance teaching methods and contribute to academic achievement. Participants' autonomy was honored by allowing them to choose whether to participate in the study. They also retained the right to withdraw without repercussions, ensuring their decisions were fully respected. The study upheld fairness by providing all science elementary teachers with equal participation opportunities. Participants were treated impartially, and risks and benefits were distributed equitably among them.

2.8 Trustworthiness

The research ensured credibility and value by emphasizing essential elements that reinforced the study's integrity and validity, prioritizing: (a) ***Credibility***. Carefully selected methods were employed to accurately capture participants' experiences. These approaches were designed to collect rich, meaningful data that reflected their perspectives and emotions. The research utilized techniques well-matched to its objectives, ensuring the findings were grounded in authentic and comprehensive insights. Additionally, these methods were tailored to fit the study's specific context, enabling a deeper exploration of participants' lived experiences; (b) ***Transferability***. Thorough and precise descriptions were provided to enhance the applicability of the findings in similar contexts. Detailed explanations of the methods, participants' experiences, and study outcomes allowed others to grasp the key factors shaping the results. This transparency ensured that the insights gained could be adapted or utilized in comparable settings, increasing their relevance and usefulness for future research or related studies; (c) ***Dependability.*** The study was meticulously documented and executed, ensuring each step was thoroughly recorded and consistently followed. Comprehensive records were maintained on the methods, procedures, and decisions made throughout the research, promoting transparency and providing a clear evidence trail. Data collection, analysis, and interpretation were conducted uniformly across all participants and situations, maintaining consistency in approach; (d) ***Confirmability***. The findings were derived directly from participants' input, ensuring they remained unbiased and accurately represented their experiences, perspectives, and feedback without external influence or distortion. Steps were taken to capture participants' voices with minimal interference from the researcher. This was achieved by employing open-ended questions, fostering a neutral response environment, and avoiding leading or suggestive prompts. Data analysis was conducted without favoring specific outcomes or preconceived ideas, ensuring that conclusions genuinely reflected participants' lived experiences.

3.0 Results and Discussion

After a thorough analysis of the transcripts and coding, 6 six emergent themes have emerged, capturing the lived experiences of elementary teachers regarding intricacies in science education.

3.1 Emergent Theme 1: Chained Potential

The first theme emphasizes the challenge of limited teaching materials and the creative ways educators adapt to ensure meaningful learning. Participants described how they navigated shortages of textbooks, science equipment, and technology by using alternatives like videos, adjusting lesson plans, and incorporating locally available resources. Despite these limitations, they remained committed to helping students grasp important concepts, often taking extra steps to fill in the gaps. This initial theme unfolds into two key aspects: Gravity of Limitations and Silent Countdown.

Theme 1: Gravity of Limitations

This theme highlights the challenges participants face due to their schools' lack of adequate teaching resources. They express disappointment with the shortage of textbooks, the incomplete state of science equipment, and the limited number of modules, which hinder their ability to deliver lessons effectively. While some participants hoped for more comprehensive teaching materials, such as video lessons and activities incorporating local resources, they struggled to find suitable materials for locally available experiments.

All these statements from the participants highlighted the challenges teachers encounter in delivering hands-on learning experiences due to limited resources:

For me, the time allotted for science is 50 minutes. It's very... well... insufficient. I think 1 hour, and 30 minutes could be the best thing, for most—uhh... for me. Primarily because if it's Science, again, as I've said, the language barrier, so it would take time for them to understand the concepts and then, you know, doing the experiments, preparing the materials. And then, when you experiment, it's not just a 5-minute thing. You know, sometimes it takes like... uhh... 15-20 minutes to finish such experiments, and then, there's observation. And then, you also must analyze what you observed. Then, you conclude what you've observed. So, for me, uhm... I think 1 hour and 30 minutes would be better. (P1)

The thing, Ma'am, I have one challenge is that... in one setting, especially during activities, hands-on— there are experiments, you really can't finish them in 45 minutes. There are times when my concept, instead of following the planned competency, is not quite like Week 1; this is it. I really can't follow it, Ma'am, because... the 45 minutes is not enough, Ma'am, if... we're being honest. (P3)

Finding appropriate materials for experiments is often difficult, and teachers frequently need to provide the necessary tools, especially when students forget to bring their own. Furthermore, integrating ICT and laboratory equipment into teaching is emphasized, as hands-on experience with scientific tools is essential for practical instruction and student understanding. This aligns with the study by Garcia et al. (2022), which stated that laboratory activities are necessary for science education as they offer students the opportunity to engage in hands-on experiments, enhancing their understanding of the material. Without these practical experiences, students often struggle to fully comprehend and appreciate the significance of science. Hadji Abas et al. (2020) observed that two public junior high schools in Lanao del Sur lacked sufficient laboratory resources, hindering teachers from effectively delivering lessons. As a result, students had limited chances for hands-on scientific learning, affecting the quality of their education.

Theme 2: Silent Countdown

The theme reflects teachers' challenges with limited class time and external disruptions. Participants expressed concerns that the time allotted for science lessons is insufficient to cover all necessary competencies, leading to rushed lessons and missed activities. External events, such as extracurriculars, often cause delays, making it difficult to ensure a thorough understanding.

These statements from the participants imply that the current time allotment for science lessons is inadequate for effectively delivering hands-on, experiential learning:

For me, the time allotted for science is 50 minutes. It's very... well... insufficient. I think 1 hour, and 30 minutes could be the best thing, for most—uhh... for me. Mostly because if it's Science, again, as I've said, the language barrier, so it would

take time for them to understand the concepts, and then, you know, doing the experiments, preparing the materials. And then, when you experiment, it's not just a 5-minute thing. You know, sometimes it takes like... uhh... 15-20 minutes to finish such experiments, and then, there's observation. And then, you also must analyze what you observed. Then, you conclude what you've observed. So, for me, uhm... I think 1 hour, and 30 minutes would be better. (P1)

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The limited class time and factors like the language barrier prevent students from fully engaging with the material and completing tasks such as experiments, analysis, and observations. As a result, teachers may struggle to cover all the necessary competencies, leading to rushed lessons or the need to extend lessons beyond the scheduled time. This highlights the need for more time to ensure thorough understanding and meaningful learning experiences. This finding aligns with those of Peniero et al. (2020), who discovered that science education in Japan and the Philippines differs in terms of lesson planning, class duration, and teaching conditions. Japanese teachers have the advantage of adaptable lesson planning and more frequent but shorter science classes. Meanwhile, Filipino teachers contend with limited class time, larger student populations, and extra duties, reducing opportunities for hands-on learning and active student participation. Similarly, Cervantes (2024) reported that a House leader had urged the Department of Education (DepEd) to review the revised time allocations under the "Matatag" curriculum, highlighting the increased workload and stress for teachers. The leader also emphasized the need to reconsider the daily subject-teaching requirement and ensure that teachers' working hours stay within the legal limit, especially in cases of double-shifting.

3.2 Emergent Theme 2: The Rift of Comprehension

This theme explores the challenges faced by science teachers due to language barriers, students' difficulty in understanding concepts, and diverse learning abilities. Using English as the medium of instruction makes it harder for students to grasp scientific terms, leading teachers to incorporate translations and bilingual explanations. Despite efforts to simplify lessons, some concepts remain complex, requiring teachers to conduct additional research and integrate interactive strategies. Students' varying learning styles and intellectual capacities add to the difficulty, prompting teachers to use differentiated instruction and remedial sessions to ensure effective learning for all. Under this, two themes also emerged, namely: Words in Void and Diverse Minds in Motion.

Theme 3: Words in the Void

This theme highlights how the language barrier affects Science education, making it difficult for students to understand and express ideas in English. Teachers address this challenge using translations, bilingual explanations, and localized strategies to improve comprehension. While some students are fluent, many require additional support, which demands more time and effort. Limited parental support at home further complicates learning, emphasizing the need for adaptive teaching approaches.

These statements from the participants highlighted the impact of language barriers in education, showing how teachers adapt their methods to help students understand content better:

We will have video lessons, then I will pause. I will pause the video lesson and then try to explain what's happening in the video so that they won't be left hanging. The video, of course, is in English, so we will switch to Binisaya. (P1)

I find it not difficult, but you must take the time to explain it to them. They will-they will, in turn, ask you to explain in... in, uh... vernacular. But I intend to speak it in English because I also want them to learn, not just Bisaya. I also want them to learn to communicate in English. (P4)

Language barrier, since our learning resources were written in English and then … we, teachers, try to localize what is present in their community so that they can connect with the lessons that we are talking about or the day's lesson—to enrich the day's lesson. And difficult uhh.. yes, the …language barriers and you must try to be strategic as a teacher, most importantly, because our learners there in Salingkubong, since their parents don't have enough opportunity to have in education, so they don't have a foundation, the highest foundation, in scaffolding their learners about the daily activity task

given by the teachers. (P6)

Teachers frequently pause lessons or translate material into the local language to aid comprehension, especially when resources are in English. Despite the extra time it takes, teachers' efforts to maintain English in the classroom reflect the growing challenge of language differences and their strategic attempts to bridge the gap in student learning. This aligns with the views of Means et al. (2021), who emphasized the need for a central scientific language but acknowledged the limitations of using just one language in science, proposing translation and technology as solutions. Furthermore, De Los Reyes (2022) supported this by showing that using a mix of languages or translanguaging enhances understanding in multilingual classrooms, offering a practical approach to overcoming language barriers in science education.

Theme 4: Diverse Minds in Motion

This theme emphasizes the importance of addressing students' diverse learning styles and abilities. It reflects teachers' efforts to adjust their teaching strategies to accommodate students' different needs, recognizing that not all learners process information the same way. Teachers utilize various methods, including remedial classes, differentiated instruction, and eclectic approaches, to ensure that fast learners and those with average abilities can grasp the material.

These testimonies from the participants illustrate the challenges teachers face when adapting to the diverse learning abilities of their students:

I used to do a remedial class. I will reteach uhh.. same topic, but in a different way. Let's say uhh… different- you know, teaching strategies or learning styles. (P1)

I don't believe that one size fits all because not all pupils have the same intellectual capacity. So, in teaching, we must differentiate between those who are fast and those who belong to the average category. (P4)

For example, Ma'am, uh... the problem in the department or in... the problem today, Ma'am, uh... the pupils, the reading ability of the students. So, it's a mix of students, Ma'am. We have many students, Ma'am, 40 plus, that's why... we still have a high... problem... uh... It's a big challenge in teaching, Ma'am, because it's a mix. (P5)

They highlighted the importance of differentiated teaching strategies, such as using varied teaching methods and adjusting instruction to accommodate students with different learning speeds and needs. This aligns with the observation of El-Sabagh (2021), who explored the impact of adaptive e-learning tailored to students' learning styles, showing its advantage over traditional methods in boosting engagement. In line with this thought, Hassan et al. (2019) developed a framework that adapts gamification to individual learning styles, resulting in a 25% increase in motivation and a 26% reduction in dropout rates.

3.3 Emergent Theme 3: Blindfolded Mentors

This theme illustrates educators' difficulties in effectively teaching Science, particularly in the context of a lack of specialized training and the struggle to implement effective teaching strategies. Teachers emphasize the importance of continuous learning and specialized training to address knowledge gaps and stay updated with evolving Scientific trends. However, even with training, many teachers find it challenging to apply new strategies in the classroom, mainly when seminars focus more on lesson planning than practical teaching. This theme includes two sub-themes: Unsharpened Minds and The Struggle to Ignite.

Theme 5: Unsharpened Minds

This theme highlights the participants' awareness of the importance of ongoing professional development in science education. Teachers express varying preferences for ongoing training, with some emphasizing the importance of staying updated on new trends, teaching methods, and technologies. They highlight the need for more focused seminars to enhance their skills, particularly for complex topics and higher grade levels.

These testimonies from the participants highlighted the critical role of continuous professional development for science teachers, emphasizing its significance in improving teaching effectiveness:

In training... uhh, training is essential, Ma'am, especially for me, I'm an elementary teacher. We don't have a major. It's not like

my teaching Science is... It's been a few years; it's still relatively new. Therefore, training is particularly necessary, especially in higher grades, as certain concepts or facts require periodic review. (P3)

Nothing much. I'm happy because, as they learn, I'm also learning. I'm happier with science, but I'm not confident with math. In my opinion, we need to have training in science. It could be annual. Just annual. At least, the teacher will experience it because there are innovations. At the same time, the teacher's learning will also be continuous. (P4)

So, I need to upskill more in teaching, such as through trainings and seminars. It's important because it has a positive impact according to research, one that I have read in research, teaching Science, it is essential – the seminars, as part of (inaudible) profile in teaching Science as a teacher because if you have less engagement or less opportunity to be exposed to workshops and trainings, of course, you also have less competency in teaching – competent in teaching Science. But if you... If you're involved in training seminars regarding teaching Science, I assure you that, as a generalist, I can teach effectively and efficiently in Science. (P6)

Particularly for those with limited experience or lacking specialization in the subject, the participants stressed the importance of ongoing training to keep teachers updated on innovations and teaching strategies. This approach ensures that teachers remain competent and adaptable in their roles. This aligns with the findings of Suchyadi et al. (2020), who argue that improving the quality of education hinges on continuous professional development through structured training and growth efforts. Similarly, Rochette (2022) advocates for more practical, on-the-job training, suggesting that schools must find more effective ways to support teachers' professional growth. Maeng et al. (2020) further support this by demonstrating that professional development programs significantly enhance elementary science teachers' understanding and confidence, particularly when they involve modeling, feedback, and coaching. These insights underscore the importance of regular learning opportunities to enable teachers to stay ahead and promote high-quality education.

Theme 6: The Struggle to Ignite

This theme focuses on the challenges teachers face when using effective Science teaching methods. It highlights the need for practical training, diverse teaching methods, and a focus on students' needs to help them learn more effectively and stay up to date with the curriculum.

These statements from the participants emphasized the need for improvements in science education by emphasizing the importance of more practical training for teachers, ensuring that seminars went beyond just lesson planning and provided hands-on experience:

For learning strategies in Science, I partly… I can say that… It's not that, you know, effective as… as in practical teaching because during our seminars, it's mostly on, uhm… lesson planning, more on lesson planning. However, when it comes to practical matters, since seminars are time-constrained, the time is very limited. I know that science can really offer a lot, but due to time constraints, it's somewhat lacking. Though, … though, it's helpful, but it's not that effective because the time is… was limited and the… the ideas and information were also limited though there were such… uhm… examples or like learning competencies being targeted, but it's not really that comprehensive because Science is a bit broad. (P1)

There are those competencies that I think would be difficult for them, and there are also competencies where it's not – it can no longer… It's no longer in the MELCs, but during those times when it wasn't yet the pandemic, it was there. Then, some were removed, and there are MELCs left that I found out that… right now, we're using MELC, there is this competency about rocks, I think, that is no longer in K to 12, because I believe that competency belongs to Grade 4 already. After all, it's no longer in our books. (P4.

Yes, teachers should be innovative and creative, and always expose learners to real-life situations. Be a learner-centered approach in teaching … science. Learner-centered approach when less of the teacher. It is more on scaffolding, not spoon-feeding. Because scaffolding is that teacher's role, they are just there to facilitate and help learners throughout the learning process. However, when the whole task is learner-centered, learners are the ones who do the task. Less of the teacher, more on the pupils or students. (P6)

It also highlighted the need for teaching resources, such as textbooks, to be updated to reflect curriculum changes, including the reassignment of topics to different grade levels. This aligns with the views of Suchyadi et al. (2020), who stated that enhancing the quality of education necessitates ongoing professional development

through structured training and sustained growth efforts. Similarly, Boateng et al. (2023) suggested that university faculties responsible for teacher training should have supported future educators in balancing practical experience with theoretical learning throughout their programs.

3.4 Emergent theme 4: The Alchemy of Teaching

This theme focuses on utilizing technology and active learning strategies to enhance science education. Participants highlighted how digital tools, such as YouTube videos and interactive simulations, help overcome resource limitations and to improve student engagement. They also emphasized the importance of hands-on activities, questioning techniques, and cross-disciplinary connections to make learning more meaningful. However, challenges such as students' struggles with complex concepts and the need for continuous teacher adaptation were acknowledged, underscoring the importance of innovative and flexible teaching approaches. Under this theme, two sub-themes emerged: EdTech in Action and Igniting Curiosity.

Theme 7: EdTech in Action

This theme illustrates how Science teachers overcome resource limitations using technology and creative methods. Participants use YouTube and ICT tools to demonstrate experiments, making lessons engaging and accessible. Interactive strategies, like group work and cross-subject integration, enhance understanding. By combining digital tools with traditional materials, teachers ensure a well-rounded learning experience.

These statements from the participants illustrate how Science teachers adapt to challenges by integrating technology to enhance student learning:

So, with that, as a teacher, with all those uhh … lack of materials and resources, I used to uhh… download videos from YouTube, okay, because there- uhh . There were videos about experiments that we would observe, so that, at least by watching the video, we could see how the experiments are conducted and what they entail. Although we may not be able to personally conduct the experiment, at least we have an idea of the things involved in experimenting. (P1)

Another thing is, one of the benefits for the teacher… we know Science is teaching the concept, it is about facts, so the students – I also saw that with the use or help of ICT, they become more engaged, especially if what you use is interactive, like there is a slideshow and there are questions where they get to choose, then the correct answer appears – it is interactive, Ma'am, where they can correct and see, "Ah, so that's how it is." As a result, the class becomes more interactive, and students remember the concept better. (P3)

With limited resources, participants use YouTube videos and interactive simulations to help students visualize experiments and grasp concepts without direct hands-on experience. They also observe that ICT tools, such as slideshows and quizzes, make lessons more engaging, interactive, and memorable. By incorporating digital tools, teachers address material shortages and improve student participation and comprehension, making Science more accessible and practical. This echoes the results of Depone et al. (2024), who emphasized that technology plays a crucial role in modern education, making integration essential for effective learning. To maintain high-quality instruction, teachers must actively adopt digital tools in their teaching methods. However, as Jannah et al. (2020) noted, the effectiveness of digital learning depends not only on technology but also on teachers' competencies and creativity. While digital tools enhance motivation, engagement, and critical thinking, their impact is significantly influenced by how well teachers implement them. Schools with strong infrastructure see better results, reinforcing that successful digital learning requires access to technology and skilled educators who can maximize its potential.

Theme 8: Igniting Curiosity

This theme highlights the importance of active learning in science. Participants emphasize hands-on activities, questioning techniques, and real-life connections to enhance understanding. They value student engagement, concrete demonstrations, and the integration of technology, creating a supportive environment for exploring scientific concepts.

These statements from the participants highlight different approaches to making science education more engaging and effective:

You develop the art of questioning. You throw them the questions, and they can share their ideas, based on real objects and

manipulated materials, so they can verify the facts we present to them. (P1)

So, I give them instructions and then they follow. They do the mixing of the ingredients by stirring, and everyone will observe. (P2)

And when it comes to my teacher relationship with my parents and students, particularly the students themselves, because we are talking here about science, they have difficulty understanding science, and that is one of the most challenging parts as a teacher in teaching science. … It's tough for them to understand the concept, but when I try to elevate my teaching strategy and technique with the uhh… integrating the technology. I try to incorporate interactive simulations so that the students can gain an in-depth understanding of the concept. (P6)

Encouraging students to ask questions fosters critical thinking and allows them to explore ideas using hands-on materials to confirm scientific facts. Providing structured guidance in experiments helps students follow step-by-step procedures, reinforcing learning through direct participation and observation. Research supports these approaches, with Canuto (2024) demonstrating how science comics improve engagement and simplify complex topics, while Safitri et al. (2023) found that Problem-Based Learning (PBL) boosts motivation and academic performance. Similarly, Picardal et al. (2022) demonstrated that contextualized instruction yields more significant student achievement than traditional methods. These findings underscore the need for dynamic, student-centered teaching to enhance the effectiveness of science education.

3.5 Emergent theme 5: The Evolving Educator

This theme highlights the importance of professional development in enhancing Science teaching. Participants recognize that continuous learning through training, seminars, and collaborative sessions strengthens their teaching skills and effectiveness. They acknowledge the evolving nature of education, emphasizing the need to adapt to students' exposure to technology and social media. Engaging in research, refining questioning techniques, and sharing strategies with colleagues contribute to personal and professional growth. This theme includes one sub-theme: Catalysts of Progress.

Theme 9: Catalysts of Progress

This theme highlights the importance of professional growth in science teaching, as emphasized by the participants. They recognize that training, seminars, and collaborative sessions enhance their skills and qualifications, making them more effective educators. Continuous learning helps them stay ahead in a rapidly evolving digital landscape, refine questioning techniques, and foster student curiosity. By actively seeking professional development, teachers improve their teaching strategies and adapt to the changing needs of education.

These statements illustrate the participants' recognition of professional development as a key factor in enhancing their teaching effectiveness:

Through the trainings, so INSET helped us a lot as teachers. INSET and the LAC sessions, the feedback during the monitoring, and it has developed us more effectively in our profession, particularly in teaching kids. (P1)

For me, Ma'am, in my case, it seems like… but trainings will… just by attending trainings, Ma'am, you can cope with the needed… needed – what is this – needed requirement or qualifications to be a science teacher. (P3)

We have given the time and, at the same time, provided seminars and trainings to capacitate learners in teaching science. And about concepts, we have our LAC sessions, as well as district-wide school LAC sessions, where we aim to capacitate our colleagues, our teachers so that we can make the best endeavor. (P6)

They emphasize the value of training programs, collaborative learning sessions, and feedback mechanisms in strengthening their skills and qualifications as science educators. By participating in INSET, LAC sessions, and various seminars, teachers improve their instructional strategies and stay updated with new methodologies, ensuring they can meet the evolving demands of science education. This is aligned with the notion of Davidson et al. (2020), who discovered that actively engaging in scientific research allowed teachers to gain a firmer grasp of epistemic affect, enhancing their ability to foster student learning and engagement in science. Similarly, Rahman Talukder et al. (2021) highlighted the importance of improving teacher training, continuous

professional growth, and integrating inquiry-based approaches to strengthen science education.

3.6 Emergent Theme 6: Beyond the Curriculum

This theme highlights how participants integrate reflective and values-driven teaching into their practice to enhance student learning and personal growth. They emphasize ensuring student mastery of competencies, making lessons relevant to real life, and fostering curiosity and critical thinking. Their reflections reveal the challenges and rewards of teaching Science, demonstrating their commitment to continuous improvement. This theme encompasses two sub-themes: Guiding Stars of Tomorrow and Waves of Reflection.

Theme 10: Guiding Stars of Tomorrow

This theme highlights participants' dedication to student-centered learning, ensuring students achieve competencies through engaging and meaningful instruction. They emphasize hands-on experiences, contextualized examples, and inquiry-based approaches to deepen understanding. Participants also recognize the importance of assessments, feedback, and parental involvement in fostering student success.

These statements from the participants illustrate the importance of going beyond basic instruction to ensure students fully grasp lessons, using strategic questioning to develop critical thinking, and maintaining regular communication with parents to support student progress:

So, uhh, with those uhh you know … problems … as a teacher, we need to go an extra mile so that we could be able to deliver our lessons to our learners with uhm … whole learning experience and at the same time, they could be able to … to get our learning competencies. (P1)

But for me, Ma'am, it's really about the level of questioning for students nowadays, when you ask "what," they can still answer. But when you get to "why," that's when they go silent. So I told myself… but you can do something about it, Ma'am. You can rephrase the question—I rephrase my questions or give them an example. If they still don't get it, I'll let them give their example. If they can't say it, they know it, Ma'am, because especially kids, they're naturally curious. (P3.

So, what I did, and again, I provided feedback to the parents. Uhh… communication is essential. Providing feedback regarding their learners or children, perhaps. And about that action, I see that it is effective because communication and feedback are essential. That you must communicate with their parents, uh, based on their performance, time to time, so that their parents should be aware of… while they are inside the classroom, because at the end, it's about our learners, so teaching science to them … time to time … I must say that there is development. (P6)

Emphasizing extra effort in teaching, adapting questioning techniques, and involving parents all contribute to a student-centered approach that fosters deeper learning and engagement. This supports the conclusions of Macias et al. (2021), who examined how future teachers worked with elementary students to create fair learning opportunities in science. Their study demonstrated that this teamwork enabled teachers to understand the challenges in underprivileged areas, develop solutions in collaboration with students, and advance in their profession.

Theme 11: Waves of Reflection

This theme captures participants' reflections on their experiences as science teachers, highlighting both the challenges and rewards of the profession. They express frustration over student struggles yet find joy in discovery, engagement, and curiosity-driven learning. Participants also emphasized the importance of values education, real-life applications, and continuous professional growth in shaping their teaching approaches.

These statements from the participants highlight different perspectives on teaching Science, showing both the challenges and rewards of the profession:

I am challenged, and it's exciting. It's fun teaching Science. (P2)

So, as a Science teacher for four years—almost four years, uhm… I can say that, as a science teacher, it is challenging, yet also exciting and enjoyable. (P3).

My experience as an Elementary Science teacher is quite uhh … exploring since I … came here uhh … 2010? I have been

teaching this subject for 8 years and... I also find this subject very interesting because, while the pupils learn, I, as a teacher, am learning too. Uhh, like those different uhh .. methods, strategies, that's why I find this subject interesting. (P4)

Some teachers find it demanding yet fulfilling, appreciating the excitement and enjoyment of engaging students in scientific exploration. Others see teaching as a continuous learning process, where they impart knowledge and discover new methods and strategies alongside their students. This aligns with McLaren's (2023) view of education as both a means of control and liberation, where strengthening teachers' instructional skills allows them to challenge traditional ideas, foster critical thinking, and guide students toward personal growth. Both perspectives underscore the transformative nature of education, where teachers play a crucial role in shaping their development and that of their students. Similarly, Menon (2020) shows that hands-on teaching experiences help aspiring educators build confidence and shape their professional identities. Both perspectives emphasize the importance of teaching as a process of imparting knowledge and evolving as an educator through experience and reflection.

4.0 Conclusions

This study explored the challenges and rewards of teaching Science, focusing on the strategies educators used to overcome obstacles and foster meaningful learning. Its main contribution was highlighting the resilience, creativity, and adaptability teachers demonstrated in navigating the complexities of science education. Participants cited challenges such as limited resources, time constraints, and language barriers; however, they addressed these issues using available materials, technology, hands-on activities, and translanguaging —an approach supported by De Los Reyes (2022) for enhancing comprehension in multilingual classrooms. Despite these difficulties, participants found teaching Science deeply rewarding, especially in cultivating curiosity, critical thinking, and a love for discovery. They also emphasized the importance of continuous professional development, reflecting McLaren's (2023) view of education as a means of both control and empowerment. Reflective teaching was another key strategy, allowing educators to adapt lessons to diverse student needs, an approach consistent with Macias et al. (2021), who documented professional growth through collaboration in underserved areas. While challenges persist, the study highlighted how adaptable, reflective, and professionally supported teaching practices can lead to meaningful science learning. These findings offer practical guidance for improving science instruction and teacher training programs, particularly in resource-limited and multilingual settings. Future research could further explore strategies for addressing resource gaps and the broader impact of translanguaging in science education.

5.0 Contributions of Authors

The author affirms sole contribution to all aspects of this work and has reviewed and approved the final version.

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The author declares no conflicts of interest.

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A Community-Based Framework for Building Sustainable Tourism

Erwin A. Mallo
University of Southern Mindanao, Kabacan, Cotabato, Philippines

Author Email: ermallo@usm.edu.ph

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Abstract. Exploring the community's perspectives on sustainable tourism yields valuable and insightful ideas about their involvement in local tourism development. In terms of their development, which reflects the abundance of resources, manages economic benefits, fosters cultural openness to visitors, and promotes dynamic collaboration among stakeholders, this study employed a phenomenological research design to capture their experiences and perspectives on what it means to have sustainable tourism. Results show remarkable responses and themes that emphasize the factors contributing to promoting tourism in the province's various tourist attractions. The participants believed that sustainability in local tourism includes people in the form of security forces, community, private sectors, and LGUs; profit as a result of infrastructure development like roads and buildings, commercialization, investment in local tourism where investors gradually come in, and crop production they sold their local products and delicacies; a planet where it must be a safe and peaceful environment, maintenance and cleanliness, sustainable living and environmental conservation. Furthermore, a new aspect of tourism is the places themselves. As the participants believed, for tourism to become sustainable, it must be emphasized through government support, the absence of conflict, security, relaxation, and development. With these four domains — planet, profit, and places — sustainable tourism is described this way. This paper attempts to develop a new framework for creating sustainable local tourism.

Keywords: Sustainable tourism; Community-based framework.

1.0 Introduction

Sustainable Tourism is a form of development that highlights economic and social development involvement (Zhang & Ali, 2024). Tourism promotes environmental and infrastructural development, which is reflected in the community's involvement and government support. The emergence of the tourism industry in Southeast Asia attracts travelers worldwide to spend their vacations with family and friends. These industries maximize environmental sustainability and development (Ha Van et al., 2024). This benefits the incoming economic generation of the government and residents.

Cotabato Province's opening of its doors to promote tourism in the Philippines has made it a new destination. According to the Department of Tourism (2025) demand statistics for travelers between 2022 and 2023, the province has an exceptional increase in visits of 213,767 and 233,214 in the respective years. Tourism's impact on the province is strongly supported, especially by the community's engagement in tourism development (Villamor et al., 2024) and stakeholders' participation in peace tourism (Mallo, 2025). Based on the record, there has been an increase in attendance among local and neighboring travelers who visit captivating attractions and environments to enjoy each other's company. One remarkable behavior that travelers often experience is the

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opportunity to savor local delicacies and explore historical areas considered a "war-torn" province. The suspension of conflict allows locals to showcase their hidden tourist attractions to the public, including national and international travelers.

Unlike previous studies, some literature discusses sustainable tourism as a balance between economic growth and environmental and social sustainability. (Elgin & Elveren, 2024); sustainable tourism employment (Kim & Baker, 2024); sustainable entrepreneurship (Zeng et al., 2024); ethnic tourism (Guo et al., 2024) , emphasizing the community's participation in creating sustainable tourism is essential and integral in promoting the social and cultural practices that local tourism is designed to showcase. The artistic practices therein were products of their ancestors, which were believed to have been adopted decades ago. This emphasis on community involvement can inspire hope for the future of sustainable tourism.

Furthermore, this research aims to explore the community's perspectives on sustainable tourism and address the question: What community-based perspectives on sustainable tourism have been explored? At the end of this study, new perspectives will be constructed, forming a framework for local, sustainable tourism in Cotabato Province. This framework could transform the region, bringing hope and optimism for the future of sustainable tourism.

2.0 Methodology

2.1 Research Design

The study employed a phenomenological research design, chosen for its unique ability to capture the distinct experiences and perspectives of the local community regarding sustainable tourism. This design was particularly relevant given the evolving landscape of local tourism in the Province of Cotabato. It provided a nuanced understanding of how tourism has impacted their lives and contributed to their social participation and the locality's development. According to Creswell and Creswell (2018) the design, it aims to capture individuals' unique experiences of a phenomenon that affects their lives.

2.2 Research Locale

The study was conducted in the Province of Cotabato, which is characterized by emerging tourism activity. According to the most recent survey by the Regional Department of Tourism XII, conducted in March 2021, the province reported 216,182 domestic and foreign tourists. Additionally, several local attractions in the province can be found in the nearby neighboring municipalities of Aleosan, Pikit, and Makilala, where the study was specifically conducted. In the Municipality of Pikit, the historical Bahay Kasal, known for its use as a military camp during the Spanish occupation, can be found. The Bahay-Kastial was declared a National Historical Landmark in central Mindanao. Today, the national government renovated and sponsored it to revive memories that shaped the Municipality's recognition for its development and cultural identity.

Another neighboring municipality is Aleosan, a newly established tourist attraction, the UK Peak. Previously, the area where the tourist site was developed was known for its grassy lands, which were used for horse ranches and were not conducive for locals to spend time or visit. It has mountainous features and a windy environment. Later, the private owner and the government decided to innovate in this area. A series of infrastructure developments were observed, and continuous support from the locals made it known to families and lovers that it was a moment to relax.

The New Israel Eco-park is in Barangay in the municipality of Makilala, a culture-based tourist attraction. New Israel is known for its community development through the religion of Moncadista. It was home to Macaque Monkeys, who had already lived there for decades. It was believed that monkeys brought luck to their community, as they were used to improve economic well-being. The provincial government exhausted some funds to make it accessible. Better known for its popularity, the New Israel Eco-Park is considered the most visited tourist site in the province.

2.3 Research Participants

This study used purposive sampling techniques to identify participants who were residents of the selected areas and could directly attest to stakeholders' development, engagement, and participation in local tourism. Their participation in regional tourism development varied according to their knowledge and type of involvement.

The selection process for research participants was based on specific parameters. Participants were chosen from the municipalities of Aleosan, Pikit, and Makilala. For the Key Informant Interview (KII), six participants were selected, including the LGU and BLGU Barangay captains, who were chosen for their current roles and knowledge of tourism development and living conditions during times of conflict. The Focus Group Discussion (FGD) involved 18 participants, including owners of tourist sites, the head of BPAT, teachers, vendors, habal-habal drivers, and a Brgy. Kagawad. These participants were selected based on their barangay residence, experience with local development, and knowledge of tourism development in their area.

2.4 Research Instrument

The study's instruments included a researcher-made interview guide. Before data collection, this guide was validated by Florie Jane Tamon and Rowell Natafan, who provided necessary probing questions. A pilot test was then conducted to ensure the questions and probes were suitable and accurate. The Key Informant Interview (KII) and Focus Group Discussion (FGD) used the same questions to ensure consistency. These questions focused on transitioning from peace to sustainable tourism and the involvement of multiple sectors in offering programs to address tourism needs and implement sustainable tourism interventions in their locality.

2.5 Data Gathering Procedure

This study employed in-depth interviews and focus group methods. Environmental scanning was conducted before the interview and focus group to validate and confirm the participation of key informants. The researcher identified the participants using the criteria provided. A letter was sent to the local government unit and the barangay captain for approval. After receiving the acceptance letter, the interview was arranged. Interview responses were digitally recorded to document the participants' answers.

2.6 Ethical Considerations

This study adhered to the principles of protecting participants and maintaining the integrity of the process, ensuring trustworthiness, and presenting accurate results in social research. According to the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (1978) ethical consideration, the value of the participants' respect, belief, and security as subjects of the study's conduct is maintained. It reiterates the provision of a proper venue, a safe space, and data privacy for the participants. Additional considerations were noted in the capacity to provide informed consent when data were produced from the participants, as well as the goal and process of how data were generated solely for this study.

3.0 Results and Discussion

3.1 Places as Sustainable Local Tourism

Table 1 shows the subthemes of places such as sustainable local tourism.

Table 1. *Places for Sustainable Local Tourism*

Sub-themes	Description
Government support systems	The Department of Tourism assisted in training the tourism front liners. The LGU planned to improve the facilities and parking space. The province funded the rehabilitation. The barangay checked the arrival of the tourists.
Absence of Conflict	Suspension of sporadic conflicts. The arrival of tourists in the locality. Visibility of peace
Secure and relaxed	Accessibility and security are strictly enforced, ensuring tourists feel safe. A children's playground has been installed. BPAT secured the tourism spot, and PNP monitors attendance.
Development	Tourism opens new opportunities for the community. Tourism activities are present, and the locality is emerging as a destination. Infrastructure-related and social development are progressing. The community and LGUs work hand in hand.

These places are considered essential characteristics of sustainable local tourism. This includes a government support system, the absence of conflict, security, relaxation, and development. The participants were also trained as tourism frontliners through DoT initiatives. This training enhances frontline staff's communication skills as tourism guides and ensures the safety of tourists. The provincial government secures the rehabilitation of the facilities. This involves constructing new recreational areas, enhancing the appearance of buildings, and implementing safety measures for tourists. DoT, a key player in promoting sustainable tourism, provides training and support to local communities and governments. The provincial government, a local authority, or

municipality has the primary role in developing and supporting the local tourism industry. Depending on the province or municipality's level of development and resources, the government may provide various support services, such as establishing a tourism office or department to manage and promote the local tourism industry. For tourism to be deemed a safe environment for visitors, the absence of conflicts must characterize the places where people will come to rest. The place has a significant attachment to the behavior of visitors, including both rational and emotional aspects (Meng et al., 2020), which enhances their connection with the environment.

Additionally, participants have noted the absence of sporadic conflicts as evidence of sustained security. Tourists are pleased with their nature experience and feel immersed in it as it offers comfort. The visibility of peace also implied that security was improved, and visitors were given a sense of calm. This way, the participants feel assured of their safety and security when traveling. This can help alleviate societal stress and enable individuals to enjoy their vacation fully. Security measures, such as increased security staff, surveillance cameras, and background checks, can help ensure tourists feel safe and secure. Additionally, improved infrastructure and enhanced public transportation can help tourists easily navigate unfamiliar places, providing an added sense of security and peace of mind.

Tourism has experienced tremendous growth in recent years, with an increasing number of destinations. For the participants, this is because there is more investment in the sector. They have been focusing on sustainability and eco-tourism destinations. In response, the community continually improves its living conditions, particularly regarding social and economic development. Similarly, sustainable tourism has played a significant role in their respective areas. It further emphasized that a place-based approach affects generality and can reflect the community legacy of future generations (Han et al., 2024). It is therefore important to underline that places must be improved in tourism development.

3.2 People as Sustainable Local Tourism

Table 2 shows the subthemes of People as Sustainable Local Tourism.

Table 2. *Subthemes of People as Sustainable Local Tourism*

Subthemes	Description
Security Forces	BPAT secured the place day and night. CAFGU remained in the vicinity.
Community	The community's active participation in the sustainable tourism process, not just as beneficiaries but as contributors, is a testament to its integral and inspiring role in the framework.
Private Sectors	Their active involvement is a testament to the collective effort required for sustainable tourism and is worthy of our appreciation.
LGU	The LGU's comprehensive and reassuring approach to sustainable tourism instills confidence and reassurance.

Sustainable local tourism is an approach that includes security forces, the community, the private sectors, and local government units. Security forces play a crucial role in ensuring safety and promoting sustainable tourism. The participants identified the presence of security forces, including police, as essential for public safety, especially in areas with a high concentration of tourists. BPAT officers patrol the areas, responding to incidents and preventing criminal activity to ensure the safety of both tourists and locals.

As mentioned by the participant:
We conducted a meeting with BPAT to maintain peace and order. As officials, we are always visible to the community and maintain peace and order.

This claim was supported by Wu et al. (2021), as cited by (Villamor et al., 2024) residents, who were concerned about security issues such as crime and alcoholism. The security forces' visibility and proactive measures significantly contributed to the overall sense of security in the area. Moreover, the relevance of security to tourism can increase tourism as a value added that contributes to visits. According to Manrique-de-Lara-Peñate et al. (2022), the vicinity of tourism is secured through strong security, led by the government security agency. On the other hand, local communities have an active role in sustainable tourism. Tourism affects the economy and profits. It will add to the community's profit. If it is not beneficial, it will not be sustainable. It will hurt the planet. Empower the community to concentrate on social benefits and environmental impacts (Zeng et al., 2024). The LGU assisted in planning and funding the tourism site, fostering greater community cooperation. Additional programs were created to provide income to the community. DA and TESDA mainstreamed their

efforts into business ideas and production. Farming materials, practices, funding, and the production of saleable, income-generating products have become ingrained behaviors in the community.

As mentioned by the participant:
The LGU sponsored skills training on gas leaking and massage. TESDA offers training in the mechanical and automotive fields.

Furthermore, LGUs' engagement and collaboration strengthened tourism development (Mandić et al., 2024). This enabled the community to expand its resources and remain productive with continuous support. The company's dependence on these government offices, powers, and authorities is essential in implementing sustainable tourism (Maxim, 2016). In summary, people are crucially involved in actualizing tourism sustainability. Behind the implementation of tourism is the presence of security forces, the community, the LGU, and stakeholders. It is imperative to revisit and examine their roles in implementing sustainability, particularly in tourism. While it is correct to consider the success of the implementation, all deserve to be recognized and partnered to build and strengthen the relationship well.

3.3 Profit as Sustainable Local Tourism
Table 3 shows the subthemes of Profit as Sustainable Local Tourism

Table 3. *Subthemes as Profitable, Sustainable Local Tourism*

Subthemes	Description
Infrastructure Development	Water and electric systems donated. Roads were concreted—more recreational facilities.
Commercialization	They stay at home while selling their products. The community introduced local delicacies or foods to the tourists.
Investment in Local Tourism	Investors come to the locality, and the land is now utilized. Businesses are visible in the locality. The LGU initiated tourism development, which helped to alleviate the community's economic instability. There were livelihood programs for women doing business.
Crop Production	Farming is the main source of food and production for the community. Ornamental plants were displayed for tourists to view.

Sustainable local tourism is a form of tourism that benefits both the local community and the environment. It aims to foster academic development, preserve cultural heritage, protect the environment, and create opportunities for interaction between locals and visitors. Another reason for effective, sustainable tourism is that it can generate profits while providing a positive social impact on the areas visited. The participants viewed tourism as a means of profit development for the locality and the province. This profit from sustainable local tourism is generated through infrastructure development, commercialization, investment in regional tourism, and crop production. The participants believed that infrastructure development is essential to the success of sustainable tourism in any province. By investing in infrastructure such as roads, reports, and accommodations, a province can create an environment that is more attractive to tourists, thus making it more profitable.

The community benefited from enhanced support in skills training. They transformed their village into a profitable area and continued to organize their other resources. Women and the locals strengthened their business efforts. Landowners within the tourist attraction constructed small businesses to cater to their clients. The idle lands are now transformed into income facilities. Homeowners residing near roads have strategized to earn money. They began selling vegetables and homemade products. They made "Talipapa" for the display of their products.

The participant proved that:
Most of my constituents, especially those in Muslim areas, worked as laborers at the market. They owned national highway stores. Prawns and tobacco were the most popular products in the area.

The emerging tourism activity in the locality caught the attention of tourists and investors from neighboring regions. The LGU collaborated with the private sector to develop infrastructure for the participants. The location was developed through consultative meetings with local community leaders and agencies. Farming was developed. The development movement also enhanced the community's infrastructure and social aspects. Funding and rehabilitation have become the leading services offered to tourism sites, creating a better

atmosphere of opportunities for the community. LGU initiated tourism development to help alleviate the community's economic stability. There were livelihood programs for women doing business. Tourism must consider employees' long-term involvement in achieving sustainable tourism (Kim & Baker, 2024). This financial stability is further supported by the updated intervention of the Department of Agriculture to enhance farmers' knowledge and skills in crop production and the continuous improvement of tourism sites like zip lines, tower views, flower production, and native delicacies. Even at home, a small business or *a tiange* supports their day-to-day expenses. In other words, the family can sustain their basic needs independently from the government programs.

Aside from tourism, the locality was also known for its farming. The province shared a hundred hectares of agricultural land. It provided crops and livestock production to the local and national markets. Various crops, including palay, corn, caravan, fruits, and African oil, were mainly planted in the land areas.

The participant believed that,
Before, the source of income was enough only to buy basic needs and things. But now, because of tourism, you cannot buy more than before. A stable business helps me improve my house. That is where I get my income.

3.4 Planet as Sustainable Local Tourism
Table 4 shows the subthemes of Profit as Sustainable Local Tourism.

Table 4. *Subthemes as Planet as Sustainable Local Tourism*

Sub-themes	Description
Safe and Peaceful Environment	The tourism site was funded to undergo rehabilitation.
Maintenance and cleanliness	The tourist site will be provided with a caretaker to maintain cleanliness.
Sustainable living	The presence of visitors and the community's income. Business keeps on going.
Environmental Conservation	Raise awareness among the community about the importance of caring for trees and prohibit the use of pesticides.

An ideal sustainable local tourism is tied to the planet. This is because the environment is the source of all our needs. The participants defined the planet as a sustainable regional tourism destination with a safe and peaceful environment, sustainable living, and environmental conservation. Sustainable tourism, to be considered a secure and peaceful environment, has a strong connection with the harmonious coexistence of the community. The community, as stewards, fosters a quiet living environment, welcoming visitors who wish to travel. During the interview, the participants stated that while tourists enjoyed nature's beauty, nature needed to rest for a while to regenerate and be restored: the DoT and the LGU funded and rehabilitated the tourism site. The strong support of government agencies made tourism sustainable, and it continued to expand its resources and create more realistic opportunities in the industry. Rehabilitating the area ensured visitors' safety, allowing them to enjoy the peaceful environment they deserved.

Tourism has become a sustainable source of income and shelter. The community's dependency on tourism was characterized by optimal security and safety monitoring, improved infrastructure, and the support of the local government unit (LGU) and stakeholders for the community. Tourism's impact on participants' income is believed to be caused by economic uplift. To achieve a sustainable lifestyle, tourists' visits were necessary.

For the participants,
Sustainable living is when there are visitors every day for viewing. When they try to claim in the UK Peak, they will probably enjoy the area's scenic beauty.

Moreover, the province of Cotabato is dedicated to promoting environmental protection and sustainable tourism. It focused on conserving a destination's natural environment and cultural legacy. Its operations guarantee that it is organized and managed to minimize the adverse effects on nature and local people. For the participants, activities concerning environmental conservation were initiated. The LGU initiated tree planting as part of their consensus agreement with the DENR to protect the environment. Designated garbage bins were located at various points throughout the tourist site. The community has demonstrated a favorable level of participation in tourism-related environmental protection. It suggests that green growth policies for environmental protection concern carbon emissions (Idroes et al., 2024). Environmental approach to minimize

emissions contributions (Dolnicar & Greene, 2025). Further, the balance between economic growth and environmental conservation (Ha Van et al., 2024).

3.5 Elkington's Triple Bottom Line approach

Elkington's Triple Bottom Line approach to sustainability emphasizes profit, people, and the planet, or the 3Ps (Elkington, 2013). This paper presents various perspectives on defining sustainability, utilizing tourism as a focal point. It defines sustainable tourism in four Ps: the process of Transition from Peace toward Sustainable Local Tourism. These domains include places, people, profit, and the planet. More importantly, places are given a distinct concept due to the presence of tourism, unlike the TBL approach, which discusses places within the context of the planet. The 4Ps concept encompasses a different domain that is highly significant to tourism. Places in sustainable local tourism play an important role in promoting tourism.

In Galtung's positive peace theory, the environment is crucial to an individual's ecological well-being. He believes that the environment must be adequately protected against human activities. The planet represents the habitat where humans are dependent on what it produces. If people destroy the environment, they also destroy their future, lives, and everything else. In conclusion, places that are the domain of sustainable tourism are important to include in discussions of sustainable tourism.

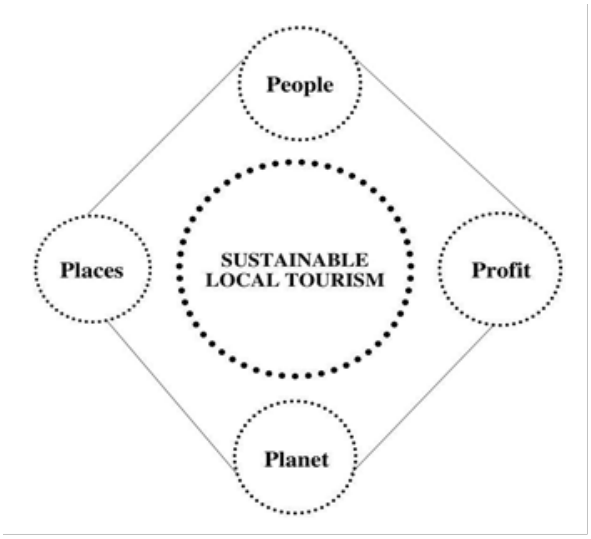

Figure 1. *A Framework for Creating Sustainable Local Tourism*

This research presents the newly created framework for creating sustainable local tourism. The domain of people is present, which is essential in actualizing peace and sectoral initiatives. This process includes the actors and imitators of peacebuilding activities, which include security forces, the community, the private sectors, and the LGU. Their role is to identify perceivable problems that might hinder the process of taking peacebuilding activities and the effects on the development of peace in their local areas. The domain of profit is present, offering economic resources to the community, facilitating commercialization activities, and attracting investment. It identifies perceptions of financial means and situations during conflict or economic disturbance. The economic means and coping interventions will help determine a basis for offering solutions to their losses. Tourism development is initiated with the community and LGUs' participation, alleviating local communities' economic stability. The government supports the strong demand for crop production, which will benefit farmers by improving their income and maximizing land area productivity.

Moreover, the domains of places and the planet significantly impact sustainable tourism. The primary requirement for tourism is that the place must be secure. This means the place is free from conflicts and has a stable security presence. The community and the tourists are enjoying the place. The planet, representing the environment and nature, should be valued as a natural resource. This means that while the community improves the area, it must also respect and secure it. They need to avoid human destruction that might endanger the natural environment. Within the process, agents must be visible to maintain security. It also encourages community participation in maintaining the area's security.

4.0 Conclusion

Sustainable tourism remains relevant to the country's and community's economic welfare and development. However, one domain that should be highlighted is places. In sustainable local tourism, it is the priority to establish and maintain a sense of attachment to places. In Elkington's Triple Bottom Line Approach, other domains, such as planet, people, and profit, have impactful contributions, especially in business sectors. However, what remains for local tourism sustainability is the participation of these four domains. In the case of Cotabato province, the tourism conflict was a disturbing problem, and places needed to be secured.

In conclusion, participation and support mechanisms established among the government, community, and private agencies are recommended. Considering the province's multicultural characteristics, further study is evident to protect, respect, and value the heritage that has been borne in the area. The attractions that tourism has developed may even affect the practices of the tri-people living within the tourist destinations, while local sustainable tourism is increasingly observed. It must also consider the government agencies, particularly the tourism sector, to provide adequate funding to improve their policies on security matters, where tourism activities are evident in the coming and going of tourists, and implement wider dissemination of agricultural opportunities to the local community for profitable business.

5.0 Contributions of Authors

The researcher is the sole author of this study.

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7.0 Conflict of Interests

This research declares no conflict of interest.

8.0 Acknowledgment

None

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Implementation and Effectiveness of Sustainable Cooperative Management Practices

Ruth Ann Marie B. Attolba-Aquino*, Marc Oliver B. Castañeda
Saint Louis University, Baguio City, Philippines

*Corresponding Author Email: 2009071@slu.edu.ph

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Abstract. This study examined the implementation and effectiveness of sustainable cooperative management practices, focusing on the core management functions: planning, organizing, directing, and controlling. Guided by the Resource-Based View Theory, Sustainable Development Theory, Fayol's Principles of Management, and Stakeholder Theory, the study addressed a research gap: limited literature on the operational and managerial strategies that drive cooperative sustainability at the local level. A descriptive-quantitative design was utilized, surveying 201 cooperative managers and board members selected through simple random sampling. Statistical analyses, including medians and Spearman's rho correlation, were applied. Findings revealed that management practices were highly implemented across all functions. Planning (Mdn = 3.95) was strong in strategic and financial planning but weaker in market research (Mdn = 3.44). Organizing showed robust governance (Mdn = 3.90) but moderate technological integration (Mdn = 3.35). Directing emphasized leadership and communication (Mdn = 4.01), while feedback mechanisms were less developed. Controlling was highly implemented in financial monitoring (Mdn = 4.04) but needed stronger performance evaluation systems (Mdn = 3.50). Effectiveness ratings were Highly Effective in the social (Mdn = 4.11) and economic (Mdn = 3.80) aspects, and Very Highly Effective in the environmental aspect (Mdn = 4.22). Strong and statistically significant correlations (ρ = 0.511–0.736, $p < 0.05$) were found between the implementation of management practices and sustainability outcomes. Key challenges included limited financial and human resources (Mdn = 3.54) and underdeveloped performance assessment systems. A sustainability framework was proposed to address these gaps, emphasizing strategic planning, technological integration, and strengthened monitoring. The study offers practical implications for cooperative leaders, stakeholders, and policymakers in enhancing sustainable management practices and achieving long-term resilience.

Keywords: Cooperatives; Sustainable management practices.

1.0 Introduction

Cooperatives are increasingly recognized as pivotal for achieving sustainable economic and social development due to their foundational structure, which promotes inclusivity and community welfare. Member-owned enterprises contribute significantly to poverty alleviation, financial stability, and democratic governance. Research has shown that cooperatives can lead to shared prosperity by fostering an environment where members collaboratively manage resources and benefits, thus emphasizing their role in sustainable business practices (Díaz de León et al., 2021; Muhardi et al., 2022). The literature also emphasizes the importance of integrating cooperative principles into management strategies, aligning them with sustainability goals, which bolsters economic viability and social responsibility among cooperatives (Bogoviz et al., 2022).

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The Resource-Based View (RBV) provides a theoretical framework to understand how cooperatives can leverage internal capabilities, such as governance, management structures, and strategic planning, to respond to external pressures and ensure long-term sustainability effectively (Gatawa, 2022; Mabalay et al., 2024). Studies indicate that cooperatives with robust internal resources can improve efficiency and member engagement, especially when addressing financial instability and operational management (Yuhertiana et al., 2022). Furthermore, Sustainable Development Theory underscores cooperatives' need to balance economic viability with environmental stewardship and social equity, promoting holistic approaches to community welfare (Dimas et al., 2022).

Management principles, notably Fayol's framework, further elucidate how cooperatives can achieve operational efficiency and strategic alignment with sustainability objectives. Fayol's planning, organizing, directing, and controlling principles underscore the importance of structured governance and participatory decision-making, which are critical for enhancing cooperative resilience and social effectiveness (Galang et al., 2020). Effective management practices optimize resource allocation and establish accountability, which is paramount in adapting to evolving community needs and environmental challenges (Rizky et al., 2024).

Engagement with stakeholders is essential in this regard. The Stakeholder Theory posits that managing relationships with various stakeholders, including members, customers, and external partners, is vital for enhancing cooperatives' sustainability and social responsibility (Marín-González et al., 2023). This is particularly evident in regions where cooperatives serve as pillars in rural and urban economies, providing essential financial services and livelihood opportunities (Oliveira & Bertolini, 2024). By actively involving stakeholders and aligning their interests with cooperative goals, organizations can fortify their operational frameworks and better navigate systemic challenges like management inefficiencies and financial sustainability (Holubčík et al., 2022).

Indeed, while cooperatives possess immense potential for fostering community development, many face obstacles that necessitate implementing sound management practices (Alfarizi & Hidayatullah, 2022). Studies demonstrate that cooperatives contributing to community growth through innovative financial services depend on structured management processes (Dumaguit & Sal, 2021; Mallo, 2025). Research highlights that effective planning, organizing, directing, and controlling are critical for empowering cooperatives and ensuring their long-term viability and community impact (Amelia et al., 2023).

Through these comprehensive insights, it becomes evident that cooperatives embody powerful vehicles for sustainable socioeconomic progress, particularly when underpinned by robust management frameworks and stakeholder engagement approaches. Thus, cooperatives reinforce their indispensable role in advancing community development objectives. While global research highlights the critical role of cooperatives in promoting sustainable development, it is essential to examine how these insights translate into specific national and local contexts. In the Philippines, cooperatives have emerged as vital institutions supporting rural and urban communities by providing financial access, employment, and community empowerment. Notably, these institutions empower marginalized communities, enhancing their socioeconomic conditions (Balingbing, 2024). Government efforts to promote cooperative development are significant; however, many cooperatives struggle with challenges related to management efficiency and financial sustainability (Muhardi et al., 2022). To address this, understanding the operational dynamics and effectiveness of management practices within these cooperatives is crucial. A systematic review highlights gaps in current research regarding implementing sustainable management within cooperatives (Benavides & Ehrenhard, 2021).

In Tabuk City, local cooperatives provide financial services and employment opportunities and engage in capacity-building initiatives (Gas-ib-Carbonel, 2019). Evidence suggests that the effectiveness of these cooperatives is intrinsically linked to their management practices, including planning, organizing, directing, and controlling (Larasdiputra, 2023). Fields like cooperative learning have shown that structured management can significantly enhance employee performance and community engagement, indicating a clear connection between effectively implemented management practices and positive outcomes (Shinde & Shinde, 2022). As cooperatives face increasing pressures from external markets and internal resource constraints, assessing their management practices becomes imperative to ensure operational sustainability and enhanced community development.

While numerous studies have explored the role of cooperatives in promoting sustainable development, much of the existing literature has primarily focused on their social and economic contributions or their alignment with global sustainability goals. However, limited research delves into the sustainable management practices of cooperatives, particularly in local contexts such as Tabuk City, Kalinga. Previous studies in this region have examined cooperatives' socioeconomic profiles, financial performance, and social impacts, often without addressing the operational and managerial strategies that drive their sustainability. This study aimed to address this gap by providing a focused analysis of sustainable cooperative management practices in Tabuk City, offering insights that can guide cooperatives in optimizing their operations and enhancing their contributions to sustainable development.

This study aimed to comprehensively evaluate the sustainable management practices implemented by cooperatives in Tabuk City, focusing on planning, organizing, directing, and controlling functions. Specifically, the research aimed to determine the level of effectiveness of these practices across social, environmental, and economic aspects. By exploring the relationship between implementation and effectiveness, identifying challenges faced by the cooperatives, and proposing a framework for enhancing sustainable development initiatives, the research aimed to provide valuable insights into improving cooperatives' overall performance and sustainability in Tabuk City.

2.0 Methodology

2.1 Research Design

The research involved a descriptive quantitative study on cooperative management practices for sustainable development.

2.2 Research Locale

The study was carried out in Tabuk City, focusing on the 66 active cooperatives in the area. Tabuk City is a thriving urban center located in Kalinga, Philippines. Situated in the Cordillera region, it is recognized for its rich cultural legacy and beautiful landscapes in its natural state. The city serves as the provincial capital of Kalinga and is a hub for various economic activities, including agriculture, trade, and tourism.

2.3 Research Participants

The total population for the study consisted of four hundred seventeen (417) cooperative managers and members of the board of directors actively involved in collaborative management and sustainable development initiatives. This population's sample size of 201 respondents was computed using Cochran's formula to ensure a representative and statistically valid selection. The study applied specific selection parameters to ensure its relevance and validity. It focused on cooperatives based in Tabuk City, providing data that reflected the local context. Eligible respondents were cooperative board of directors and managers who played a direct and significant role in cooperative management and sustainable development initiatives. The study did not include individuals who were not board of directors or managers, individuals with minimal involvement in cooperative management, and those not actively engaged in sustainable development initiatives. By establishing these selection parameters, the study ensured that it targeted the most relevant cooperatives and individuals, enhancing the collected data's accuracy, reliability, and applicability.

2.4 Research Instrument

A questionnaire was developed based on relevant literature and research objectives. The questionnaire consisted of three sections. The first section collected data on the level of implementation of the management practices employed by cooperatives, focusing on the planning, organizing, directing, and controlling management functions. The second section gathered data on the effectiveness of cooperatives' current sustainable management practices. The third section collected data on the cooperatives' challenges and barriers to implementing sustainable development initiatives.

The questionnaire was content-validated by five experts in the field of cooperatives. The validity test results showed that all the given values were rated as "very valid," indicating that the questions were relevant to addressing the proposed study objectives. The specific validity results were as follows: planning (0.9833), organizing (0.9926), directing (1.000), and controlling (0.9667). For the level of effectiveness, the validity scores were 1.000 across the social, economic, and environmental aspects. The challenges and barriers section also

demonstrated strong validity, with an Aiken's V of 0.9083. After undergoing validity testing, the questionnaire was finalized, enhanced, and proceeded to reliability testing.

The questionnaire was tested for reliability to ensure consistency and accuracy in measuring the intended variables. The reliability testing was conducted through a pilot test with 30 respondents in the Cordillera Administrative Region to determine the questionnaire's reliability. Cronbach's alpha was applied to confirm the questionnaire's reliability, requiring a mean of at least ≥ 0.8 with an interpretation of "very reliable." For the level of implementation of cooperative management practices, Cronbach's alpha values were as follows: planning (0.963), organizing (0.901), directing (0.962), and controlling (0.909). For the level of effectiveness, the reliability coefficients were 0.896 for the social aspect, 0.924 for the economic aspect, and 0.870 for the environmental aspect. Meanwhile, the challenges and barriers section demonstrated strong reliability with a Cronbach's alpha 0.958. The Cronbach's alpha values for all measured factors indicate a very high level of reliability, confirming that the questionnaire is a valid and consistent tool for assessing cooperative management practices and sustainable development.

2.5 Data Gathering Procedure

Before gathering data, permission was obtained from the appropriate authorities. The data-gathering procedures involved 201 cooperative boards of directors and managers. After identifying them and acquiring all relevant permits, the survey questionnaires were distributed to the respondents. The questionnaires were distributed electronically or in person, depending on the respondents' preferences.

2.6 Data Analysis

A 5-point Likert scale was employed to measure the level of implementation and effectiveness of cooperatives' current sustainable management practices and the challenges and barriers they face in implementing sustainable development initiatives. The study also utilized Spearman's rho to analyze relationships in sustainable cooperative management practices. Furthermore, the Likert scale median rating for per-item interpretation was used, which involved calculating each Likert item's median score to understand the responses' central tendency.

2.7 Ethical Considerations

The study's approach always took into account ethical considerations. All respondents' informed consent was acquired, and their privacy and confidentiality were ensured. The study adhered to ethical guidelines and regulations regarding human subject research. Offensive language was avoided in formulating questionnaires, interviews, or focus group questions, and the works of other authors were acknowledged using the APA referencing system. The highest level of objectivity was maintained in discussions and analyses throughout the research, and adherence to data protection laws was ensured. The study adhered to the Philippine Data Protection Act of 2012.

3.0 Results and Discussion

3.1 Implementation of Current Sustainable Management Practices of Cooperatives

Planning Phase

Cooperatives in Tabuk City exhibit a Highly Implemented (HI) level of sustainable management practices in the planning phase, demonstrating a strong commitment to strategic and financial planning (see Table 1). The highest-rated aspect, medium-term strategic planning, focuses on setting achievable goals over a 3–5-year period, aligning with Henri Fayol's planning principles and Resource-Based Theory on effective resource utilization (Fernandez-Guadaño et al., 2020; Mbuthia & Ragui, 2023; Rana, 2024). In contrast, market research and analysis received the lowest score, indicating room for improvement in assessing customer needs, market trends, and competition, which are vital for adaptive decision-making and sustained success, as supported by Contingency and Stakeholder Theories (Zakaria et al., 2021). While cooperatives perform well in long-term planning, financial planning, and planning consistency, areas like risk assessment, contingency planning, and project-specific business plans show potential for further development. Existing literature highlights the importance of integrating risk management and market analysis to build resilience and ensure long-term sustainability in dynamic environments (Radhakrishnan et al., 2018; Chaudhuri et al., 2020; Mishra, 2020; Nyuydine Wirba et al., 2020) .

The results imply that while strategic and financial planning capabilities are strong, cooperatives may struggle

with adaptability and innovation without deeper investment in market research and risk management practices. To sustain growth and resilience, cooperative leaders must prioritize developing systems for environmental scanning, competitive analysis, and proactive risk planning. Strengthening these areas would enhance responsiveness to external changes and foster a more agile and resilient organizational culture capable of thriving under uncertainty.

Table 1. *Implementation of the Current Sustainable Management Practices of Cooperatives in terms of the Planning Phase*

Indicators		Mean	Interpretation
1.	The cooperative engages in long-term strategic planning to define the organization's vision, mission, and objectives.	3.88	Highly Implemented
2.	The cooperative engages in medium-term strategic planning to define the organization's vision, mission, and objectives.	4.01	Highly Implemented
3.	The cooperative develops detailed business plans for specific projects or initiatives that outline the goals, timeliness, budgets, and strategies they plan to implement.	3.78	Highly Implemented
4.	The cooperative creates financial plans to budget, forecast, and project finances for sustainability and the proper allocation of resources.	3.88	Highly Implemented
5.	The cooperative conducts market research and analysis to understand market trends, customer needs, and competition to make informed and planned decisions.	3.44	Highly Implemented
6.	The cooperative creates contingency plans in case of emergencies and unforeseen circumstances that help in crisis management and minimize loss.	3.69	Highly Implemented
7.	The cooperative creates consistent plans in order to remain adaptable and flexible in various situations.	3.86	Highly Implemented
8.	The cooperative identifies and assesses risks and plans according to them to mitigate potential losses and challenges.	3.76	Highly Implemented
Overall Result		**3.95**	**Highly Implemented**

Legend: VHI – Very Highly Implemented, HI – Highly Implemented, MI – Moderately Implemented, LI – Less Implemented, NI – Not Implemented

Moreover, the data suggest a need for capacity-building initiatives specifically aimed at improving technical planning skills - such as conducting market studies, developing contingency protocols, and designing flexible business plans. These initiatives can be supported by partnerships with government agencies, educational institutions, and private sector advisors specializing in cooperative development.

Organizing Phase

Cooperatives in Tabuk City exhibit a High Level of Implementation (HI) of sustainable management practices in the organizing phase, highlighting strong governance, participatory decision-making, and training (see Table 2). The highest-rated aspect- establishing clear governing structures- underscores the importance of leadership and defined roles in ensuring sustainability. However, lower scores in technological adoption, conflict resolution, and recognition indicate areas for improvement. Challenges in integrating modern systems reflect resource constraints and adaptability, as discussed in Resource-Based and Contingency Theories (Omotosho & Anyigba, 2019; Wang et al., 2019), while studies also stress that conflict management and inclusive governance enhance cooperative sustainability and resilience (Micu & Necula, 2019; Wilson et al., 2019; Damayanthy et al., 2020).

Table 2. *Implementation of the Current Sustainable Management Practices of Cooperatives in terms of the Organizing Phase*

Indicators		Mean	Interpretation
1.	The cooperative establishes clear governing structures, such as the board of directors, appointed committees, and the management team. They have clearly defined roles, responsibilities, and duties.	4.31	Very Highly Implemented
2.	The cooperative develops strategies for the recruitment of new members and the development of existing ones.	3.99	Highly Implemented
3.	The cooperative ensures that each employee and member has a voice in business affairs and participates in decision-making.	4.23	Very Highly Implemented
4.	The cooperative offers training and educational programs to improve and develop various skills and knowledge for its members and leaders.	4.16	Highly Implemented
5.	The cooperative maintains excellent and effective communication systems that ensure information flows smoothly between various departments and leaders.	4.08	Highly Implemented
6.	The cooperative has effective conflict resolution protocols that help resolve disputes and conflicts within the organization promptly and fairly.	3.83	Highly Implemented
7.	The cooperative implements up-to-date technological systems to help manage data communication and ease workloads. These include software for financial management, member databases, and project management.	3.35	Moderately Implemented
8.	The cooperative has systems and protocols in place for the fair and timely promotion and recognition of the organization's outstanding and performing members and employees.	3.69	Highly Implemented
9.	The cooperative has clear election guidelines in place for the transparency, fairness, and equality of its electoral process.	4.11	Highly Implemented

Overall Result	**3.90**	Highly Implemented

The findings imply that while cooperatives have successfully built strong governance and communication frameworks, their sustainability could be undermined if technological integration and human resource management are not improved. To remain competitive and resilient, cooperatives must invest in digital tools to streamline operations and enhance data management. Improving conflict management protocols and establishing clear recognition and reward systems can also strengthen organizational loyalty and productivity. Addressing these gaps will modernize cooperative management and foster a more adaptive, motivated, and cohesive membership base better equipped to meet future challenges.

Directing Phase

Cooperatives in Tabuk City demonstrate a High Level of Implementation (HI) of sustainable management practices in the directing phase (see Table 3). This indicates strong leadership in setting clear objectives, promoting open communication, and delegating responsibilities, aligned with Henri Fayol's Directing Principle and Sustainable Development Theory (Khanal, 2023; Abella & Bation, 2024). These practices also support the findings of Rincon-Roldan and Lopez-Cabrales (2022), who emphasize leadership's role in guiding sustainable strategies, and Stakeholder Theory, which highlights balancing diverse stakeholder needs. However, relatively lower scores in leadership monitoring and feedback, leadership development, and motivational efforts suggest areas for improvement, reinforcing Systems and Contingency Theories that stress feedback and adaptability (Zakaria et al., 2021; Khanal, 2023). These findings echo Goltsov et al. (2020) and Sumuob and Maghuyop (2020)those who advocate for continuous leadership training and structured feedback mechanisms to enhance cooperative resilience, efficiency, and member engagement. Overall, cooperatives excel at setting goals and encouraging involvement but are relatively weaker in leadership development and performance feedback loops, which are critical for continuous improvement and innovation.

Table 3. *Implementation of the Current Sustainable Management Practices of Cooperatives in terms of the Directing Phase*

Indicators		**Mean**	**Interpretation**
1.	The cooperative invests in leadership development programs to train and prepare members and employees for various leadership roles in the cooperative.	3.91	Highly Implemented
2.	The cooperative establishes clear, open communication lines that let organization members freely communicate with their leaders.	4.11	Highly Implemented
3.	The cooperative's leaders define clear objectives, goals, and decision-making processes and how they impact the organization and the members involved.	4.13	Highly Implemented
4.	The cooperative's leaders motivate its members and employees and recognize their contributions and achievements through financial incentives, non-financial rewards, and recognition.	3.92	Highly Implemented
5.	The cooperative's leaders engage with their employees in various decision-making and problem-solving processes.	4.05	Highly Implemented
6.	The cooperative's leaders monitor operations and gather feedback from their members to make necessary adjustments and improvements.	3.88	Highly Implemented
7.	The cooperative's leaders establish and assure the quality of products or services to meet cooperative standards and customer expectations.	4.01	Highly Implemented
8.	The cooperative's leaders encourage creativity and innovation among its members.	3.94	Highly Implemented
9.	The cooperative's leaders clearly define the tasks and responsibilities of their members and employees and delegate them appropriately to ensure the implementation of approved plans.	4.05	Highly Implemented
Overall Result		**4.01**	**Highly Implemented**

These findings imply that while cooperatives are strong in leading their members toward shared goals, their long-term resilience will depend on strengthening feedback systems and leadership development programs. Without regular monitoring and adaptive management, even well-set goals may fail to respond effectively to changes in the environment or membership needs. Future initiatives should prioritize building structured feedback mechanisms, more formalized leadership succession planning, and encouraging a culture of innovation. Strengthening these areas will sustain current achievements and foster a leadership pipeline and dynamic responsiveness, ensuring the cooperative's adaptability and competitiveness in evolving economic and social landscapes.

Controlling Phase

Cooperatives in Tabuk City demonstrate a High Level of Implementation (HI) of sustainable management practices in the controlling phase, indicating strong governance, particularly in financial monitoring (see Table

4). Key practices, such as maintaining accurate records and adapting policies, emphasize transparency and compliance and align with stakeholder and sustainable development theories (Bridoux & Stoelhorst, 2022; Valentinov, 2023). These practices support cooperative resilience and long-term sustainability (Yuhertiana et al., 2022). However, lower ratings in performance metrics, risk management, and quality assurance highlight areas for improvement, particularly in refining performance measurement systems and risk strategies. This pattern suggests that while operational control is well-practiced, strategic-level evaluation and continuous improvement mechanisms are not yet fully optimized. Mella and Gazzola (2019) suggest that enhancing these aspects using Systems Thinking and Contingency Theory can improve decision-making and performance evaluation. Strengthening these practices will enhance cooperative governance, operational efficiency, and sustainability.

Table 4. *Implementation of the Current Sustainable Management Practices of Cooperatives in terms of the Controlling Phase*

Indicators		Mean	Interpretation
1.	The cooperative monitors its operations' financial status and health and regularly reviews its financial statements, budget, and cash flow to control and manage expenses, revenue, and financial risks.	4.10	Highly Implemented
2.	The cooperative employs the use of performance metrics and performance indicators to measure the success and productivity of the organization in achieving its goals.	3.50	Highly Implemented
3.	The cooperative implements quality measures to ensure products and services meet the quality standards set.	3.82	Highly Implemented
4.	The cooperative continuously manages risks that can be encountered and develops risk mitigation strategies to minimize adverse circumstances and events.	3.81	Highly Implemented
5.	The cooperative maintains accurate records and documentation of its activities, financial transactions, and decisions for the sake of transparency and compliance.	4.17	Highly Implemented
6.	The cooperative maintains updates of the operational policies in order to prevent any faults and mishaps from occurring.	4.07	Highly Implemented
Overall Result		**4.04**	**Highly Implemented**

The findings imply that to sustain long-term resilience, cooperatives must move beyond traditional financial control and invest in building comprehensive performance measurement and risk assessment frameworks. Without robust performance indicators, it will be difficult for cooperatives to evaluate their actual impact, identify inefficiencies, and innovate. Strengthening risk management strategies and enhancing quality assurance systems will prepare cooperatives for future uncertainties and competitive pressures. These improvements are crucial for safeguarding operational stability and enabling growth, continuous innovation, and higher member satisfaction in a dynamic cooperative sector.

3.2 Effectiveness of Current Sustainable Management Practices of Cooperatives

Table 5 presents the effectiveness of sustainable management practices among cooperatives in Tabuk City regarding social, economic, and environmental dimensions. The findings reflect a generally high commitment to sustainability, though with varying degrees of strength across the three aspects.

Social Aspect

Cooperatives in Tabuk City demonstrate strong effectiveness in their social sustainability practices. High levels of community involvement and inclusive decision-making highlight active engagement with stakeholders, aligning with the principles of Stakeholder Theory (Robson et al., 2021; Yakar Pritchard & Çalıyurt, 2021). These practices are consistent with research emphasizing participatory governance and community-based action (Adabanya et al., 2023). However, indicators related to addressing social inequalities and community assistance were comparatively lower. This reflects challenges in broadening inclusivity efforts, a concern also raised by Abella and Bation (2024). As Candemir et al. (2021) noted, measuring social outcomes remains complex, highlighting the need to deepen social capital through trust-building and reciprocal relationships. The median score reinforces the perception that, while generally effective, some aspects of social equity require strategic attention.

The high effectiveness of cooperatives in fostering community involvement and participatory decision-making suggests a strong alignment with inclusive governance and stakeholder engagement. However, slightly lower scores in addressing social inequalities and community assistance indicate that while cooperatives are socially active, there is room to improve in reaching marginalized groups and expanding social impact. To strengthen social sustainability, cooperatives should enhance targeted initiatives for vulnerable populations and establish structured community outreach programs. Embedding social equity indicators into their management systems can also help measure and improve inclusivity outcomes over time.

Table 5. *Effectiveness of the Current Sustainable Management Practices of Cooperatives*

Indicators	Mean	Interpretation
Social		
1. The cooperative involves themselves in the activities of the community to foster positive relationships with them and have a positive impact on their projects and programs.	4.34	Very Highly Effective
2. The cooperative involves its members and the community in the decision-making process to welcome new ideas and promote equality among all those involved.	4.16	Highly Effective
3. The cooperative sets standards for work practices and ethics that can affect other cooperatives within the area and positively influence the community.	4.05	Highly Effective
4. The cooperative's sustainable management practices help address social inequalities and promote inclusivity among its members and community.	3.95	Highly Effective
5. The cooperative helps improve its community through donations, fundraisers, healthcare and education programs, and other forms of aid and assistance.	3.99	Highly Effective
Overall	**4.11**	**Highly Effective**
Economic		
1. The cooperative can provide employment opportunities for unemployed individuals within the community.	3.43	Highly Effective
2. The cooperative helps in fostering entrepreneurship within the community to assist in alleviating individuals from poverty.	3.59	Highly Effective
3. The cooperative provides long-term financial sustainability and the potential for stable economic growth within the community.	3.75	Highly Effective
4. The cooperative provides investment opportunities to members of the community and promotes their cooperative as a safe and stable investment that can benefit the community.	3.86	Highly Effective
Overall	**3.80**	**Highly Effective**
Environmental		
1. The cooperative's sustainable management practices help promote environmentally friendly practices and activities that keep the community healthy, clean, and safe.	4.25	Very Highly Effective
2. The cooperative's sustainable management practices help provide environmental education, environmental awareness, and environmental advocacy efforts.	4.12	Highly Effective
3. The cooperative positively impacts the community's environmental and ecological state and helps protect and enhance its ecosystem.	4.15	Highly Effective
4. The cooperative complies with environmental regulations (such as acquiring the necessary permits) imposed by local, national, and international authorities.	4.32	Very Highly Effective
5. The cooperative's sustainable management practices include applying environmentally friendly methods that help reduce and properly dispose of waste, minimize energy consumption, and implement recycling programs.	4.20	Highly Effective
Overall	**4.22**	**Very Highly Effective**

Note: VHE – Very Highly Effective, HE – Highly Effective, ME – Moderately Effective, LE – Less Effective, NE – Not Effective

Economic Aspect

Economic effectiveness is evident in cooperatives' contributions to investment opportunities and financial sustainability, aligning with Resource-Based Theory, which emphasizes using internal capabilities for resilience (Zhou et al., 2021). These findings also support Yu et al. (2022), who stress the importance of local economic collaboration for sustainable development. Nonetheless, weaker performance in employment generation and entrepreneurship support reveals areas for growth. Deng et al. (2021) highlight the limited role of cooperatives in job creation, often due to underutilized social capital. This concern is echoed by Muangasame & Tan (2023), who stress the need for robust economic frameworks, and by Doloan (2024), who note that economic underperformance may hinder broader cooperative goals. The median score here reflects that some foundational aspects need strengthening, while cooperatives are generally economically practical.

Although cooperatives are seen as economically practical, especially in providing investment opportunities and promoting financial stability, the relatively lower scores in job creation and entrepreneurship support reveal untapped potential in driving grassroots economic growth. This suggests that cooperatives may operate more as financial service providers than active economic engines. To enhance their monetary role, cooperatives should diversify income-generating services, provide entrepreneurship training, and forge partnerships with local businesses and LGUs to boost employment and enterprise development.

Environmental Aspect

Cooperatives show the highest level of effectiveness in environmental sustainability. Substantial compliance with environmental regulations and engagement in community health initiatives reflect alignment with Systems Theory and the Sustainable Development Framework (Canwat, 2023). These practices indicate a solid integration of ecological priorities into operations.

Still, relatively lower scores in environmental education and ecological impact point to the need for enhanced advocacy and awareness-building. As Dudka and Magnani (2024) advocates argue, compliance alone is not sufficient—education and behavioral change are essential for long-term sustainability. Fayol's Directing Principle underscores the role of leadership in steering these efforts. The median score confirms a strong environmental commitment, though deeper community engagement through education remains vital.

Environmental effectiveness was the strongest among the three dimensions, with particularly high ratings in regulatory compliance and promoting eco-friendly practices. These indicate that cooperatives have successfully institutionalized ecological responsibility. However, slightly lower scores in environmental education and advocacy suggest a need to go beyond compliance by actively cultivating environmental awareness among members and communities. Cooperatives should invest in environmental training, community campaigns, and green innovations to deepen ecological impact and influence sustainable behavior. Doing so will not only enhance their environmental contribution but also solidify their reputation as proactive sustainability leaders.

3.3 Relationship between Level of Implementation and Effectiveness of Current Sustainable Management Practices

Table 6 presents the Spearman-rho correlation coefficients indicating strong and statistically significant relationships between the level of implementation- planning, organizing, directing, and controlling- and the level of effectiveness- social, environmental, and economic- of sustainable management practices in cooperatives in Tabuk City. These findings affirm the practical relevance of classical and modern management theories. Planning demonstrated strong connections to all effectiveness dimensions, reinforcing Fayol's and Sustainable Development Theory's emphasis on the foundational role of strategic planning (Hristov & Chirico, 2019; Kurowksa et al., 2021; Basuki, 2024). Organizing also showed consistent positive relationships with effectiveness, validating principles from Fayol, Systems Theory, and Stakeholder Theory, which highlight how proper structure and stakeholder collaboration enhance sustainability (Keating et al., 2024; Wijesundara et al., 2024). Directing revealed the importance of leadership in aligning goals and motivating stakeholders, supported by Fayol's directing principle and Contingency Theory (Hristov & Chirico, 2019; Keating et al., 2024; Wijesundara et al., 2024). Controlling showed meaningful correlations with sustainability outcomes, underscoring the importance of monitoring and feedback mechanisms, as supported by Systems Theory, Sustainable Development Theory, and Fayol's Principles (Hristov & Chirico, 2019; Kurowksa et al., 2021; Keating et al., 2024). These empirical results support the Resource-Based View, which posits that strong internal capabilities such as governance structures and leadership contribute to long-term sustainability (Candemir et al., 2021; Junges et al., 2022). In line with Stakeholder Theory, the findings also emphasize that participatory decision-making and managing stakeholder relationships enhance cooperative effectiveness (Taruvinga et al., 2021; Velandia et al., 2022; Ingutia & Sumelius, 2024). Additionally, evidence from studies on youth involvement in cooperatives supports the idea that training and engagement improve responsiveness to stakeholder needs and overall sustainability (Velandia et al., 2022). The relationship between controlling and sustainability effectiveness further highlights the need for risk management and continuous improvement, aligning with the findings of Malekpour et al. (2020) and Valero-Amaro et al. (2021), who stress that consistent evaluation fosters innovation and strategic alignment with long-term sustainability goals.

Table 6. Correlation between *Level of Implementation and the Level of Effectiveness of the Current Sustainable Management Practices of Cooperatives*

Predictor	Response	ρ	Interpretation	p
Planning	Social	.63	Strong Relationship	<.001*
	Environmental	.63	Strong Relationship	<.001*
	Economic	.53	Strong Relationship	<.001*
Organizing	Social	.73	Very Strong Relationship	<.001*
	Environmental	.61	Strong Relationship	<.001*
	Economic	.67	Strong Relationship	<.001*
Directing	Social	.61	Strong Relationship	<.001*
	Environmental	.52	Strong Relationship	<.001*
	Economic	.60	Strong Relationship	<.001*
Controlling	Social	.61	Strong Relationship	<.001*
	Environmental	.60	Strong Relationship	<.001*
	Economic	.51	Strong Relationship	<.001*

**significant @ ≤ 0.05*

The strong positive relationships between implementation and effectiveness suggest that sustainability in cooperatives is not incidental - it is built deliberately through structured management processes. First, cooperatives must recognize that strengthening internal organizational frameworks, particularly in governance (organizing), directly impacts building social capital and driving community development. Enhancing member engagement, accountability systems, and decision-making inclusiveness can further amplify social effectiveness. Second, strategic planning must go beyond traditional goal setting to incorporate flexible, market-responsive strategies that adapt to changing community needs and environmental realities. The strong link between planning and environmental/economic outcomes shows that sustainability must be an intentional part of early planning stages, not an afterthought. Third, leadership development should be a continuous investment. As directing showed strong correlations across all dimensions, fostering transformational leadership that motivates innovation, environmental stewardship, and inclusive economic participation is critical for future-proofing cooperatives. Finally, although controlling shows the "weakest" relative correlation, its role in risk management, transparency, and performance monitoring should not be underestimated. Cooperatives must strengthen their evaluation and corrective mechanisms, particularly through digital tools and key performance indicators, to close the feedback loop and ensure consistent progress toward sustainability goals. In short, the findings imply that cooperatives must approach sustainability holistically - integrating robust governance, forward-looking strategies, empowering leadership, and continuous monitoring to realize resilient, inclusive, and environmentally responsible growth.

3.4 Challenges and Barriers in Implementing Sustainable Development Initiatives

Table 7 highlights the perceived challenges cooperatives face in Tabuk City when implementing sustainable development initiatives. Cooperatives agree that limited financial and human resources are significant barriers, while other challenges, such as difficulties in collaboration and weak internal communication, are considered less critical. The neutral stance on several challenges suggests mixed experiences or uncertainty about their impact, indicating a need for further investigation into why some barriers are more pronounced in certain cooperatives.

Table 7. *Challenges and Barriers in Implementing Sustainable Development Initiatives*

Indicators		Mean	Interpretation
1.	The cooperative is over-controlled and regulated by the government, which can hinder the autonomy and effectiveness of the cooperative in implementing sustainable management practices.	2.96	Undecided
2.	The cooperative has limited access to credit.	3.17	Undecided
3.	The cooperative has limited financial and human resources in order to invest in sustainable development initiatives.	3.54	Agree
4.	There is a weak internal communication system or poor communication among the members and stakeholders.	2.75	Undecided
5.	There are limited skills in cooperative management and governance (a lack of expertise in cooperative management and governance) in implementing sustainable management practices.	2.97	Undecided
6.	The cooperative focuses more on short-term financial gains than long-term sustainability and does not invest in sustainable developmental initiatives.	3.23	Undecided
7.	The cooperative lacks awareness and education on sustainability principles and potential benefits for sustainable development.	2.82	Undecided
8.	The cooperative has difficulty collaborating and coordinating with other organizations, government bodies, and stakeholders in developing and implementing a sustainable development initiative.	2.74	Undecided

Note: SA – Strongly Agree, A – Agree, U – Undecided, D – Disagree, SD – Strongly Disagree

The Resource-Based Theory aligns with the finding that financial and human resources are essential for implementing sustainability initiatives, as these factors determine organizational success (Egorov & Inshakov, 2023). Similarly, Sustainable Development Theory stresses that ongoing investment is necessary for long-term sustainability (Fernandez-Guadaño et al., 2020). The lower concern regarding collaboration difficulties supports Stakeholder Theory, which suggests that external partnerships enhance sustainability initiatives, while Systems Theory indicates that cooperatives may already have established networks (Melane-Lavado & Álvarez-Herranz, 2020; Valentinov, 2023). The overall uncertainty about the impact of various challenges reflects findings by Rahmadhani et al. (2022) and Miranda-García and Segovia-Vargas (2024), which emphasize financial constraints as major barriers to sustainability. Moreover, the study illustrates how financial constraints often take precedence over ecological goals, as discussed by Kervall and Pålsson (2023), and restrict the adoption of sustainable practices. Lastly, while governance frameworks and over-regulation are acknowledged, financial sustainability remains the primary concern for cooperatives, as noted by (Esamah et al., 2023; Hu & Zeng, 2024).

The findings hint at a deeper issue - not just the existence of barriers, but the limited organizational capacity to identify and respond to them effectively. The lack of consensus and clarity on most challenges suggests that many cooperatives may not yet have systems to assess internal weaknesses or anticipate future sustainability risks.

The strong agreement on resource limitations confirms that capacity-building must be a top priority. This includes financial support mechanisms (e.g., better credit access, investment partnerships) and human capital development through governance training, technical education, and leadership development. The widespread uncertainty about most other barriers presents a critical opportunity for awareness-raising. Cooperatives need diagnostic tools, such as sustainability audits or internal organizational assessments, to help them understand where they are vulnerable. These tools can guide strategic planning and prevent underestimating emerging challenges such as poor stakeholder coordination or lack of sustainability awareness. Additionally, the undervalued role of collaboration is a missed opportunity. Strengthening linkages with government agencies, NGOs, and other cooperatives could unlock access to resources, training, and innovation. Programs incentivizing multi-sector partnerships or knowledge-sharing among cooperatives could reduce isolation and boost collective resilience. Lastly, the apparent short-term orientation of some cooperatives should be addressed through policy and education. Even if not universally perceived as a significant issue, overemphasizing immediate financial returns can erode long-term sustainability efforts. Promoting success stories of cooperatives that balanced profitability with sustainability could shift this mindset.

3.5 Framework for Enhancing Sustainable Development Initiatives in Cooperatives

The Sustainable Cooperative Management Framework (Figure 1) is a strategic model designed to enhance the long-term viability of cooperatives in Tabuk City by integrating sustainability principles with core management functions.

Figure 1. *Proposed Framework*

Based on the study's findings, it addresses gaps in cooperative management, focusing on social, environmental, and economic sustainability. The framework provides a clear pathway to improve operational efficiency,

adaptability, and resilience by aligning planning, organizing, directing, and controlling with sustainability goals. It promotes social sustainability through inclusive governance and community engagement, environmental sustainability by encouraging responsible resource use and compliance, and economic sustainability by enhancing financial stability and risk management. The framework integrates management functions to strengthen strategic planning, governance structures, leadership, and performance monitoring. It also offers actionable recommendations, such as improving market research, investing in digital transformation, and expanding financial sustainability strategies. Adopting this framework will help cooperatives enhance sustainability, strengthen governance, and optimize resource management, positioning them as key drivers of sustainable development in Tabuk City.

4.0 Conclusion

This study provides a comprehensive evaluation of the sustainable management practices of cooperatives in Tabuk City, focusing on the core management functions of planning, organizing, directing, and controlling. The findings revealed a high level of implementation across all phases, reflecting a strong organizational commitment to sustainability. Cooperatives demonstrated particular strength in strategic and financial planning, participatory governance, transparent operations, and environmental compliance. A statistically significant correlation was also established between the level of implementation and the effectiveness of these practices in achieving social, economic, and ecological goals. Organizing practices showed the strongest link to sustainability outcomes, highlighting the value of inclusive structures, active member participation, and clearly defined roles. These findings affirm the applicability of classical management theories, such as Fayol's principles, along with modern frameworks like the Resource-Based View, Sustainable Development Theory, and Stakeholder Theory.

Despite these strengths, several areas require improvement. Weaker performance in market research, technological adoption, performance monitoring, and risk management indicates the need for innovation and long-term adaptability. Additionally, while environmental sustainability scored highest, the economic and social pillars showed greater variability, particularly in job creation, entrepreneurship support, and inclusivity. These gaps call for strategic interventions from both cooperative managers and policymakers. For cooperative managers, specific recommendations include strengthening market intelligence through regular research and environmental scanning; adopting digital technologies to streamline operations and enhance data management; establishing structured feedback systems to support continuous improvement; prioritizing leadership development and succession planning; and creating inclusive programs to help marginalized groups such as women, youth, and indigenous communities. For policymakers and support institutions, recommendations include facilitating access to credit and funding, institutionalizing capacity-building initiatives in partnership with educational institutions, supporting digital transformation through subsidies and infrastructure, promoting inter-cooperative collaboration, and encouraging sustainability reporting to enhance transparency and accountability. This study is not without limitations. Its geographic focus on Tabuk City may limit the generalizability of findings to other regions with different contexts. The cross-sectional design offers only a snapshot in time, restricting insight into long-term trends. Additionally, the reliance on self-reported survey data introduces the risk of social desirability bias, which may overestimate implementation levels. While a Sustainable Cooperative Management Framework was proposed, it has yet to be tested through pilot implementation or longitudinal research.

Future research could address these limitations by conducting comparative studies across rural and urban cooperatives, implementing longitudinal tracking of sustainability outcomes, piloting the proposed framework in selected cooperatives, and exploring themes such as digital readiness, youth and women's leadership, and cross-sector partnerships. Ultimately, this study underscores that sustainable cooperative management is not incidental but a deliberate, structured process that requires integrating inclusive governance, strategic planning, proactive leadership, and continuous monitoring. With these elements in place, cooperatives can play a vital role in driving resilient, inclusive, and environmentally responsible development.

5.0 Contributions of Authors

Ruth Ann Marie A. Aquino – writing, encoding, editing
Marc Oliver Castañeda – supervising, checking

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7.0 Conflict of Interests

The authors declare no conflict of interest in the paper's publication.

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Readiness of Technical Vocational Institutions in the Delivery of Technical Vocational Education and Training for Differently Abled Persons

Rey B. Im-motna
University of Baguio, Baguio City, Philippines

Author Email: reyims1001@gmail.com

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Abstract. Even though inclusive education is getting more attention, we still don't fully understand how Technical Vocational Institutions (TVIs) in Baguio City run Technical Vocational Education and Training (TVET) programs designed for people with disabilities. Therefore, this study investigated the degree of initiative by Technical Vocational Institutions (TVIs) in Baguio City, whether there was low in-placed initiative based on the inclusion criteria, or whether the institution already showed a great degree of initiative. The study then intends to investigate additional factors influencing education inclusion. The study uses a modified and validated survey questionnaire in a mixed-method research design that is anchored in the Vocational Education and Training (VET) toolbox criteria, which consist of five (5) major indicators: Disability Support Unit (DSU), Accessibility, Human Resources, Complaint Mechanism, and Funding for Inclusion. The survey included 12 school heads/administrators with TESDA program registrations in tourism, construction, language, ICT, and health. The research found that most schools lack the initiative and evidence to implement inclusive education. Despite the limited initiative from the institutions, 9 out of the 12 schools adhere positively to some inclusiveness criteria, such as correct designs on doors, gates, stairs, rooms, sanitary conditions, work equipment, and escape and rescue measures. The follow-up interview identifies additional factors influencing the provision of technical training for persons with disabilities (PWD). These factors encompass challenges related to accessibility and infrastructure, financial support and resource limitations, human resource and instructor training, inclusive curriculum and support services, commitment to strategic planning and long-term implementation, attitudinal barriers, and societal stigma. The study recommended establishing a Disability Support Unit (DSU) and dealing with the factors that hinder the full implementation of inclusive education for persons with disabilities.

Keywords: Differently abled persons; Technical Vocational Education and Training; Technical Vocational Institutions; Vocational Education and Training.

1.0 Introduction

According to Nhlapo (2025), of the World Bank, 16% of the world's population has a disability, with the majority being of working age. According to Browne (2017), disability is more common among women and girls (19%) than among men and boys (12%). Employment numbers emphasize disparities: only 20% of disabled women in low-income nations work, compared to 59% of males (European Disability Forum, 2022). These findings highlight the difficulties disabled people experience in gaining equal access to education and work. Motivated by these inequities, the researcher wants to know if the Philippines is effectively addressing the shortage of

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training possibilities through technical education programs for people with disabilities (PWDs). The emphasis is mainly on technical vocational education and training (TVET) institutions in Baguio City, where there is currently little published research on the extent of inclusive implementation.

Multiple international frameworks advocate for integrating disabled students in Technical and Vocational Education and Training (TVET). The United Nations' Agenda 2030 and its 17 Sustainable Development Goals (SDGs) emphasize the principle of inclusivity, encapsulated in the commitment to "Leave No One Behind." SDG 4 highlights the importance of inclusive and equitable quality education, whereas Target 8.5 advocates for full, productive employment and equal remuneration for work of equal value for persons with disabilities (UN DESA, 2015). The UN Convention on the Rights of Persons with Disabilities (CRPD), particularly Article 27, affirms the rights to equal remuneration, access to technical and vocational education and training (TVET), safe working conditions, and opportunities for career advancement. The International Labor Organization (1983) reinforces these principles via Convention No. 100 concerning equal remuneration, No. 111 of the International Labor Organization (1958) addressing non-discrimination, and No. 159 of the International Labor Organization (1983) focusing on vocational rehabilitation and employment for individuals with disabilities. Republic Act 7277, known as the Magna Carta for Persons with Disabilities (PWDs) in the Philippines, defines disability and stipulates the necessity for access to education and employment. Despite existing legislative safeguards, there is a significant lack of comprehensive studies evaluating the actual adherence of TVET institutions to inclusive practices, especially in Baguio City.

A commitment to nondiscrimination, accessibility, equal opportunities, and full involvement of handicapped people with disabilities is outlined in the ILO's 2022–2030 Disability Inclusion Strategy (UNICEF, 2023). However, there are still several obstacles to practical implementation. According to Ebuenyi et al. (2020), barriers to inclusive technical and vocational education include cultural stigmas, rigid curricula, inexperienced teachers, and ambiguous policies. Global best practices demonstrate different success levels. Despite the importance placed on pedagogical and social abilities, a shortage of qualified educators in Germany has worsened disadvantages among young people in transition systems (Peinemann, 2021). Bangladesh, an early signatory to the CRPD, on the other hand, requires all TVET institutions to have a 5% admission quota for students with disabilities (International Labor Organization, 2016). With the help of the 2012 Disability Act and CRPD ratification, Zambia has also made progress toward inclusion by moving from special schools to mainstream vocational training (International Labor Organization, 2016). In towns like Baguio, where educational systems must adapt to suit local demands and international norms, these examples offer crucial insights for the Philippines in assessing and improving inclusive practices in its TVET schools (International Labor Organization, 2017).

Current global research highlights the importance of inclusive practices in vocational education and training (VET), focusing on teacher training and curriculum adaptation to better accommodate people with disabilities and migrants. Matafora (2020) supports the viability of inclusive teacher training. However, Torrano et al. (2022) identify substantial challenges such as educator attitudes, insufficient collaboration, and inaccessible school procedures. UNESCO's TVET Strategy (2016-2021) assists Member States in providing all individuals with the necessary skills for decent work and lifelong learning, focusing on young employment, equity, gender equality, and sustainability (UNESCO, 2021). Despite expanding efforts worldwide, there are still gaps in recognizing the unique issues faced by inclusive VET educators and measuring VET students' viewpoints. This rising corpus of research highlights the need for specific studies in localized contexts, such as Baguio City, Philippines, to assess how inclusive techniques are adapted or whether they exist within technical-vocational education systems.

Moreover, the Department of Health (2024) recorded 889,764 males and 805,121 females with disabilities, the most prevalent of which were physical, speech, and psychosocial. Employment statistics suggest that 51% of people with severe disabilities are unemployed, showing systemic hurdles. The National Council on Disability Affairs (NCDA) classifies disabilities ranging from visual and hearing impairments to rare diseases, but it lacks granular data relevant to towns such as Baguio. Without this, policy formulation remains broad and potentially ineffective in addressing local circumstances. CARAGA area Director Rosalinda Apura's 2016 Disability Prevalence Survey underlined the necessity of localized registries to drive evidence-based programs. For Baguio City, which has a mix of urban and indigenous populations, research is urgently needed to determine whether inclusive education policies and training programs genuinely reach and empower PWDs. Grounded, city-specific data could enable targeted interventions to promote a truly inclusive TVET environment consistent with

national priorities and global development goals.

The Philippine government, under the Magna Carta for Disabled Persons (Republic Act No. 7277), strongly supports the right of people with disabilities (PWDs) to quality education and skill development. Sections 12 and 13 of the Act (1992) require that educational institutions do not deny PWDs entrance based on their impairments and actively consider their special requirements in education policy, infrastructure, and service supply. These include accessible facilities, auxiliary services, and financial aid through scholarships, loans, and subsidies from governmental and private institutions. Despite these rules, implementation and monitoring across regions are variable. According to the 2010 Census of Population and Housing, 1.44 million Filipinos—or 1.57% of the population have a disability, with the majority falling into the working-age group of 15 years and older (TESDA, 2020). Hence, Baguio City, an important educational hub in Northern Luzon with a diverse student population and active technical-vocational schools, requires customized study. While policies exist, there is limited information on how efficiently they are enforced in the city. Are PWDs benefiting from these inclusive demands in local technical-vocational education? Are schools in Baguio City accessible and supportive of PWD students? Addressing these issues through empirical research can give policymakers valuable insights, improve compliance with national mandates, and ensure that inclusive education is a reality rather than a legal ideal.

In the Philippines, the Technical Education and Skills Development Authority (TESDA) has promoted inclusivity through programs such as the Training for Work Scholarship Program (TWSP), which allows PWDs to earn National Certificates (NCs) required for employment both locally and internationally (TESDA, 2020). Ignacio and Tabu (2018) documented excellent TESDA training for PWDs in housekeeping and barista courses, focusing on people with hearing impairments and autism. Although the pilot program produced high certification and employment rates, graduates stayed in temporary positions. These findings show that, while inclusive training is viable, systemic deficiencies in job placement and long-term assistance remain. Despite national agreements, there is little research on how these programs are implemented and sustained in specific localities such as Baguio City. Given the city's changing urban context and its population of working-age PWDs, there is an obvious need to explore whether local institutions provide equal access, adequate accommodations, and viable job routes for PWDs through TVET.

Despite growing global support for inclusive education, some studies have found significant gaps that impede effective implementation. Muzite and Gasa (2024) recognized physical and curricular inaccessibility as essential barriers for students with impairments, emphasizing the importance of localized solutions. Mosalagae and Bekker (2021) show a policy and practice gap, revealing that prevalent exclusionary practices lead to learners' poor academic performance and represent a larger dearth of educated educators capable of providing special needs teaching. Similarly, Okech et al. (2021) identified the lack of proper support networks as a persistent impediment to inclusion. Moreover, Sierra et al. (2025) emphasized the importance of adopting inclusive methods, citing institutional constraints that impede the inclusion of people with disabilities in TVET institutions. Jobir (2025) also stated that underfunding, poor infrastructure, and persistent societal stigma are key barriers to creating truly inclusive educational environments. As the gap was unveiled, the researcher was encouraged to determine the initiative and implementation level of the different training institutions in Baguio City on delivering inclusive education, focusing on differently abled persons, including the underlying factors and barriers in converting their vocational institutions to inclusive schools.

2.0 Methodology

2.1 Research Design

The researcher used a mixed-method type of research for this study, wherein the researcher used quantitative and qualitative methods to gain a deeper understanding of the research problem, which was piloted before deployment of the tools. The collected data through survey questionnaires was interpreted to answer the first problem processed through the weighted mean of the following assessment indicators: disability support unit, accessibility, human resources, complaint mechanism, and funding for inclusion. The quantitative part of the study focused on data collection from school administrators/heads/presidents using the assessment indicators from the assessment of the inclusivity of TVET colleges using the VET toolbox sourced online through vettoolbox.eu, where the researcher modified it. The tool was available online and was highly encouraged by the author to be retrofitted as an assessment criterion for assessing institutions' inclusivity. After the survey, the

researcher conducted follow-up interviews to gather further information as part of the qualitative design of the study. The interview results are treated through a structured thematic analysis for the coding system. This allowed the researcher to propose better recommendations for Vocational institutions in delivering programs to differently abled persons.

2.2 Research Participants

The researcher uses purposive sampling to represent the different sectors in the study locale. The target population of this study is the TVET-registered schools in the City of Baguio that have at least one Certificate of Program Registration (CTPR) under TESDA. The researcher identifies twelve (12) respondents, heads/administrators representing their schools. The respondents were chosen regardless of gender, civil status, number of children, and gross income. The schools come from the list of private and public schools in Baguio City through the records of the Technical Education and Skills Development Authority (TESDA) provincial office, which is responsible for registering schools under the agency and then releasing Certificate of Program Registration (CTPR) that serves as their license to offer TVET programs. The TESDA training centers were not chosen as participants as they already have plans and budgets for inclusivity compared to private schools. Special funded schools (local and international), integrated schools, and government agency-funded schools with vocational programs were also not included in the selection of participants for the research.

2.3 Research Instrument

A standard questionnaire was adopted from the Vocational Education and Training (VET) toolbox, created in 2017. This provides partner countries with know-how, tools, and advice to improve the effectiveness and inclusiveness of VET reforms. Both instruments were pilot tested and validated for reliability by the researchers assigned as tool validators from the University of Baguio Research and Development Center (UB RDC), and they were given a tool validation certificate. The tool comprises five (5) assessment indicators and criteria/statements that must be fulfilled by the institution in delivering their respective TVET programs and must be present and continuously offered. These indicator sets include Disability Support Unit (DSU), with 28 assessment criteria; Accessibility, with 66; Human Resources, with 4; Complaint Mechanism, with 5; and Funding for Inclusion, with 4. Respondent data was collected using a single survey checklist. For the second problem, the researcher conducted a follow-up questionnaire to determine what other reasons Technical Institutions (TVI) perceive as their readiness to deliver Technical Vocational Education and Training (TVET) to differently abled people. One person from each institution answered the respondents' tool. They rated on a 5-point Likert scale, with 5 being the highest and values 5-"the initiative is implemented and actively monitored", 4-"the initiative is being implemented but needs to be consistently offered", 3-"the initiative is in development and needs implementation", 2-"the initiative is being considered and needs development" and 1-"the initiative needs consideration". Based on the VET toolbox spectrum, areas for improvement are 1-3, while the institution's TVET policy strength is 4 or 5. A weighted mean was used to interpret scores.

2.4 Data Gathering Procedure

The researcher prepared a cover letter to the institution's head explaining the objective and purpose of the study and a brief explanation about each respondent's role in the study's realization and ensured that the data gathered would be treated with the utmost confidentiality. To gather information available to the respondents, the researcher seeks help from the TESDA provincial office through the approval of the provincial director located at Wangal La Trinidad, Benguet. A letter was provided, and the course was conducted through the Unified TVET Program Registration and Accreditation System (UTPRAS) focal. The data collection took place from November 2024 to February 2025. The proponent used the Baguio-Benguet group chats to gather information conveniently, where consent was considered individually, and all TVI heads, administrators, and presidents were members. The researcher sent the research instrument containing the cover letter through personal encounters (meet-ups) for the respondents who do not have access to internet connectivity. Once all the data is complete, the researcher personally collects it. The follow-up interviews were done online at the most convenient time for the respondents. Lastly, confidentiality was considered by the researcher during the study, and information was cleared to be used for academic purposes only.

2.5 Ethical Consideration

In the conducted study, the researcher considered ethical considerations to come up with fair and unbiased research, starting with informed consent, which means that the respondents of this study are well informed of the purpose, benefits, and risks behind the survey before they agree or decline to join. The researcher also

considers the confidentiality of the participants. The right to withdraw from the respondents was also allowed at any moment without jeopardizing their participation in future studies or their relationship with the researcher and the university. No explanations were sought upon respondents' choice of withdrawal. The researcher also ensured that all respondents were free from potential harm, particularly physical, social, and psychological. Moreover, regarding results communication, the researcher ensured that this research work is free of plagiarism and research misconduct and accurately represents the results of this study. Throughout the study process, the researcher ensured that ethical standards were respected. The University of Baguio Research Ethics Committee (UB REC) ethically reviewed the manuscript with protocol number.

Furthermore, sharing research findings with respondents is essential to the research process. Lastly, the soft copies of all data were maintained in a password-protected computer and laptop, kept safe and accessible by the researcher; hence, data was only kept for record-keeping purposes related to the research. After a year, the researcher removed the softcopy files from his computer and laptop, following ethical data retention standards.

3.0 Results and Discussion

3.1 Readiness in the Delivery of Technical Education to Differently Abled Persons

In terms of Disability Support Unit

Table 1 shows the mean of the Disability Support Unit assessment indicator on the readiness of the Technical Vocational Institution to serve differently abled persons. As revealed in the table, the mean of the Private institutions states that their initiative level is under development and needs implementation (M=3.31). The study's findings indicate a negative initiative from technical vocational institutions; however, certain areas require improvement. The mean ratings across the indicators demonstrate moderate to strong support systems for students with disabilities. The interval spans from 2.92 to 3.83. The standard deviation values, ranging from 1.03 to 1.57, indicate variability in respondents' experiences or impressions regarding the services provided. The average score of 3.17 for the first four criteria and 3.25 for the fifth and sixth indicators suggests that DSU and services from private schools are being acknowledged; however, further efforts are required for complete implementation. The study indicates that effective service delivery relies on active collaboration with organizations of persons with disabilities (OPDs) and the implementation of feedback systems, which necessitate a cooperative team approach involving teachers, parents, support staff, and specialists (Cabañero, 2023). The Department of Higher Education & Training (2022) emphasizes the significance of standardized functions for the Disability Support Unit (DSU) as the initial point of contact for individuals with disabilities.

However, another TVET Instructors sub-indicator, with an average of 3.25 to 3.83, indicates moderate to high initiative in accommodating students with disabilities. DSU helps with learning adjustments and staff training: The DSU is important to TVET teachers with high marks (3.83 for learning accommodations and 3.75 for staff training). This shows that the DSU helps teachers accommodate disabled pupils. Educating faculty is key to enhancing the academic experience for students with impairments, especially in vocational settings where adaptations are less uniform (Aguirre et al., 2020). Alternatively, Course Activity Adaptation: The grades for generating accessible communication formats (3.42) and adjusting course activities (3.58) suggest that the DSU is tailoring course material to each student's needs. Universal Design for Learning (UDL) studies recommend more flexible and inclusive curricula for all students (Almeqdad et al., 2023). These findings support qualitative comments that infrastructure issues and rental agreements limit customization possibilities and accessibility. Participant comments in the qualitative study show that funding restrictions and poor infrastructure prevent many organizations from providing sufficient accommodations. This mismatch indicates that while support systems are improving, physical and digital infrastructure still hinders service delivery.

The mean range for student support indicators is 3.08 to 3.42. To implement college ideas, student support must work hard. Assistance policies and equipment, Disability regulations, and assistive equipment during matriculation are well-regarded, but marketing efforts for students with disabilities during enrollment (mean 3.08) need improvement. Comprehensive disability policies and proactive communication about accessible services by program implementers, including universities and colleges, are crucial to creating an inclusive atmosphere (Bessaha et al., 2020). Conversely, assistive technology and social support: The mean support of 3.25 for students to buy assistive equipment shows that institutions must offer equitable access for students from varied socioeconomic situations. Green et al. (2023) stress that inclusiveness requires proper support suited to students' needs

Table 1. *Readiness in the Delivery of Technical Education to Differently Abled Persons in terms of Disability Support Unit*

Indicators	Mean	SD	Interpretation
General			
1. A DSU has been established	3.17	1.03	TIDNI
2. The DSU offers services to increase the participation and learning achievements of students with disabilities.	3.17	1.27	TIDNI
3. The DSU has developed and published a diversity and inclusion policy for the TVET college that lays out the services offered	3.17	1.40	TIDNI
4. The DSU connects with Organizations of Persons with disabilities-OPDs for the exchange of challenges, ideas, and lessons learned as well as external advisors.	3.17	1.40	TIDNI
5. The DSU has a system for collecting and acting on feedback from students with disabilities about the support services provided	3.25	1.29	TIDNI
6. The DSU has protocols in place to address emergencies involving students with disabilities	3.25	1.29	TIDNI
TVET Instructors			
7. The DSU assists in providing learning accommodations for students with disabilities.	3.83	1.03	TIBINCO
8. The DSU conducts training sessions for instructors and staff to improve their understanding and accommodation of students with disabilities.	3.75	1.06	TIBINCO
9. The DSU assists in adapting course activities so that learners with disabilities can participate in meaningful.	3.58	1.16	TIBINCO
10. The DSU unit assists in developing communications and handouts in alternative formats that are accessible for learners with disabilities and enable them to participate in meaningful.	3.42	1.24	TIBINCO
11. The DSU facilitates leveraging third-party services to enhance classroom inclusivity and individual student support	3.25	1.36	TIDNI
12. The DSU connects with students with disabilities or their caregivers to create dialogue and exchange of best practices	3.17	1.40	TIDNI
Students Support			
13. Disability policies that promote access and support structures for students with disabilities are in place.	3.42	1.08	TIBINCO
14. Persons with disabilities are actively addressed during enrolment using advertisements, information events, and accessible information on the colleges' website.	3.08	1.16	TIDNI
15. Assistive devices and other accommodations are available to support the matriculation process for persons with disabilities.	3.25	1.29	TIDNI
On-boarding			
16. The college provides students with orientation events that are accessible to all students with disabilities.	3.67	1.15	TIBINCO
17. Mobility instructors are appointed to assist students with disabilities in adapting to the college environment.	3.58	1.31	TIBINCO
18. The DSU assesses the abilities and needs of students with disabilities.	3.75	1.05	TIBINCO
19. The DSU in cooperation with OPDs identifies suitable assistive devices to support individual students.	3.33	1.37	TIDNI
20. Students with disabilities from all socio-economic backgrounds receive assistive devices.	3.50	1.31	TIBINCO
21. Students are instructed by the DSU and/or OPDs about how to use the assistive device.	3.33	1.55	TIDNI
22. The college implements a buddy system where older learners support new learners to find their way around the college and the whole new environment.	3.50	1.38	TIBINCO
On-course Support			
23. Sign Language interpreters and other auxiliary support staff are orientated on the students' program and subject outcomes by subject lecturers to assist the auxiliary staff member in understanding the academic needs.	3.00	1.41	TIDNI
24. The disability support unit coordinates support services, assistive technology support, conversion of learning materials to Braille, and screen-reader software accessibility.	3.08	1.31	TIDNI
25. The college monitors, documents, and evaluates the progress of students with disabilities. Based on the evaluation support will be recommended.	3.33	1.30	TIDNI
26. The disability support unit ensures that the examination unit on campus has a database of trained persons to act as readers and scribes.	3.08	1.24	TIDNI
27. Examination concessions are considered and accommodated based on the student's assessment. Concessions are discussed between the disability support unit, OPDs, the local TVET authorities, and the students.	2.92	1.24	TIDNI
Exit Support			
28. The college features a job placement unit.	3.17	1.19	TIDNI
29. The job placement unit networks with the industry and maps the demand of the industry.	3.25	1.14	TIDNI
30. The job placement unit in cooperation with the disability support unit hosts preparation workshops for students with disabilities to prepare them for the work environment.	3.17	1.11	TIDNI
31. The job placement unit in cooperation with the disability support unit hosts awareness workshops for the industry to promote the employability of students with disabilities.	3.17	1.11	TIDNI
32. The job placement unit monitors the placement of students with disabilities and collaborates with the disability support unit and OPDs to mitigate challenges and conflict.	3.17	1.11	TIDNI
Overall	**3.31**		**TIDNI**

Scale	Statistical limits	Descriptive Interpretation
5	4.21-5.00	The Initiative is implemented and needs to be actively monitored (TIIAM)
4	3.41-4.20	The Initiative is being implemented, but needs to be consistently offered (TIBINCO)
3	2.61-3.40	The Initiative is in Development and Needs Implementation (TIDNI)
2	1.81-2.60	The Initiative is Being Considered and Needs Development (TIBCND)
1	1-1.80	The Initiative Needs Consideration (TINC)

Onboarding sub-indicators under DSU average m = 3.17–3.75. Assistance with mobility and orientation: Mobility teachers (3.58) and accessible orientation activities (3.67) show that the DSU helps new students adjust to college. Colleges are taking more initiative to assess disabled students' abilities and needs (M=3.75). Personalized orientation programs boost academic and social outcomes for students with impairments, according to one study (Savita & Sharma, 2022). Tools and advice: Private institutions lack need assessment and assistive equipment provision (3.33). Instruction on utilizing these devices (3.33) is also needed. Research shows

that assistive technology is crucial to higher education performance for disabled students (McNicholl et al., 2019). The sub-indicator On-course support averages M=2.92–M=3.33. This average interpretation shows that the colleges' evaluation criteria for activities were observed and need implementation, emphasizing opportunities for improvement. The lowest mean scores are 2.92 to 3.08 for Analysis and Support Services: Test support (readers, scribes). These regions ensure disability-friendly test access for students. Evans and Zhu (2022) suggested that students with impairments need exam accommodations like extra time and assistive technology to have equal opportunity.

Moving forward, observing and assessing student development: With a mean score of 3.33 for tracking and evaluating student development, the DSU's part in determining and suggesting more help, such as peer tutoring or extra classes, becomes even clearer. Regular student progress monitoring has been shown in studies to help those with impairments have better academic results (Nunes et al., 2018). Qualitative findings reflect this variability, showing that infrastructure challenges, especially in rented facilities, limit institutions' capacity to accommodate students with disabilities. Low mean scores for aspects like assistive equipment and exam accommodations highlight gaps in infrastructure investment. Participants noted poor accessibility, such as inadequate physical facilities and internet access. This indicates that while there are efforts to support students with disabilities, significant improvements in infrastructure and digital tools are needed to realize the DSU's initiatives fully.

The last sub-indicator for exit support in the DSU shows that the initiative is still in development and requires implementation, with a range of M=3.17 to M=3.25. Networking and job opportunities: The job placement unit is a helpful tool, with mean scores ranging from 3.17 to 3.25 for networking with the sector, organizing preparation seminars, and tracking placements. With students with disabilities making up a notable portion of the student body, understanding their experiences and how to support them effectively is essential. The institution should prioritize its students' best interests when dealing with corporations for work placements (Mogaji & Nguyen, 2022). Another critical step in promoting the employment of students with impairments is sector awareness seminars. Studies suggest improving job outcomes for individuals with disabilities largely relies on employer awareness and knowledge (Ikutegbe et al., 2024). The statistics show that the DSU at the TVET institution is implementing initiatives to support students with disabilities, especially in learning accommodations, staff training, and orientation. Several areas need improvement, such as exam accommodations and proactive information sharing during enrollment. According to research, promoting an inclusive workplace is an ongoing process that benefits from regular assessment and strategy adjustments (Tarikhkyzy, 2023).

In terms of Accessibility

Table 2 shows the mean of the Disability Support Unit assessment indicator on the readiness of the Technical Vocational Institution for differently abled persons. As revealed in the table, the mean of the Private institutions states that the initiative is implemented and needs to be consistently offered (M=3.48). Table 2 ratings show that, according to barrier-free design principles, most building accessibility indicators, such as college administration awareness of differently abled needs, are implemented at an above-average level in private colleges. The mean score of 3.50 for awareness of which group uses various spaces indicates a basic yet active effort to ensure architectural designs accommodate differently abled individuals. Scores of 3.17 highlight the need for consistent attention to specific groups' capacities and requirements. The college initiative on alternative ramps and inclusive construction could be a future adjustment for installation. Sharma & Kumar (2022) concluded that barrier-free design in built environments positively impacts the empowerment of physically disabled individuals. Therefore, attention should be given to creating proper ramps, hand railings, suitable floor finishes, and other techniques that eliminate barriers for the physically challenged.

The mean scores for path and building accessibility, as per the Paths and Navigation criteria, are consistently in the TIBINCO range, with a score of 3.67 for wide and high paths. Most institutions have lifts and ramps, averaging 3.58. Floors were installed with a slip-free design and appropriate coverings (M=3.42). The training centers installed signage and tactile features for client orientation (M=3.75). TIDNI scores for inclined pathways (3.33) and lifts (3.08) require enhancement. The least critical criteria for doors and gates addressed by training colleges were automated doors (M=2.75) and the 90cm limit for doors (M=3.25). Criteria 10 to 14 indicated favorable placements of doors and gates that are accessible and convenient for disabled students (M=3.92- 4.00).

Table 2. *Readiness in the Delivery of Technical Education to Differently Abled Persons in terms of Accessibility*

Indicators	Mean	SD	Interpretation
Accessibility			
1. The college management is aware of which group of people uses or will use certain buildings, rooms, work equipment, alarm systems, and so on.	3.50	1.24	TIBINCO
2. Existing abilities and needs have been clarified for this group of people.	3.17	1.11	TIDNI
3. Impairments and needs are considered when renovating buildings, planning new buildings, or procuring work equipment.	3.42	1.00	TIBINCO
4. Relevant information	3.50	1.09	TIBINCO
5. Alternative possibilities for the use of buildings or the operation of work equipment are in place	3.25	1.06	TIDNI
Paths Outside and Inside			
1. Paths are 150 cm wide.	3.67	1.15	TIBINCO
2. Paths are sufficiently high - usually at least 220 cm clear height.	3.67	1.15	TIBINCO
3. Paths are free of thresholds, steps, and uneven surfaces.	3.67	1.15	TIBINCO
4. Alternatives to stairs and steps are available	3.58	1.08	TIBINCO
5. Floor coverings are even and slip resistant.	3.42	1.08	TIBINCO
6. Paths are inclined (lengthwise and crosswise) as little as possible.	3.33	0.98	TIDNI
7. Lifts at least 110 cm wide and 140 cm deep.	3.08	1.31	TIDNI
8. Easy orientation is ensured (for example through signage or tactile floor coverings).	3.75	1.06	TIBINCO
9. Paths are sufficiently illuminated.	4.00	0.95	TIBINCO
Doors and gates			
10. Doors are easily noticeable	3.92	1.08	TIBINCO
11. Sufficient space for movement in front of and behind manually operated doors is available.	3.75	0.97	TIBINCO
12. Door handles are easily accessible at an average height of 85 cm.	4.00	0.85	TIBINCO
13. Door handles are designed to be easy to grip	4.00	0.85	TIBINCO
14. The effort required to open the doors is as low as possible.	4.00	0.85	TIBINCO
15. Automated doors are installed where necessary	2.75	1.29	TIDNI
16. Doors and lift doors at least 90 cm wide and 205 cm wide.	3.25	1.29	TIDNI
Stairs			
17. Stairs are at least 120 cm wide.	3.83	0.83	TIBINCO
18. Uncertainties of use avoided	3.58	0.79	TIBINCO
19. All steps of a staircase are slip-resistant.	3.75	0.87	TIBINCO
20. An intermediate landing after a maximum of 12 steps is in place.	3.67	1.07	TIBINCO
21. A handrail on each side of the stairs at a height of 85 to 90 cm is installed.	3.67	1.15	TIBINCO
22. Handrails extend at least 30 cm beyond the first and last step.	3.58	1.08	TIBINCO
23. The rising ratio is the same for all steps of a staircase (ideally 17 cm for the riser and 29 cm for the tread)	3.75	0.97	TIBINCO
24. The stair treads are marked to be easily recognizable from one another.	3.33	0.89	TIDNI
25. Undercuts of the treads are excluded to avoid "getting stuck"	3.42	1.00	TIBINCO
26. There are tactile markers at the start and end of stairs for the visually impaired	2.17	0.83	TIBCND
Rooms			
27. Rooms offer sufficient space	3.50	0.90	TIBINCO
28. Circulation areas within rooms are at least 90 cm wide.	3.92	0.90	TIBINCO
29. There is a sufficiently large movement area behind worktables	4.08	1.00	TIBINCO
30. When arranging work equipment, accessibility is ensured for all users and considers individual reach distances and heights.	4.00	0.85	TIBINCO
31. Sufficient and individually adjustable illuminance is available for all expected users	3.67	1.15	TIBINCO
32. Glare is avoided through a suitable arrangement of furniture and other work equipment.	3.67	0.89	TIBINCO
33. Room acoustic conditions are adapted to the requirements of people with hearing impairments.	3.50	1.38	TIBINCO
Sanitary			
34. Enough accessible toilet cubicles are available.	4.00	1.04	TIBINCO
35. Unlocking of doors from the outside is possible in emergencies.	4.08	0.90	TIBINCO
36. Doors open to the outside of the cubicle.	3.92	0.90	TIBINCO
37. It is possible to raise the alarm from inside the cubicle.	3.08	1.08	TIDNI
38. The emergency call system can be triggered while sitting on the toilet bowl or lying on the floor.	3.00	1.13	TIDNI
39. The emergency call system is easily recognizable for blind or visually impaired people.	3.00	1.21	TIDNI
40. Operating elements and equipment are accessible and operable - even without changing the sitting position.	3.58	1.00	TIBINCO
Work Equipment			
41. The work equipment and the associated works area is perceptible and operable for all potential users	3.42	1.08	TIBINCO
42. The technical processes of the work equipment meet the abilities and needs of the potential users.	3.42	1.00	TIBINCO
43. Relevant elements of the work equipment are accessible to all potential users	3.42	1.08	TIBINCO
44. The work equipment is usable by all potential users	3.42	1.08	TIBINCO
45. The work equipment is sufficiently fault-tolerant regarding foreseeable errors so that the work task can be completed without danger.	3.42	1.08	TIBINCO
Software and websites			
46. The content presented is perceptible to all users	3.25	1.06	TIDNI
47. The perceptibility of important content is ensured through the two-senses principle	3.25	0.97	TIDNI
48. Operability is ensured through the two-channel principle	3.42	1.16	TIBINCO
49. Usability is ensured for all users	3.08	1.16	TIDNI
50. The content and structures are comprehensible for all users	3.17	1.19	TIDNI
51. The structure and use are predictable for all users	3.00	1.28	TIDNI
52. The content is compatible with the input or output devices used by users	2.83	1.03	TIDNI
Information and communication			
53. Guidance and orientation systems are comprehensible for all people	3.33	0.98	TIDNI
54. All people can perceive the information intended for them	3.25	0.87	TIDNI
55. Information and communication facilities	3.42	1.24	TIBINCO
56. Communication systems are usable by all people	3.17	1.03	TIDNI
Escape and rescue			
57. The alarm-triggering element is perceptible to all persons	3.17	1.03	TIDNI

58. The alarm triggering is feasible for all persons	3.08	1.16	TIDNI
59. The alerting of all persons is guaranteed for emergencies - also of persons with sensory impairments.	3.33	1.15	TIDNI
60. The escape and rescue route concept is comprehensible for all persons	3.58	0.90	TIBINCO
61. The safe escape or rescue of all persons ensured - especially of persons with limited mobility.	3.83	0.83	TIBINCO
62. The structural conditions are suitable for a rescue	3.75	0.97	TIBINCO
Overall	**3.48**		**TIBINCO**

The data results for the stairs, criteria from items 17 to 23 (M=3.58 to M=83), indicate the college's adherence to accessible stairs for physically challenged students. However, item 24 (M=3.33) and item 26 (M=2.17) regarding stair threads and tactile features were not met by the training college. The trade college rooms were initiated for implementation and require ongoing offerings. Indicators 27 to 33 average between 3.50 and 4.00, indicating moderate to high implementation by the colleges. These show that institutions prioritize clear pathways and access, yet design modifications may be necessary to enhance accessibility for disabled individuals. This reinforces the qualitative concerns that the current infrastructure is insufficient, particularly in rented or under-resourced facilities. According to qualitative results, the most significant obstacle to inclusion is infrastructure issues. Many schools operate in rented spaces, which limits customization and accessibility improvements. Participants mentioned concerns such as a lack of ramps, bad internet, and limited physical accessibility, particularly for students with impairments. Additionally, the qualitative findings reflect this: numerous institutions stated that they were unable to remodel rental buildings, which explains the inconsistency in quantitative infrastructure rankings.

It was emphasized by Morley (2024) that one strategy for enhancing inclusivity in vocational education and training (VET) is adhering to the Universal Design in TVET facilities, where colleges should ensure that all learning spaces are accessible to individuals with disabilities. This includes creating barrier-free design environments that accommodate the physically disabled in sensory-friendly classrooms. The same findings also coincide that the level of availability of infrastructure in the implementation of inclusive education on skill acquisition among students with learning disabilities needs to be addressed for successful inclusive education practice (Umar, 2019). The move for inclusivity was also aligned with the building and transport, where physical barriers that make it difficult for people with disabilities should be audited for adherence to international standardization by the ILO in 2017.

School sanitary facilities have a mean of 4.08 for unlocking doors from the outside in emergencies, suggesting strong emergency preparedness. Accessible toilets (M=4.00) and cubicle doors (M=3.92) meet the 34th and 36th criteria, respectively. The comfort room disposables accessibility rating (M=3.58) met criterion 40. School emergency call systems on criteria 38 and 39 (M=3.00) and cubicle alarms at 3.08 suggest that schools are still evolving and need additional emergency inclusion. As required by the National Council on Disability Affairs (2024), the accessible stand-alone toilet will have a waterproof emergency call button inside and outside. The schools' initiative level demonstrates that most indicators are TIBINCO, showing strong accessibility efforts from indicators 41 to 45, with an average work equipment operability rating of 3.42. Studies show that infrastructure facilities should satisfy learners' needs for rooms, equipment, media, and resources, fostering inclusivity and helping special needs pupils (Azzahra et al., 2022).

Institutional software and websites received average evaluations, demonstrating effort but not execution. Indicators 46, 47, 49, 50, 51, and 52 have scores from M=2.83 to M=3.25. Focus on the lowest mean across the criteria to identify content compatibility issues with input/output devices like Braille displays. Information boards, personal computers, and phones are ICT facilities as per Criterion 48, M=3.42. Education and technical training require digital access; failure to provide assistive technology compatibility may limit differently-abled students. Remote education arose post-pandemic, requiring TVET institutions to train and support teachers and instructors online, according to UNESCO-UNEVOC (2021). Service delivery to disabled customers requires tools and technology. Escape and rescue routes are TIBINCO-rated 3.58 to 3.83 for indicators 60, 61, and 62, protecting disabled people. Some sections need attention: indicator 57 averages 3.17, indicator 58 averages 3.08, and criterion 59 is M=3.33. These indicate that while certain alarm-triggering elements are visible, major changes are needed for total safety. Automation and effective alerts improve educational institutions since staff and students respond quickly (Mustafa et al., 2023). Qualitative accounts indicate that inadequate internet connections and digital exclusion hinder accessibility (Participant 2). This argument is supported by low quantitative scores in digital access indicators—software and website presence averaged M=2.83–3.25, indicating gaps in assistive technology compatibility.

In terms of Human Resources

Table 3 shows the mean of the Disability Support Unit assessment indicator on the readiness of the Technical Vocational Institution for differently abled persons. As revealed in the table, the means of the private institutions state that there is an initiative that requires implementation (M=2.73).

Table 3. *Readiness in the Delivery of Technical Education to Differently Abled Persons in terms of Human Resources*

Indicators	Mean	SD	Interpretation
1. Skilled and qualified staff in the field of Sign Language interpretation is employed. The person can communicate in the locally used Sign Language and can interpret during courses.	2.50	1.17	TIBCND
2. Skilled and qualified staff in the field of occupational therapy are employed. The person suggests suitable accommodations and assistive devices that increase the functionality of learners with disabilities.	2.50	1.17	TIBCND
3. Skilled and qualified staff in the field of educational psychology are employed. The person advises instructors, learners, and caregivers about how people learn. This includes teaching methods, instructional processes, and individual differences in learning.	3.08	1.08	TIDNI
4. Skilled and qualified staff in the field of orientation and mobility training is employed. The person provides instructions that help learners with disabilities to develop or learn the skills and concepts they need to travel safely and independently within the TVET college and commute from their homes.	2.92	1.08	TIDNI
5. Skilled and qualified staff is trained to handle and support the integration of service animals in the college environment.	2.67	1.15	TIDNI
Overall	**2.73**		**TIDNI**

Table 3 shows that the average scores for human resource indicators at private Technical Vocational Institutions (TVIs) for differently abled individuals suggest these institutions are developing and need more efforts to improve accessibility. The mean score is 2.73, within the range of 2.50-3.08, indicating that "The Initiative is in Development and Needs Implementation (TIDNI)." A mean score of 2.50 shows a lack of experienced and qualified personnel for sign language interpretation, essential for hearing-impaired learners with disabilities. This highlights a significant lack of human resources to properly support hearing-impaired learners. Sign language improves learners' self-expression, connects them to the hearing world, and fosters ties with the deaf community. A qualified trainer helps learners build a strong foundation for communication and social interaction (Tharuka, 2025). The Occupational Therapy score (M=2.50) shows a lack of qualified individuals to recommend suitable accommodations and assistive devices for differently abled learners. The disparity is concerning, as occupational therapy is crucial for giving students the necessary support to succeed in school. SAGE (2020) highlights the importance of occupational therapists, focusing on personalized treatment and promoting independence for individuals with disabilities. Grit Psychology (2024) lists the benefits of having an occupational therapist in an institution: enhanced independence, improved mental health, cognitive and emotional support, holistic care, and skills development for daily activities.

Conversely, educational psychology (M=3.08) shows the highest mean score of 3.08, indicating that TVET institutions are taking steps to hire skilled personnel in this area. Educational psychologists guide educators in modifying instructional strategies to meet the diverse learning needs of differently abled students, greatly influencing educational outcomes. Therefore, effective instruction design by teachers to enhance student engagement and discussions on interdisciplinary learning, multimodal learning, technology-assisted learning, and meaningful learning in vocational education are key focus areas (Ye et al., 2024). Orientation and Mobility Training scored M=2.92, showing efforts to help differently abled learners navigate the institution and commute independently. A study emphasized that orientation and mobility training (OMT) skills are crucial for fostering self-efficacy in mobility and promoting independent living, leading to increased self-efficacy, higher post-secondary education rates, employment, and improved overall quality of life (Bandukda et al., 2021). Support for service animals (M=2.67) indicates moderate progress in the initiative. These figures closely reflect the qualitative descriptions, in which participants reported the absence of HR officers for special needs (Participant 5), unqualified teachers (Participant 7), and insufficient training and financing (Participant 11). This demonstrates that, despite institutional awareness, implementation is hampered by staffing shortages and a lack of specialized support. While there are efforts to integrate service animals into the campus environment, further attention and development are needed. The Americans with Disabilities Act (2020) defines service animals as those that assist disabled students by guiding visually impaired individuals, alerting those with hearing impairments, maneuvering wheelchairs, providing safety during seizures, reminding individuals with mental health conditions about medication, alleviating anxiety in PTSD sufferers, and performing other tasks.

In terms of the Complaint Mechanism

Table 4 shows the mean of the Disability Support Unit assessment indicator on the readiness of the Technical Vocational Institution for differently abled persons. As revealed in the table, the means of the private institutions state that there is an initiative that requires implementation (M=3.35).

Table 4. *Readiness in the Delivery of Technical Education to Differently Abled Persons in terms of Complaint Mechanism*

Indicators	Mean	SD	Interpretation
1. Complaint systems must offer a variety of communication means: oral, written, and easy-to-read, Braille, audio, face-to-face, via website, or through meetings.	3.17	1.19	TIDNI
2. Anonymous complaint boxes are accessible for most users. For users that cannot write or blind, other means of communication must be available (For example, text messages or voice mail).	3.08	1.08	TIDNI
3. The DSU, in cooperation with OPS, must be involved in the development of an accessible complaint mechanism.	3.25	1.22	TIDNI
4. Ensure the anonymity of the complainer. All complaint communication means must be anonymous and secure.	3.67	1.30	TIBINCO
5. Follow-up and responses to complaints must be provided in an accessible format.	3.58	1.08	TIBINCO
Overall	**3.35**		**TIDNI**

The fourth indicator in Table 4 of the complaint system shows an average of 3.35, indicating a need to consider implementing the complaint mechanism in various technical-vocational institutions. Criterion 1 showed a mean score of 3.17 for complaint systems across communication channels, indicating a TIDNI score, which reflects the lack of an established complaint system despite considerable initiation efforts. The second criterion shows a similar result, with technical institutes failing to implement complaint boxes for students with disabilities (M=3.08). The third indicator, M=3.25, shows the average initiatives from the school regarding collaboration with the DSU and OPS. The first three criteria of the complaint mechanism show that significant improvements are needed in developing systems for Trainees with disabilities. The National Disability Services ("N, D") highlights the benefits of a complaint procedure that encourages engagement and feedback in the disability services sector. It promotes openness, leading to the reporting of grievances that result in positive business outcomes and improved safety. The Disability Advocacy Network Australia emphasizes the advocacy sector's experience, showing how a functional accessibility complaints mechanism can drive change and enhance the disability services system and beyond. Criterion 4 (M=3.67) is beneficial, showing that complainants' confidentiality and security are well protected. This corresponds with the high ranking for criterion 5, which has an average score of 3.58 for the private college's follow-up responses and complaint handling. Both indicators were set up and regularly provided to students. SpriggHR (2020) noted the benefits of confidentiality and anonymity for complainants, stressing that feedback should stay confidential and only be shared with the intended recipient, protecting the complainant. Survey Connect (2025) emphasized that feedback should benefit both the receiver and provider and accommodate accessible formatting for disabled members' follow-up responses and complaints.

In terms of Funding for Inclusion

Table 5 shows the mean of the Disability Support Unit assessment indicator on the readiness of the Technical Vocational Institution to serve differently abled persons. As revealed in the table, the means of the private institutions state that there is an initiative that requires implementation (M=2.85).

Table 5. *Readiness in the Delivery of Technical Education to Differently Abled Persons in terms of Complaint Mechanism Funding for Inclusion*

Indicators	Mean	Std. D	DI
1. The college must provide funding for setting up and running a DSU. The funding must cover the human resources and operational expenses.	2.83	1.19	TIDNI
2. The DSU, in cooperation with the college administration, must identify avenues to access third-party funding to cover the expenses for building renovations to increase accessibility.	2.92	1.08	TIDNI
3. The DSU, in cooperation with the college administration, must identify avenues to access third-party funding for the purchase and maintenance of assistive devices.	2.83	1.27	TIDNI
4. DSU budgets are being monitored and evaluated. The funding must be adjusted according to the number of learners with disabilities and the expenses of necessary interventions to provide accommodations and to increase the overall accessibility of the college's facilities.	2.83	1.11	TIDNI
Overall	**2.85**		**TIDNI**

The 5th and final indication under "funding for inclusion" has a low average rating of 2.85, showing it relies on institutional initiative and is not implemented by Technical Vocational Schools. Criteria 1, 3, and 4 each have an average of 2.83, showing that measures need to be implemented. The low quantitative scores on funding initiatives are consistent with participants' reservations about long-term commitment to inclusive education practices. Four institutions expressed difficulty with ongoing assistance and management's reluctance to fully commit owing to financial implications and concern regarding resource continuity (Participants 7, 8, 9, and 12). Thus, the company must establish the funds for DSU and third-party funding and monitor budgets as outlined in these requirements before implementing all criteria. The quantitative absence of monetary support for inclusive initiatives is consistent with qualitative concerns regarding support services and inclusive curriculum delivery. Participants 6 and 7 discussed difficulties in recognizing disabilities during enrollment and adapting the curriculum, highlighting limited support mechanisms and the additional strain on educators. Lack of

financial resources limits the institutions' ability to provide tailored learning accommodations, highlighting how financing constraints affect both strategic planning and day-to-day operations. Indicator 2, with a mean of 2.92, shows that DSUs' cooperation with college administration for third-party funding remains unaddressed and unimplemented. This aligns with the qualitative data, indicating that five private schools reported considerable financial limitations in executing inclusion initiatives. Participants reported challenges related to rental issues (Participants 4 & 5), high costs for program adaptation (Participant 10), and difficulties in meeting inclusive education standards (Participants 8 & 9). The comments illustrate the institutional difficulties in obtaining and distributing adequate resources for infrastructure, personnel, and inclusive tools.

Evidence indicates the need for stronger funding initiatives to support a well-funded and operational DSU, along with necessary monitoring and assessment. This result is attributed to Goldan et al. (2022), which indicates that while many studies suggest an inclusive school system is more cost-efficient, countries with both inclusive and special schools face significant cost increases, explaining the low responses from participants. It aligns with the OECD, highlighting that insufficient funding hinders the successful transition to tertiary education for students with disabilities, due to costs related to doctors, therapists, counselors, and administrators (Chiwandire & Vincent, 2019).

3.2 Factors Affecting the Success of the Delivery of Technical Vocational Education and Training to Differently Abled Persons

Accessibility and Infrastructure Challenges

It was found that most schools experienced accessibility and infrastructure challenges. This makes it the most dominant theme that emerged from the study results. Studies found that investing in infrastructure and pursuing improvements must be the responsibility of both private and public schools for improving the students' learning environment through quality school infrastructure (Navarro, 2024). In addition, Barett and Shmis (2019) emphasized that the Sustainable Development Goals, established by the United Nations, outline the global development agenda and mandate that countries build and upgrade education facilities that are child, disability, and gender-sensitive, and provide safe, non-violent, inclusive, and effective learning environments for all. For the respondents, it was seen that the causes of their infrastructure and accessibility challenge were because many of the schools were renting, hence leaving them no choice for customization and renovation, abiding by the requirement of disabled students mentioned by participants 3, 4, 5, and 12.

We need to improve our facilities further to accommodate PWD students (Participant 3)
The school is renting, and we can't customize our facilities for PWD trainees (Participant 4)
Location of TVI, TVI is renting the place, and the budget for implementation (Participant 5)
Challenges in building requirements (Participant 12)

On the other hand, participants 1 and 2 do have difficulty enrolling disabled persons in their institutions and challenges with accessibility, a positive learning environment, and poor internet connectivity. Due to limited infrastructure development, students with disabilities have difficulty looking for PWD-friendly Technical vocational schools.

There were no enrollees with disability in movement, vision, hearing, or speech. (Participant 1)
Some DSUs don't have access or have poor internet signals, or fail to inform the person on time (Participant 2)

The outcome corroborates the findings of William et al. (2025), who emphasized that inadequate infrastructure impedes students' concentration and learning. The findings indicate that the primary issue is the scarcity of resources, evident in underfunded schools that lack needed supplies, equipment, and facilities, which hinders instructors' capacity to offer adequate support to pupils (Espeño et al., 2024). Additionally, expanding and upgrading school infrastructure will help meet the access and equity objective in Sustainable Development Goals (SDG) 4.1 to 4.5, ensuring adequate and high-quality school infrastructure in creating an inclusive learning environment, which will help create a conducive environment for skills and knowledge acquisition (Navarro, 2024). Another connection from the research also shows that people use and need digital assistive tools, including the Internet. Understanding how this web of networks started, grew, and spread can help us determine the best way to make things more accessible (Botelho, 2021).

Financial Support and Resource Constraints

It was revealed that five (5) of the schools have experienced financial support and resource constraints in implementing TVET for students with disabilities. Evidently, private schools under study have difficulty funding their infrastructure development and employing Disability Support Units (DSU) within their institution. A study reveals that lack of funding is a critical factor that impedes the implementation of inclusive education; it is also a challenge for many colleges, which hinders the level of development (Delubom et al., 2020). In support, public TVET funding could be more efficient and equitable, wherein the government often allocates funds for specific inputs such as trainers, maintenance, facilities, and laboratories (Tanaka et. al., 2024). The five participants elaborate on the constraints affecting their training delivery to disabled students.

The school is renting, budget for implementing (Participants 4 and 5)
Funding challenges involve a lot of costs (Participants 8 and 9)
Generally expensive, given the number of differently abled students enrolled per qualification, this is particular to TVET institutions that do not offer exclusive training programs for persons with disability (Participant 10)

Participants 4 and 5 consistently claimed that they are only renting premises for the implementation of their training programs. Participant 5 stated that economic constraints strongly influenced their decision to implement the inclusion criteria for students with special needs fully. Moreover, participants 8 and 9 also report that financial sources were one of their concerns, as significant expenditures are associated with meeting the needs of the standards specified by the assessment indicators of law under inclusive TVET. This was proven in a study where the program implementers were concerned about the school's financial situation and the resources needed in the classroom. Implementing the right to education involves resources or financing to create schools, pay teachers' salaries and training, and supply instructional materials, among other things (Adanza & Sayson, 2022). Consequently, participant 10 stated their constraint on the expensive costs of applying changes to school facilities and equipment. As highlighted by Penn State (2025), improving the quality of school facilities is costly.

Human Resource and Instructor Training

It was revealed that three (3) schools have experienced human resource and instructor training constraints in implementing TVET for students with disabilities. It was revealed that the schools have difficulty placing human resource officers who focus on attending to students with special needs; likewise, there is an indicated instructor training requirement. Prior research suggests a consensus among practitioners and scholars that an organization's human resource (HR) practices significantly influence the vocational inclusion of minorities. However, mainstream HR practices have yet to adequately address the complexities of sustainability in the workplace (Schloemer et al., 2021). In corroboration, Lapeña et al. (2023) recommend that the government enhance funding and support for special needs education to facilitate acquiring learning resources, infrastructure development, and training and recruiting sufficient educators. Furthermore, the availability of teaching and learning resources significantly impacts implementing inclusive education within schools. The participants narrate their feedback on the human resource and instructor constraints.

There is no available human resource (Participant 5)
There were no qualified instructors (Participant 7)
Insufficient training and funding for instructors on how to accommodate diverse learning needs can affect the success of its implementation (Participant 11)

Participant 5 confesses that their school lacks staff. This suggests that the study area lacks disability-related human resources. Employing impaired student specialists requires administrative responsibilities, including compliance reporting and extensive documentation, which takes time away from student involvement and instructional planning (Izak & Prescott, 2024). Participants 7 and 11 listed instructor qualification and training funding needs. The technical school can hire more instructors/trainers or train current instructors to work with disabled pupils. Empowerment and training also affect teachers' self-efficacy, such as team teaching, observation and feedback, monitoring, and special needs student support in and out of the classroom (Mieghem et al., 2020). In an existing special education system, poor teacher wages, uncertified special education teachers, insufficient training and resources lead to shortages, teacher retention, and many teachers teaching outside their disciplines (Sze, 2005). According to another study, other hurdles to teacher certification, hiring, and training include a lack of teacher expertise and school inclusion awareness. Second, inclusive or regular classrooms with differently abled students lack training; third, there is a lack of examination to select the most appropriate

teaching aids; and fourth, learning difficulties and psychological issues. Teacher preparation programs and school district staff should also collaborate to create and deliver relevant and interactive Professional Development and support teachers beyond their initial years (Larios & Zetlin, 2023).

Inclusive Curriculum and Support Services

The study unveils that two (2) participating schools listed curriculum and support services, overcoming barriers in successfully delivering training for Students with disabilities. The following are the words from different heads of the private schools.

We encourage our trainees with disabilities to inform us about their health issues so that we can easily assess them during their training (Participant 6)
Inclusive curriculum constraint (Participant 7)

Participant 6 was aligned with the function of support services in determining and screening students' disabilities as part of their entry requirements. In case there are support services present in each school, students with disabilities must be treated with humility to assess the needs for self-disclosure, determine the function of self-disclosure, and collaborate with the trainee about the appropriate course of action (Gorica, 2020). Participant 7 was concerned with an inclusive curriculum, wherein implementing an inclusive curriculum entails additional work. In line with this, education specialists may review the tertiary/college curriculum and revise it to incorporate better international standards and principles of inclusive education (Dela Fuente, 2021). Moreover, as challenges arise, Cabañero (2023) recommends that existing laws, administrative support, and inclusive education implementation design programs.

Commitment to Strategy and Long-term Implementation

The study unveils that four (4) participating schools enumerated their challenge of commitment to strategy and long-term implementation in delivering training to students with disabilities.

Employment opportunities and continuous evaluation and improvement (Participant 7)
Support from the management (Participant 8)
It's hard to commit to the strategy (Participant 9)
Management initiative in catering to PWDs (Participant 12)

Participant 7 outlined their approach moving ahead, emphasizing their confidence in delivering quality education to students with disabilities about their employment outcomes. The evaluation and improvement requirements for addressing students with disabilities were also considered. Participants 8 and 12 express their concerns regarding management support, highlighting that one of their primary issues is the funding and resource allocation if the programs are implemented. Conversely, participant 9 expressed apprehension regarding their dedication to the strategy of the presence of PWD training. Awal and Sarkar (2022) assert that all educational institutions must prioritize inclusivity irrespective of their outputs. They advocate for the provision of adequate infrastructural facilities, resource teachers, and alternative assessment systems, as well as diverse teaching techniques, to address the varied needs of every learner. A recommendation to the management was to ensure adequate allocation of maximum resources and provision of support to promote inclusive practices (Aftab et al., 2024). Another result goes with the idea that inadequacy in resources, and financial, emotional, moral, and administrative support are needed as a support mechanism for the successful delivery to learners with disabilities (Campado et al., 2023).

Attitudinal Barriers and Societal Stigma

The follow-up interview revealed feedback from participants about the challenges of attitudinal barriers and societal stigma. Respondent 11 feels that if the school offers an inclusive school in the city, then social problems can occur.

Also, I think societal attitudes and stigma surrounding disabilities may create an unwelcoming environment, affecting the overall success of the implementation.

Participant 11 thinks they'll be judged when they deliver disability-friendly schools. The problem was that Special Education (SPED) schools were founded to serve students with special needs; thus, a technical

vocational school that accommodated disabled students would be a breakthrough. A study found that socioeconomic class affects disabled youth's systematic discrimination and school placement. Material and cultural capital disparity affect learning investments, school quality and experience, and institutional authority navigation and confrontation. These advantages assist high- and middle-class parents overcome ableist barriers and practices in mainstream English schools to give their children a more inclusive and supportive education. Disabled youth from low-income households have several obstacles in school due to micro-level structural discrimination (Chatzitheochari & Butler, 2023). When severe, the attitude barrier—believing impairments are stigmatized—can cause violence, isolation, and bullying (Epic, 2021). Fausto et al. (2024) encourage the public to assist inner development by understanding that we are all the same and that what is different is not always the other.

4.0 Conclusion

This study aimed to assess Technical Vocational Institutions' (TVIs) readiness to provide inclusive technical and vocational education programs for people with disabilities. The research presents a detailed assessment of current limitations and potential for improving inclusive practices in TVET settings by examining five primary institutional criteria: disability support units (DSU), accessibility, human resources, complaint mechanisms, and inclusion funding. Results indicated that the institution's initiative, as assessed through indicators related to the Disability Support Unit, inclusion for funding, human resources, and complaint mechanisms, is still in the planning phase and needs to move towards active execution. On the other hand, accessibility standards generally require continual institutional assistance in the key areas of barrier-free design, digital accessibility, and communication systems. The overall evaluation of participating schools demonstrates that inclusive education is still in its early stages, with staffing, infrastructure, budget, and support service deficits, which implies that most TVIs are not yet ready to support students with disabilities. Hence, schools must establish Disability Support Units, invest in accessibility renovations, train teachers, assign inclusion resources, and create transparent complaint processes for disabled students to improve preparation. The in-depth interviews conducted with respondents in the study identified six recurring themes, which are infrastructure issues, financial support and resource limitations, commitment to strategic and long-term implementation, training of human resources and instructors, development of an inclusive curriculum and support services, as well as attitudinal barriers and societal stigma. Addressing these institutional gaps is critical not only for ensuring compliance with accessibility standards but also for promoting equity and inclusive participation in technical and vocational education. Future research should focus on developing practical implementation models, long-term funding mechanisms, and national policies that enable TVIs to become fully inclusive learning environments for all.

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7.0 Conflicts of Interest

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Effectiveness of the SAMR Model for Enhancing Literature Instruction in Junior High School

Cindy Carmela B. De Castro*, Aimee M. Guia
Batangas State University-Pablo Borbon Campus, Batangas City, Philippines

*Corresponding Author Email: cindydecastro281930@gmail.com

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Abstract. This study explored how English teachers in private junior high schools in Batangas City applied the SAMR model in teaching literature. A descriptive research design, combining qualitative and quantitative methods, was employed to gather data from 60 English teachers during the School Year 2023–2024. Data were collected using a researcher-made questionnaire that captured teachers' experiences, perceptions, and instructional practices. The findings revealed diverse teaching experiences, mainly in terms of years and grade levels, with most teachers holding bachelor's degrees and attending moderate seminars. While the SAMR model was moderately applied across its Substitution, Augmentation, Modification, and Redefinition levels, teachers who attended six or more seminars showed higher usage of the Redefinition level. No significant differences were found in SAMR usage based on years of teaching experience or highest educational attainment. The study emphasized the importance of accessible technology, collaborative tools, and purposeful integration in teaching literature, while identifying barriers such as limited resources and time constraints. These findings underscore the SAMR model's potential to revolutionize literature instruction when challenges are addressed, highlighting the need for targeted guidelines to help teachers effectively integrate educational technologies.

Keywords: 21st-century skills; Barriers to integration; Professional development; SAMR model; Technology Integration.

1.0 Introduction

The rapid evolution of Information and Communication Technology (ICT) in the 21st century has significantly influenced numerous fields, with education being one of the most impacted. As ICT becomes an integral part of teaching practices, educators must acquire the competencies to effectively utilize these tools within and beyond the classroom to achieve educational goals (Setyaningsih, 2020). A vital component of this integration involves enhancing crucial student skills—communication, collaboration, critical thinking, and creativity—necessary to navigate the vast resources available online (Aprinaldi et al., 2018; Tunjera & Chigona, 2019).

Various frameworks have been proposed to guide ICT integration in education. While Mishra and Koehler's (2006) TPACK framework emphasizes the interplay between technological, pedagogical, and content knowledge, critics like Harris and Hofer (2011) argue that its complexity limits practical application. Conversely, Puentedura's (2013) SAMR model offers a more structured approach by categorizing ICT use into substitution, augmentation, modification, and redefinition. Although the SAMR model holds potential for transformative educational practices, many educators remain confined to the substitution level, where technology replaces traditional tools without enhancing pedagogy.

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The SAMR model, as detailed by Hamilton et al. (2016), serves as a framework to integrate technology into instruction to improve student engagement and motivation. It underscores the importance of utilizing technology to create meaningful, authentic learning experiences that address students' diverse needs and interests (Puentedura, 2014). Educators can transform their teaching approaches by progressing through the SAMR stages, fostering active participation, digital literacy, and improved learning outcomes (Hamilton et al., 2016; Savignano, 2017; Harapnuik & Thibodeaux, 2017). The goal is to use the model to develop critical skills such as collaboration, creativity, and communication, which are essential for success in the 21st century (Pfaffe, 2017). In addition to ICT, literature plays a crucial role in education by fostering students' comprehensive development. It enhances critical thinking, empathy, cultural awareness, and social-emotional abilities, helping learners connect with diverse viewpoints and historical contexts. Literature is especially valuable in English language teaching (ELT) as it provides authentic materials that aid language acquisition, boost creativity, and deepen appreciation for complex concepts (Kaowiwattanakull, 2021).

While traditional methods of teaching literature hold their importance, advancements in technology encourage educators to explore innovative approaches for a more engaging learning experience. Conventional methods often face challenges like passive learning, limited relevance to real-world applications, and a focus on memorization that hinders student involvement. These techniques, relying heavily on textbooks, lectures, and static materials, can lead to monotonous learning environments, despite occasional use of visual aids such as maps, charts, and images. Transforming these approaches with technology has the potential to address these limitations effectively. Banerjee (2024) highlights how technology-integrated learning revolutionizes the learning process by utilizing digital tools. Interactive presentations, multimedia resources, virtual field trips, and educational applications create immersive and dynamic learning experiences. Moreover, digital archives, online databases, and virtual museums provide access to extensive historical data, empowering students to explore primary sources and conduct independent research. Collaborative platforms foster teamwork, critical thinking, and analytical skills, making the learning environment more engaging and inclusive. By blending traditional methods with technological innovations, educators can create more effective and enriching educational experiences.

The advent of the Common Core Standards, which emphasizes technology and integrates digital tools, and the SAMR Model have become a school priority (Cristen, 2019). Technology positively impacts student learning by promoting engagement, often leading to better information retention. As technology continues to evolve globally, it remains highly relevant to students' lives. Technology-enabled hands-on learning opportunities can be integrated into various subjects, including mathematics, science, reading, and social studies, providing collaborative environments where students can learn from one another. These factors collectively enhance student motivation and academic achievement. The SAMR Model (Substitution, Augmentation, Modification, and Redefinition) enhances literature teaching by enabling educators to integrate technology in ways that transform learning. It allows teachers to evaluate their use of technology, redesign lesson plans, and create activities that foster more profound understanding and engagement. By adopting the SAMR Model, educators can develop interactive and collaborative projects, link literature to real-world contexts, and address diverse learning needs. This model also supports digital literacy development, encouraging creativity and innovation in literary analysis.

This study, conducted by a junior high school literature teacher, suggests that focusing on students' needs and creating enjoyable learning experiences can benefit literature instruction. Utilizing the SAMR Model to assess and implement technology can help teachers seamlessly integrate digital tools into the curriculum. This approach encourages deeper engagement, enhances critical thinking, and significantly improves the educational experience. Thus, this study assessed the use of the SAMR model in teaching literature in junior high school.

2.0 Methodology

2.1 Research Design

This study employed a descriptive research design to explore using the SAMR Model in teaching Literature in Junior High School. According to Siedlecki (2020), descriptive research involves gathering information about prevailing conditions or situations to describe individuals, events, or environments in real-life educational contexts. This method focuses on studying the characteristics of populations, identifying existing problems within a unit, or comparing variations in practices across institutions. In this study, descriptive analysis included both qualitative and quantitative data. Qualitative methods provided an in-depth understanding of participants'

experiences and perceptions, while quantitative methods facilitated numerical data collection and statistical analysis. Together, these approaches offered a comprehensive insight into the impact of the SAMR Model on teaching Literature in Junior High Schools.

2.2 Research Participants

The study included 60 English teachers from private junior high schools in Batangas. Inclusion criteria required participants to be employed in schools with valid operating permits. For qualitative data, the researcher obtained written permission from school principals through formal letters endorsed by the research adviser and approved by the Dean of the College of Teacher Education.

2.3 Research Instrument

The main instruments for data collection were a researcher-made questionnaire and a semi-structured interview. The questionnaire was carefully developed to ensure content validity, clarity, and alignment with the study's objectives. The interview was a supplementary tool to validate and enrich the quantitative findings.

2.4 Data Gathering Procedure

The researcher followed a systematic procedure for data collection. First, permission was secured from private schools with an operating permit. Next, the researcher coordinated with school heads in Batangas City to identify eligible participants. Formal letters endorsed by the research adviser and approved by the Dean were then sent to principals to obtain approval. Once consent was granted, the survey and interview were conducted.

2.5 Ethical Considerations

The researcher followed a systematic procedure for data collection. First, permission was secured from private schools with operating permits for SY 2023–2024. Next, the researcher coordinated with school heads in Batangas City to identify eligible participants. Formal letters endorsed by the research adviser and approved by the Dean were then sent to principals to obtain approval. Once consent was granted, the survey and interview were conducted.

3.0 Results and Discussion

3.1 Profile of the Teachers

Table 1 indicates that the respondents' years of experience are evenly distributed: 20 are beginners (0-3 years), 21 are transitioning (4-5 years), and 19 are experienced (more than 5 years). Most teachers in the initiation and transition stages are more likely to adopt new technologies like the SAMR model. While experienced teachers may need more time to adjust, their background enables them to mentor peers and support effective implementation of technology-based teaching methods.

Table 1. *Respondents' Years of Experience*

Categories	Frequency	Percentage
Beginning (0-3 years)	20	33.30
Transitioning (4-5 years)	21	35.00
Experienced (more than 5 years)	19	31.70
Total	**60**	**100**

The distribution of the teacher-respondents' highest educational attainment in Table 2 shows that 36 hold a bachelor's degree, and 24 have a master's degree, indicating that most have achieved undergraduate qualifications. Master's degree holders are likely better equipped with advanced pedagogical skills and research-based strategies, making them more effective in implementing frameworks like SAMR. Meanwhile, although professionally capable, bachelor's degree holders may need additional support to adapt to modern educational technologies and strategies.

Table 2. *Respondents' Highest Educational Attainment*

Categories	Frequency	Percent
Bachelors' Degree	36	60.00
Masters' Degree	24	40.00
Total	**60**	**100**

Table 3 depicts the number of trainings and seminars attended by the teacher-respondents, which varies from a

few to several. Between 1 and 5 workshops were participated in by 31 teachers. However, 29 teachers attended seminars numbering six or more. It is nearly a tie. Most of the teachers have experienced some form of professional development, but the frequency and depth differ among them. Teachers with 6 or more seminar hours have been trained to infuse many new teaching strategies and educational technologies. Such training gives them confidence to apply the SAMR model and other digital tools in their classrooms, making them apt coaches to less-trained colleagues. Teachers who attended 1-5 seminars still develop their skills in effective technology integration. These teachers require more training in the practical application of the SAMR model to enhance their self-confidence and competence in using technology for teaching.

Table 3. *Respondents' Number of Trainings and Seminars Attended*

Categories	Frequency	Percent
1-5 Seminars	31	51.70
6 Seminars and more	29	48.30
Total	**60**	**100**

3.2 Extent of Teachers' Use of the SAMR Model in Teaching Literature

Below is the extent to which teachers use the SAMR Model (Substitution, Augmentation, Modification, and Redefinition) in teaching literature.

Substitution

At the substitution level found in Table 4, the teachers have displayed an average technology use in place of the old ways in teaching literature, as it has a generally weighted mean of 3.17. The items that garnered the highest scores were the online quizzes or assessments, which scored a WM of 3.38, and the integration of educational apps, with a score of 3.33. This signifies that testing was evident among the different frequencies in the use of digital tools. A mid-score item deals with creating and collaborating to distribute information digitally through applications like Padlet or Google Slides. WM = 3.25. It represents a medium acceptance rate for collaborative digital tools. The lowest rated was the storyboard apps. WM = 2.90. At least on some of the applications, integration was less thorough.

Table 4. *Extent of Utilization of the SAMR Model in Teaching Literature relative to Substitution*

	Indicators	Mean	SD	Interpretation
1.	I incorporate online quizzes or assessments, substituting the traditional paper-based tests.	3.38	0.55	Moderate Extent
2.	I integrate educational apps for literature classes.	3.33	0.60	Moderate Extent
3.	I instruct students to type and submit their work electronically instead of handwritten assignments.	3.28	0.61	Moderate Extent
4.	I create and share information digitally using platforms like Padlet or Google Slides.	3.25	0.70	Moderate Extent
5.	I replace physical copies of novels, stories, poems and other literary piece with digital versions, allowing students to read and annotate on e-readers or tablets.	3.20	0.77	Moderate Extent
6.	Instead of physical book reports, I ask students to create digital presentations or blogs to share their analyses and interpretations of literary works.	3.18	0.67	Moderate Extent
7.	In literature analysis, I use digital annotations tools or apps instead of traditional highlighting and margin notes.	3.03	0.61	Moderate Extent
8.	I use online discussion forums or chat platforms to facilitate class discussions about literature.	2.95	0.62	Moderate Extent
9.	I use Storyboard that, an app for making storyboards in literature.	2.90	0.91	Moderate Extent
Overall		**3.17**	**0.38**	**Moderate Extent**

The study highlights that teachers frequently substitute traditional tools with digital platforms like Padlet and Google Slides, improving efficiency but not fundamentally transforming instruction. While digital annotation tools and online discussion forums make literature engagement more interactive, their moderate adoption suggests reluctance or systemic barriers to deeper integration. The SAMR model indicates that technology substitution is widely embraced, yet progress beyond this level remains limited. As De Morais Bicalho et al. (2022) noted, while substitution enhances productivity, educators must critically reflect on whether these changes enrich learning experiences or merely digitize existing tasks. Drugova et al. (2021) also emphasize that advancing into higher SAMR levels, where technology transforms and redefines tasks, significantly increases student engagement and learning outcomes. To support this shift, additional professional development and institutional support could encourage educators to explore Augmentation, Modification, and Redefinition, allowing technology to replace and enhance and transform literature instruction.

Augmentation

The data collected on the level of augmentation of the SAMR model in Table 5 indicated that teachers moderately applied it for the use of technology to enhance improvement, with a mean rating of 3.17. This therefore suggests that while improvement and augmentation using technology by teachers occur, potential still exists in the utilization of technology more integrally to make the learning even richer. The highest-rated practice in this category is multimedia presentation with tools such as PPT, Prezi, or Canva (WM = 3.55 or interpreted as to a great extent). It suggests that teachers appreciate that multimedia features can make the presentation more interesting and informative for the students. This might be through images, videos, and animations, which facilitate a literature presentation in ways that can capture the students' attention and explain thick themes or concepts.

Table 5. *Extent of Utilization of the SAMR Model in Teaching Literature relative to Augmentation*

	Indicators	Mean	SD	Interpretation
1.	I give more informative and engaging oral presentations accompanied by PPT, Prezi, Canva or similar applications containing multimedia elements.	3.55	0.64	Great Extent
2.	I use supplemented video that clarifies a particularly hard-to-explain concepts.	3.38	0.69	Moderate Extent
3.	I encourage students to collaborate on analyzing and annotating a digital version of a novel using real-time collaborative tools like Google Docs.	3.37	0.66	Moderate Extent
4.	I integrate online forums or discussion boards where students not only discuss literature but also share relevant multimedia content related to the themes and motifs of the works being studied.	3.27	0.66	Moderate Extent
5.	I use an EdTech program that gamifies curriculum content for student engagement and allows students to track progress in an accessible way.	3.17	0.76	Moderate Extent
6.	I encourage students to use multimedia tools to create interactive timelines, character maps, or concept maps to visually represent the structure and elements of literary works.	3.10	0.83	Moderate Extent
7.	In vocabulary exercises, I use interactive language learning apps that provide instant feedback and adaptive challenges based on individual progress.	2.93	0.75	Moderate Extent
8.	I utilize virtual reality (VR) or augmented reality (AR) applications to immerse students in settings related to the literature being studied, providing a more experiential learning experience.	2.88	0.80	Moderate Extent
9.	I facilitate online literature circles using platforms like Google Meet or Zoom, where students discuss assigned readings in small groups.	2.88	0.84	Moderate Extent
Overall		**3.17**	**0.41**	**Moderate Extent**

Other practices include, for instance, using supplemented video support for complex topics (WM = 3.38) and having students work in small groups to produce digital texts on Google Docs (WM = 3.37). These supports extend traditional literary analysis by allowing for real-time collaboration and supplementing learning with multimedia, but do not change the essential nature of the tasks. Another area in which teachers are starting to use technology to engage their students is through using the EdTech programs that transform the curriculum into a game format, such as "LiteratureQuest" (WM = 3.17). In this sense, gamification motivates these students because it turns reading and analysis into more interactive activities, though still moderately applied.

Supporting research from Haleem et al. (2022) emphasizes the value of interactive and collaborative tools such as Google Docs, multimedia platforms (PowerPoint, Prezi), and gamified learning environments in fostering active learning. As demonstrated by programs like LiteratureQuest, gamification motivates students by making reading and literary analysis more interactive. Bhutoria (2022) further supports this by highlighting how adaptive technologies personalize learning, offering instant feedback and tailored challenges that enhance academic performance. While interactive apps, concept maps, and timeline creators are moderately used, their further development could enhance educational efficiency. However, resource-intensive technologies like virtual and augmented reality remain underutilized, despite their potential to deepen experiential learning. This limited adoption signals the need for teacher training to maximize the benefits of these tools. Overall, integrating technology at the augmentation level facilitates personalized learning, fosters collaboration, and improves comprehension, ensuring literature instruction evolves to meet the needs of modern students.

Modification

Simply examining the lens of utilization of the SAMR Model, particularly for its modification level in Table 6, it follows that the teachers have manifested a varying level of technology. On average, a general weighted mean score of 3.09 stands out from the computation of the scores, indicative of the moderate extent of technology application in literature teaching. Among the different practices rated, multimedia resources, such as author interviews and documentaries, were the most utilized, with a weighted mean of 3.23. This means that teachers use them quite frequently because they are believed to positively impact students' comprehension of the literature. Multimedia connects students with texts more intimately and exposes them to several perspectives of

the same problem, making learning more diverse and holistic.

Table 6. *Extent of Utilization of the SAMR Model in Teaching Literature relative to Modification*

Indicators	Mean	SD	Interpretation
1. In literature analysis, students utilize multimedia author interviews, documentaries, or relevant video content to deepen their understanding and modify their perspectives on the works being studied.	3.23	0.72	Moderate Extent
2. I create an informative video presentation in place of a standard oral presentation.	3.18	0.87	Moderate Extent
3. I use a technological tool that makes an abstract concept visible in a hands-on, responsive way. For instance, suppose you're teaching a unit on symbolism in literature, and you want to help students understand the abstract concept of symbolism in a more concrete and interactive manner. You could use an AR or VR tool that allows students to overlay digital images or 3D models onto real-world objects or environments.	3.13	0.76	Moderate Extent
4. I integrate interactive simulations or role-playing activities online, allowing students to modify and explore different scenarios based on the themes of the literature.	3.13	0.81	Moderate Extent
5. Instead of individual writing assignments, students could collaborate on literary projects using online platforms such as Google Docs or Microsoft Teams. This modification promotes collaborative learning and allows students to collectively modify and refine their literary analyses, essays, or creative writing pieces in real time.	3.12	0.73	Moderate Extent
6. Instead of traditional book reports, I ask students to create interactive digital portfolios showcasing their modified interpretations, analyses, and creative responses to literature.	3.05	0.74	Moderate Extent
7. I use podcasts in summarizing a topic, which can then be accessed by other teachers as a revision resource.	2.78	0.95	Moderate Extent
Overall	**3.09**	**0.52**	**Moderate Extent**

On the other end, the lowest score in rating is when it comes to using podcasts to summarize what has been discussed, amounting to a weighted mean of 2.78. A lower frequency to use it may be observed, such as teachers applying different forms of technology during their instruction, but more innovative materials like podcasts appear to remain underutilized. From the results gathered, this could mean the teachers still do not enjoy the level of comfort in using new technologies and applying them within their instructional routines. Even though there is moderate acceptance and application of technology in teaching literature, the room for improvement remains huge. Teachers need to further explore more transformative practices by taking the full potential of technology into the classroom. Professional development initiatives can fill this gap that is left to date, especially on podcasting and AR/VR tools, as comfort and familiarity are presently missing from the teachers.

The modification level in the SAMR model is crucial. While the average ratings for the overall span of practices suggest that teachers are beginning to accept the idea of changing a traditional activity, considering technology, there is still much scope for a much greater change. For instance, listening to podcasts for revision purposes (WM = 2.78) and using AR/VR to experience something firsthand have a very low rating. These areas point to a gap that might be filled through relevant professional development in which teachers would learn and feel comfortable applying these newer technologies. Chen et al. (2022) support this, as highlighted in their abstract, that abstract difficult-to-understand concepts can be explored through interactive simulations, augmented reality (AR), and multimedia resources. For example, where AR tools are used in visualizing symbolism in the text, video presentations may replace those oral ones instead of the traditional oral reports. These changes can prove very pedagogically facilitative as learners work on or internalize the material in ways that are impossible under more conventional methods.

Redefinition

The analysis of the SAMR Model usage level, based on teaching literature, particularly in the Redefinition stage in Table 7, shows a weighted mean score of 3.14, indicating that overall application of technology was moderately carried out. This assessment also involves students in actual problem-solving with the real world through literature, with a weighted mean of 3.40. In such a course, this method would enable the learners to solve some real-life problems by utilizing their understanding of the text in question. Through this approach, the literature is given significance by teachers but simultaneously boosts critical thinking and creativity, where real-life applications or implications emerge and are discovered.

Table 7. *Extent of utilization of the SAMR Model in Teaching Literature relative to Redefinition*

Indicators	Mean	SD	Interpretation
1. Instead of traditional written exams, I engage students in real-world problem-solving using literature, collaborating on projects that address societal issues depicted in the texts studied.	3.40	0.69	Moderate Extent
2. I record students as they deliver a presentation or practice a physical skill, then use this recording to prompt student reflection.	3.28	0.73	Moderate Extent
3. I create interactive simulations where students become characters in literary worlds, making decisions and influencing the narrative, providing a dynamic and engaging experience.	3.22	0.69	Moderate Extent
4. I ask students to create interactive, choose-your-own-adventure style digital stories inspired by the themes of the literature, redefining the concept of reader engagement and agency.	3.17	0.71	Moderate Extent
5. I let my students connect with other people around the world as part of the literary learning journey.	3.15	0.91	Moderate Extent
6. I ask students to publish their literary works online where it can be viewed by peers and the broader community.	3.13	0.79	Moderate Extent
7. I facilitate online literature symposiums where students present their literary analyses to a global audience, redefining the audience and purpose of academic discussions.	3.05	0.76	Moderate Extent
8. Instead of traditional classroom discussions, students participate in national or global literature debates using video conferencing tools, redefining the scope and audience of literary discourse.	2.70	0.86	Moderate Extent
Overall	**3.14**	**0.51**	**Moderate Extent**

The lowest was in the use of video conferencing tools to facilitate national or even international literature debates, with a score of 2.70 on the weighted mean scale. This indicates that whereas some teachers want to encourage more discussions than these, the practice has not been commonly implemented. The rating may mean that many instructors don't have the power or resources to apply these creative ideas effectively. As a result, students have fewer opportunities to practice critical thinking by mingling with peers from diverse parts of the world. It suggests that although teachers embrace innovative practices to teach literature, much room remains for improvement. Professional development programs focusing on technology can help them explore more transformative approaches, improving the use of video conferencing for global discussions. In doing so, there is a better engagement for students and enrichment of activities in learning, making the literature more effective and relevant, especially in today's forever-connected world.

Research backing the idea of connecting these students with peers overseas states that it significantly shifts the learning experience. For example, publishing their work online also expands the reach of valuable feedback to the students, enhancing students' engagement and investment. This is how this practice develops community and helps students to understand their ideas as a part of a larger conversation (Kelsch & Wang, 2021). Generally, at the Redefinition stage, technology may help apply literature to real life, make students think more critically about the issues prevailing in society, and creatively work on the material (Zhai et al., 2024).

3.3 Differences in the Extent of Utilization of the SAMR Model when Grouped according to Profile Variables

Findings on the gaps of the differential meaning when categorized by years of experience in Table 8 show no statistical meaning difference among the levels of the SAMR model: substitution, augmentation, modification, and redefinition. This analysis reveals that regardless of whether it is a beginning, transitional, or seasoned teacher, these teachers are still working within a similar vein concerning the model. For the Substitution level, the means are: 3.07 for starting teachers, 3.26 for mid-career teachers, and 3.18 for experienced teachers. The H-value of 2.702 and p-value of .259 indicate that the differences are insignificant, leading to the failure to reject H0. This would mean that all groups are on equal practicing level for substitution, and therefore, replacing the old traditional tools with digital counterparts is a common practice by all teachers, irrespective of their level of experience.

In the Augmentation level, the means are also closely aligned: 3.24 by the novice teachers, 3.12 by the transitional teachers, and 3.15 by the experienced teachers. The H-value of 0.858 and p-value of .651 further cement that augmentation practices are not significantly different. Teachers commonly understand how traditional practices are amended with technology; yet, at this level, it concludes that no cohort is superior in innovative applications. The mean scores for the Modification level are 3.08, 3.13, and 3.06 for beginning, transitioning, and experienced teachers, respectively. Again, differences not significant, with an H-value of 0.160 and p-value of .923. This means all groups are alike in modifying practice using technology, as experience does not provide intuitive evidence. Then, at the Redefinition level, average scores for starting teachers are 3.13, transitional teachers with an average of 3.10, and experienced teachers with an average score of 3.19. The H-value was 0.642, and the p-value was .725, indicating that differences have not been that significant. This means

that although some teachers have just started redefining their teaching using technology, the scope of this change is not significantly different between inexperienced and experienced teachers.

Table 8. *Difference in the Extent of Utilization of the SAMR Model when Grouped according to Years of Experience*

	Mean	SD	H	p	Decision on H0	Interpretation
Substitution						
Beginning	3.07	0.32	2.70	.259	Failed to Reject	Not Significant
Transitioning	3.26	0.38				
Experienced	3.18	0.42				
Augmentation						
Beginning	3.24	0.48	0.85	.651	Failed to Reject	Not Significant
Transitioning	3.12	0.28				
Experienced	3.15	0.48				
Modification						
Beginning	3.08	0.55	0.16	.923	Failed to Reject	Not Significant
Transitioning	3.13	0.54				
Experienced	3.06	0.48				
Redefinition						
Beginning	3.13	0.62	0.64	.725	Failed to Reject	Not Significant
Transitioning	3.10	0.36				
Experienced	3.19	0.53				

Generally, the results show that although the teachers of all the experience levels use the SAMR model to a considerable extent, their application has no significant differences. This is one potential direction for focused professional development to promote deeper technology integration for all teachers. This should facilitate cooperation and sharing best practices that could raise the standards on applying the SAMR model, resulting in much more innovative and effective teaching of literature. The experience does not relate directly to the depth of technology integration in teachers' teaching practices. Bicalho et al. (2022) pointed out that research underscored that technology should be integrated at deeper levels through structured professional development to support experience at all levels. They found out that experienced teachers mostly use technology at the levels of substitution and augmentation, while not developing transformation levels, including modification and redefinition. While many teachers are receiving their training based on the SAMR model, the transition from low levels to high requires specific training and assistance that would help all educators. The fact that there is a slight variation in the application of technology by teachers with diverse experience underlines the importance of CPD so that teachers can engage more deeply with the SAMR framework to facilitate better and innovative pedagogical approaches further. (Blundell et al., 2022)

Regarding the variations in the degree of SAMR model implementation based on the highest educational attainment in Table 9, the results showed no statistical significance difference between the various extents of the model- Substitution, Augmentation, Modification, and Redefinition. The application of the SAMR model by the baccalaureate degree holder and master's degree holder is similar. Mean scores at the Substitution level are 3.15 for teachers holding a bachelor's degree and 3.20 for a master's degree holder. U-value = 396.000 and p-value =.585. It is interpreted that the difference between them is not significant. Both have had equal opportunities to use technology to support and complement conventional methods in their teaching work.

Table 9. *Difference on the Extent of Utilization of SAMR Model when Grouped according to Highest Educational Attainment*

	Mean	SD	U	p	Decision on H0	Interpretation
Substitution						
Bachelors' Degree	3.15	0.36	396.00	.585	Failed to Reject	Not Significant
Masters' Degree	3.20	0.41				
Augmentation						
Bachelors' Degree	3.20	0.40	398.00	.607	Failed to Reject	Not Significant
Masters' Degree	3.12	0.44				
Modification						
Bachelors' Degree	3.04	0.55	376.50	.400	Failed to Reject	Not Significant
Masters' Degree	3.17	0.46				
Redefinition						
Bachelors' Degree	3.11	0.54	414.00	.785	Failed to Reject	Not Significant
Masters' Degree	3.18	0.46				

In the Augmentation level, the average scores are 3.20 among bachelor's degree holders and 3.12 among master's degree holders. U-values are .398.000, and p-values are low again, at .607; again, no significant differences appear. This means that both groups approach integration similarly toward improving their teaching skill, with no evidence that an increase in the educational levels accompanies greater creativity in application. In the case of the Modification level, a mean score is seen for both bachelor's and master's degree holders as 3.04 and 3.17, respectively. The value of U is 376.500, and the p-value is .400, which shows that at a 0.05 level of significance, both the groups under consideration are not statistically different. Both groups modified their practice to teach at nearly the same rate, and educational attainment has no noticeable effects when using technology to change tasks.

At the Redefinition level, mean scores are 3.11 for bachelor's degree holders and 3.18 for master's degree holders. The U-value is 414, and the p-value is p-value.785 supports the finding that there are no significant differences. Therefore, regardless of their highest educational level, teachers are not differently oriented towards redefining their teaching practice using technology. The overall results showed no critical difference across the educational levels; thus, both groups use the SAMR model similarly. This could result in the inference that, however much higher academic level may make a teacher more pedagogically and technologically sophisticated, it does not necessarily convert into the wider or even more creative application of the SAMR model in literature on teaching.

Such findings indicate the need for professional support, which should be more accessible to all teachers, especially in schools with a weak educational background. Educators who are encouraged through collaborative learning environments and targeted training should successfully explore deeper forms of technology use in literature instruction for better student engagement and learning outcomes. This means that the use of technology in teaching practices is deemed the same for all educators regardless of degree level. This would suggest that teachers use technology similarly unless there is directed, ongoing professional development. Your research finding does seem to support this fact in that the bachelor's degree recipient and the master's degree recipient use SAMR similarly.

Furthermore, neither group of teachers has significantly outperformed the other within the SAMR model at the more transformed levels of the model (Zhang, 2022). Professional development focused on all teachers' needs must be pursued to integrate technology more deeply. That means, in turning the schools' desire to have better-educated instructors who could become more competent into a common reason for them to learn even more, it could instead address the problem directly by offering ongoing education that would support the proper application of technology by any level's instructor (Rablin, 2024).

The number of seminars attended, and trainings taken, as found in Table 10, relate to professional development and its impact on using the SAMR model in teaching literature. This example shows that most use levels of the model encompass Substitution, Augmentation, and Modification. No significant differences were found between teachers who had attended 1 to 5 seminars and those who had participated in 6 or more conferences. In contrast, a difference was found to be significant at the level of Redefinition.

Table 10. *Difference in the Extent of Utilization of the SAMR Model when Grouped according to Number of Trainings and Seminars Attended*

	Mean	SD	U	p	Decision on H0	Interpretation
Substitution						
1-5 Seminars	3.09	0.33	337.00	.094	Failed to Reject	Not Significant
6 and more	3.26	0.41				
Augmentation						
1-5 Seminars	3.18	0.41	443.50	.929	Failed to Reject	Not Significant
6 and more	3.16	0.43				
Modification						
1-5 Seminars	2.99	0.55	361.00	.188	Failed to Reject	Not Significant
6 and more	3.20	0.46				
Redefinition						
1-5 Seminars	3.00	0.54	316.50	.048	Reject	Significant
6 and more	3.29	0.43				

For the Substitution level, the mean scores indicate 3.09 for teachers who attended 1-5 seminars and 3.26 for

those who attended six or more meetings. The U-value of 337.00 and p-value of .094 indicate no significant difference, thus not rejecting the null hypothesis (H0). This finding shows that both groups are on an equal footing in substituting traditional teaching methods with technology, whereby the number of seminars attended makes no difference. For the Augmentation level, mean scores are 3.18 for the workshops of 1-5 and 3.16 for the seminars of 6 or more. The U-value of 443.500 and p-value of .929 all support the fact that there is no real difference in how technology is used to heighten teaching practices. This implies that the degree to which teachers augment traditional tasks with technology does not depend on the number of seminars attended.

While seminars aim to equip teachers with new skills, their effectiveness depends on whether they address the real-world constraints educators face. Successful professional development models emphasize hands-on training, peer collaboration, and contextual application. The TPACK framework (Technological Pedagogical Content Knowledge) provides a valuable lens for understanding this dynamic, as it emphasizes the need for teachers to integrate technology in ways that align with their subject matter and teaching strategies. Effective programs should introduce new tools and offer guidance on overcoming barriers, such as strategies for managing time constraints and advocating for institutional support.

On the Modification scale, average scores are 2.99 for workshops of 1-5 and 3.20 for workshops of 6 or more. The U-value of 361.00 and p-value of .188 indicate no significant difference. Therefore, while there may be a slight difference between teachers who attended more workshops and other teachers in the sense that the former may have slightly modified their practice, this is not statistically significant. The mean scores for Redefinition level among the teachers who attended 1 to 5 seminars were only 3.00. The mean scores for teachers who attended more than six seminars stood at 3.29. Since the U-value was 316.500 and the p-value was 048, the observed difference was highly significant in rejecting H0. This means that some teachers have attended more seminars likely to show redefined teaching practices through transforming learning experiences using technology.

A significant difference at the Redefinition level shows that more professional development opportunities can empower teachers to create innovative and interactive learning environments. This finding raises the importance of continuous professional development through enhancing teachers' ability to use technology creatively in their instruction. The number of seminars has very little influence on the use of SAMR models at substitution, augmentation, and modification; however, the number of workshops plays a critical role in how the teachers redefine their practice. This makes professional development training very important to motivate teachers to adopt more transformative teaching practices that use technology effectively. The findings indicate that educators who attend more seminars demonstrate greater application of Redefinition practices, such as engaging students in real-world problem-solving, facilitating interactive digital storytelling, and connecting learners to global literary discourse. These transformative approaches require a depth of technological proficiency and pedagogical innovation that general teaching experience alone may not provide. One possible explanation for this gap is that professional development seminars often focus on cutting-edge technology use, encouraging educators to push beyond basic integration. Substitution and augmentation allow for straightforward improvements in efficiency and accessibility, such as transitioning (Bradley, 2020). This supports that there were no significant differences between teachers attending one to five seminars versus those attending six or more at the substitution, augmentation, and modification levels.

3.4 Processes Used by Teachers in Integrating Technology for Literature Instruction

This study explores the application of the SAMR Model in teaching Literature in private junior high schools. Using thematic analysis, the research identifies teachers' technology use patterns and aligns these practices with the SAMR Model's levels—Substitution, Augmentation, Modification, and Redefinition. Findings highlight practical applications, challenges like limited resources, and the transformative potential of technology in enhancing student engagement and instructional practices. The study proposes guidelines for teachers leveraging technology for more dynamic and effective literature instruction.

Impacts of Technology Integration on Educational Transformation

This theme showcases teachers' understanding of the SAMR model and its role in integrating technology to enhance teaching. Their responses illustrate how progressing from Substitution to Redefinition transforms basic technology use into innovative learning opportunities.

"When we say Substitution, technology is used as a direct substitute for a traditional tool without a significant change in

the task. Augmentation – the technology still serves as a substitution but offers functional improvement. Modification is when technology makes substantial changes in designing new possibilities, and using Redefinition means technology allows for creating new tasks that were previously unimaginable.

These explanations reveal that teachers understand both the technical and pedagogical aspects of the SAMR model and recognize its potential to enhance learning. They see how Substitution and Augmentation improve teaching incrementally, while Modification and Redefinition enable transformative, creative, and engaging student experiences.

Technology Availability and Its Impact on SAMR Implementation

This theme explores how technological resource availability influences the SAMR model's effective adoption. Teachers highlighted that access to reliable infrastructure is essential for progressing through the levels of SAMR. Schools with sufficient resources empower educators to explore higher-level tasks, while those with limited infrastructure are often restricted to basic technology use.

"Since we are provided with internet connection facilities, I can say that the implementation of the SAMR model is effective. We also have an LMS to transfer learning and administrative activities."

This statement shows that infrastructure contributes to the adoption of technology. Teachers in schools with sufficient resources find it easier to innovate and design tasks that enhance student engagement and learning outcomes. Reliable technology also allows teachers to explore complex tasks that foster collaboration and critical thinking.

Strategic Technology Utilization to Foster Engagement and Collaboration in Education

This theme centers on the various methods teachers use to maintain high student engagement levels while implementing the SAMR model. Participants acknowledged that engaging students effectively requires intentional strategies that align technology use with learning objectives. They recognized that integrating technology meaningfully enhances the learning experience and fosters greater interaction and participation among students.

"As a teacher, I employ a high level of student engagement when using technology to ensure that technology integration aligns with specific learning goals and objectives that provide purpose and relevance for students, increasing their engagement."

This theme centers on the various methods teachers use to maintain high student engagement levels while implementing the SAMR model. Participants acknowledged that engaging students effectively requires intentional strategies that align technology use with learning objectives. They recognized that integrating technology meaningfully enhances the learning experience and fosters greater interaction and participation among students.

Teamwork and Time Management in Technology-Enhanced Teaching

This theme investigates how teachers navigate the complexities of planning and implementing technology-based lessons. Educators recognize that effectively managing time and resources is crucial to successfully integrating technology into their teaching practices. By employing various strategies, teachers can streamline their efforts and enhance the quality of their lessons.

"Managing the additional time required for planning and implementing technology-enhanced lessons can be challenging, but it's essential to plan, use templates, collaborate, and utilize technology tools effectively."

"I prioritize and schedule specific blocks of time for lesson planning. I also use ready-made resources and tools to streamline the process."

These statements highlight that collaboration saves time and enhances lesson quality by incorporating diverse perspectives and expertise. Teachers recognize that working together fosters a supportive environment where they can learn from each other and improve their practices.

3.5 Guidelines for the teachers in the Use of the SAMR Model

The integration of technology in education has become increasingly important in modern classrooms. The SAMR Model (Substitution, Augmentation, Modification, and Redefinition) provides a structured framework for educators to incorporate technology into their teaching practices effectively. This research aimed to prepare guidelines for teachers to utilize the SAMR Model, ensuring that technology integration enhances student learning and engagement. The study revealed that private junior high school English teachers need more professional development to use the SAMR model and educational technologies better. Despite having varied backgrounds and some experience with the SAMR Model, they only moderately use it, indicating room for improvement. Teachers who attended more seminars used the Redefinition level more effectively. Challenges like limited resources and time constraints hinder full implementation. In line with this, the researcher prepared guidelines wherein teachers can move beyond merely substituting traditional tools with digital ones and transform their teaching methods to create dynamic and interactive learning environments. This transformation is essential for fostering a more engaging and practical educational experience, ultimately preparing students for the demands of the 21st century.

The proposed guidelines aim to assist teachers in effectively using the SAMR model in teaching literature, addressing the identified gaps and challenges, and providing structured support to enhance teachers' abilities to integrate technology and transform their instructional practices.

Table 9. *Guidelines for the Teachers in the Use of the SAMR Model*

Phase	Goal	Examples	Teachers Actions
Substitution (Tech acts as a direct tool substitute, with no functional change)	Introduce technology as a simple replacement for traditional tools.	**Instead of:** Reading a printed text. **Use:** An e-book or PDF version of the text on a tablet or computer. **Instead of:** Writing essays by hand. **Use:** Word processing software (e.g., Google Docs, Microsoft Word). **Instead of:** Handing out paper copies of poems. **Use:** Displaying poems on a projector or interactive whiteboard.	• Ensure students are comfortable accessing and using basic digital versions of texts. • Provide tutorials on basic word processing skills. Focus on the content of the literature, not the technology itself.
Augmentation (Tech acts as a direct tool substitute, with functional improvement)	Enhance the learning experience through the functionality of technology.	**Instead of:** Simply reading an e-book. **Use:** E-books with features like text-to-speech, built-in dictionaries, or highlighting and annotation tools. **Instead of:** Writing essays in a basic word processor. **Use:** Word processing with features like spell check, grammar check, thesaurus, and track changes for peer review. **Instead of:** Displaying poems on a projector. **Use:** Interactive whiteboards to annotate poems as a class, highlight key literary devices, or collaboratively brainstorm interpretations.	• Introduce students to the advanced features of the technology. • Model how to use these features effectively. Encourage students to use these features to improve their understanding and analysis of the text.
Modification (Tech allows for significant task redesign)	Redesign learning tasks to incorporate technology in a meaningful way.	**Instead of:** Writing a traditional b ook report. **Use:** Creating a digital multimedia presentation with images, audio, and video to analyze the characters, themes, and setting of a novel. **Instead of:** Answering basic comprehension questions. **Use:** Participating in online discussion forums or blogs to analyze literary themes, share personal interpretations, and engage in debates with classmates. **Instead of:** Memorizing poems. **Use:** Creating digital audio recordings of their own dramatic readings of poems, incorporating sound effects and music.	• Design learning activities that require students e technology to create, collaborate, and communicate. • Provide clear guidelines and rubrics for these activities. Offer opportunities for students to share their work with a wider audience (e.g., through a class blog or website).
Redefinition	Transform the learning	**Instead of:** Simply studying Shakespearean	• Encourage students to think

(Tech allows for the creation of new tasks, previously inconceivable)	experience by creating new tasks that would be impossible without technology.	plays. **Use:** Creating interactive, branched narrative stories using tools like Twine or Inkle writer, where students adapt the plot or characters of a Shakespearean play for a modern audience. **Instead of:** Writing traditional essays. **Use:** Collaboratively creating a digital annotated edition of a literary text, incorporating multimedia annotations, historical context, and critical analysis. **Instead of:** Analyzing a text in isolation. **Use:** Participating in a global online book club, connecting with students from other countries to discuss shared readings and cultural perspectives.	creatively and explore new possibilities with technology. • Provide access to a range of digital tools and resources. • Facilitate collaboration and communication among • students, and with experts or audiences beyond the classroom.

4.0 Conclusion

The findings highlight that private junior high school English teachers in Batangas possess diverse teaching experiences, primarily hold bachelor's degrees, and have attended a moderate number of seminars. While professional development remains crucial, especially in applying the SAMR Model effectively, its impact on Substitution and Augmentation levels appears limited, likely due to pressing barriers such as resource constraints and workload demands. Despite moderate usage of the SAMR Model across all levels, opportunities remain for deeper technology integration to enhance instruction. Seminar participation showed an apparent influence at the Redefinition level, suggesting that hands-on training, exposure to advanced pedagogical frameworks, or structured collaborative learning may be key drivers of higher-level technology adoption. However, professional development alone may not be sufficient without addressing teachers' practical constraints. The proposed guidelines should focus on practical strategies, such as time-efficient tech integration models, access to adaptable digital tools, and institutional support mechanisms to ensure meaningful implementation.

Additionally, professional development initiatives should address the systemic barriers that hinder lower-level SAMR applications, offering targeted solutions for resource limitations and workload management. Future research should explore long-term impacts of professional development, variations in institutional support, and strategies for sustaining higher-level technology integration. By refining professional development approaches and addressing practical constraints, educators can more effectively navigate the complexities of technology-enhanced literature instruction, ultimately improving student engagement and learning outcomes.

5.0 Contributions of Authors

The first author significantly contributed to the research by conceptualizing ideas, designing methodologies, conducting data analyses, drafting manuscripts, and revising them based on feedback. The second author served solely as the adviser, providing consultation during the conception and design phases to ensure clarity and relevance. The second author also guided the first author in refining methodologies and addressing critical aspects of the research. The authors confirm that they reviewed and approved the final manuscript.

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Challenges and Support Systems for Non-Early Childhood Education Teachers in Kindergarten Instruction

Cherry R. Gastador*, Queenie Lyn G. Almerez, Amelie E. Trinidad, Augie E. Fuentes, Dulce Marie A. Martinez
Institute of Graduate and Professional Education, Davao del Sur State College
Matti, Digos City 8002, Davao del Sur, Philippines

*Corresponding Author Email: cherry.gastador@dssc.edu.ph

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Abstract. This study explored the instructional challenges and support systems encountered by non-Early Childhood Education (non-ECE) teachers in kindergarten settings. Recognizing the increasing deployment of non-ECE graduates in early childhood programs, the study examined how gaps in training, pedagogical alignment, and classroom management affected instructional effectiveness. A qualitative, phenomenological approach was utilized, involving in-depth interviews with twelve non-ECE kindergarten teachers across selected Davao del Sur Division districts. Thematic analysis revealed three significant challenges: professional and pedagogical mismatch, student engagement and behavior management difficulties, and limited familiarity with play-based learning. Teachers employed self-directed learning, multimedia tools, and parental collaboration as coping mechanisms. However, these were often unstructured and insufficient. Findings highlighted the critical need for targeted professional development, structured mentorship, and access to quality instructional resources. Moreover, inconsistencies in parental involvement also affected the continuity of learning. The study recommends strengthening institutional support from the Department of Education and teacher training institutions to enhance early childhood instructional competence among non-ECE teachers. These insights contribute to the broader discourse on quality kindergarten education and the urgent need for inclusive capacity-building efforts in the early childhood teaching workforce.

Keywords: Classroom management; Early childhood education; Non-early childhood education teachers.

1.0 Introduction

Kindergarten is the foundational stage of formal education, shaping children's early learning experiences and setting the tone for their academic, social, and emotional development. However, the quality of this critical stage is compromised when teachers without specialized training in Early Childhood Education (ECE) are assigned to kindergarten classrooms. In many contexts, including the Philippines, the deployment of non-ECE graduates to early childhood education has created a gap between the developmental needs of young learners and the instructional practices employed by these teachers.

Globally, early childhood education underscores the need for appropriately qualified teachers to implement developmentally appropriate and play-based strategies (Du et al., 2019). However, non-ECE teachers often rely on traditional, direct instruction methods that may not cater to the learning styles of young children. Studies have shown that the lack of specialized training in early childhood pedagogy and developmental psychology

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among kindergarten teachers negatively affects children's learning outcomes and well-being (Cohen-Vogel et al., 2020). This mismatch between teacher preparation and classroom demands results in ineffective instruction, behavioral challenges, and reduced student engagement.

In the Philippine context, education policies are gradually acknowledging the importance of qualified early childhood educators. Republic Act 10157 mandates kindergarten teachers to complete at least 18 ECE units (DepEd, 2012), but this requirement is often not enforced, particularly in rural and underserved areas. As a result, teachers without ECE backgrounds are frequently assigned to kindergarten classes. Davao del Sur, for example, hosts 218 public elementary schools offering kindergarten programs, yet none of the tertiary institutions in the province offer specialized ECE programs (DepEd, 2021). This gap significantly impacts the instructional competence of teachers and the overall quality of early childhood education in the region.

Studies such as those by Constantino-Lane (2021) and Ulep et al. (2024) emphasized the need for reforms that enhance teacher readiness through targeted training, curriculum alignment, and institutional support. While some research has explored professional development and policy interventions, there remains a lack of comprehensive frameworks addressing the lived experiences of non-ECE teachers and the specific challenges they face in kindergarten classrooms. Furthermore, limited local research examines how these challenges affect program development and instructional delivery in Philippine schools. The urgency of this study lies in the critical role of teacher qualifications in delivering developmentally appropriate instruction and sustaining learner engagement in the early years. When instructional approaches do not align with young children's cognitive and emotional needs, it can hinder their growth and weaken public trust in the education system (Jernes et al., 2020). This particularly concerns kindergarten, a level that lays the groundwork for lifelong learning.

This study aims to explore the instructional challenges faced by non-ECE teachers in kindergarten settings, identify their coping mechanisms, and examine the support systems needed to enhance their teaching effectiveness. By analyzing the gaps in teacher preparation and the institutional and community support structures available to them, the study offers evidence-based recommendations to improve kindergarten instruction. The insights gained can serve as a foundation for future policies, professional development programs, and academic interventions to equip non-ECE teachers with the necessary competencies for early childhood instruction.

2.0 Methodology

2.1 Research Design

This study employed a qualitative phenomenological research design to explore the lived experiences of non-Early Childhood Education (non-ECE) teachers assigned to kindergarten classes. Phenomenology was chosen for its emphasis on understanding participants' subjective perspectives and revealing the essence of their experiences (Groenewald, 2004; Bliss, 2016). The approach enabled the researcher to uncover meaningful patterns and themes related to non-ECE teachers' instructional challenges, coping strategies, and support systems in early childhood settings.

2.2 Research Locale

The study was conducted in various kindergarten classrooms across three districts—Malalag, Sulop, and Kiblawan—in the Division of Davao del Sur, representing diverse socioeconomic and cultural backgrounds. It involved five kindergarten teachers from two districts and two from the third district. Participants were secondary education graduates, aged 25–45, without Early Childhood Education specialization, and had one to five years of teaching experience.

2.3 Research Participants

The participants comprised twelve (12) kindergarten teachers from selected schools in the Division of Davao del Sur. These participants were purposively selected based on the following criteria: ages 25–45, graduates of secondary education without specialization in ECE, and with at least one to five years of teaching experience in kindergarten. The sample included five teachers from each of two districts (Malalag and Sulop) and two teachers from the third district (Kiblawan). The sample size was sufficient to reach thematic saturation, consistent with qualitative research standards (Fofana et al., 2020).

2.4 Research Instrument
The primary data collection instrument was a semi-structured narrative interview guide, designed to elicit in-depth insights into the teachers' challenges, instructional practices, and support needs. The instrument underwent content validation by two internal faculty reviewers from Davao del Sur State College and one Master Teacher from the Department of Education. Revisions were made based on their feedback to ensure clarity, relevance, and alignment with the study's objectives.

2.5 Data Gathering Procedure and Analysis
Data collection occurred during the third and fourth quarters of the 2024–2025 school year. Following ethical clearance and informed consent, interviews were conducted in person or virtually, depending on participant availability and accessibility. Interviews were recorded with participant permission and later transcribed verbatim. Ethical standards and confidentiality protocols were strictly observed (Taherdoost, 2021). Thematic analysis was employed to interpret the qualitative data, following Braun and Clarke's six-phase framework, as cited in Byrne (2022).

2.6 Ethical Considerations
This study adhered to ethical research standards involving human participants. Informed consent was obtained from all participants before data collection. Participation was voluntary, with full disclosure of the study's purpose, potential risks, and the right to withdraw at any point without consequence. To ensure confidentiality, all names and identifiable details were anonymized using pseudonyms. Data were securely stored and used solely for academic purposes. The Institutional Ethics Committee of Davao del Sur State College approved the research protocol.

3.0 Results and Discussion
3.1 Challenges Faced by Non-ECE Teachers in Kindergarten Instruction
The Department of Education's implementation of the K-12 Basic Education Program in 2012 aimed to enhance the educational system by extending schooling years and mandating kindergarten through Republic Act No. 10157 (DepEd, 2012). DepEd Order No. 32, s. 2012, established policies for kindergarten instruction, while DepEd Order No. 81, s. 2012, outlined hiring requirements, emphasizing ECE qualifications. However, based on this research, many kindergarten teachers lack specialized training, leading to instructional misalignment and classroom management challenges. Without a solid foundation in early childhood education, they struggle with age-appropriate teaching strategies, behavior management, and fostering an engaging learning environment. These findings highlight the need for targeted training, mentoring, and continuous professional development to bridge these gaps and ensure high-quality early education. Table 1 below presents the challenges non-Early Childhood Education (ECE) teachers encounter in kindergarten instruction.

Table 1. *Core Ideas, Emerging Themes, and Major Themes on the Challenges Faced by Non-ECE Teachers in Kindergarten Instruction*

Core Ideas	Emerging Themes	Major Theme
• Struggling with professional mismatch in the transition to early childhood teaching. • Lack of preparation and confidence in teaching kindergarten.	Challenges in Professional and Pedagogical Mismatches in Kindergarten Instruction	Classroom Management Gap, Professional and Pedagogical Misalignment in Kindergarten Education
• Difficulty in Student Engagement due to limited Knowledge of Classroom Management • Struggle in managing behavior in kindergarten classrooms	Struggles in Enhancing Student Engagement and Managing Behavior in Kindergarten Classrooms	
• Reliance on Direct Instruction due to limited training in play-based methods. • Limited Understanding of Play-Based Learning and lack of knowledge in hands-on, exploratory approaches. • Struggles to balance play with structured lessons	Pedagogical Gaps in Play-Based Learning	

The result reveals challenges faced by non-ECE kindergarten teachers, including a readiness gap, difficulty in student engagement, and reliance on direct instruction due to limited training in play-based learning. These issues underscore the need for professional development, mentorship, and support systems to ensure effective, developmentally appropriate teaching.

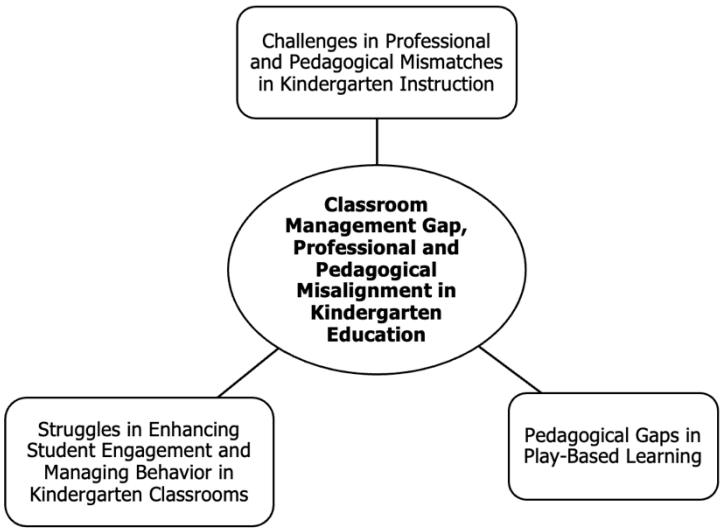

Figure 1. *Challenges of Non-Early Childhood Education Teachers*

The Department of Education's implementation of the K-12 Basic Education Program in 2012 aimed to enhance the educational system by extending schooling years and mandating kindergarten through Republic Act No. 10157 (DepEd, 2012). DepEd Order No. 32, s. 2012, established policies for kindergarten instruction, while DepEd Order No. 81, s. 2012, outlined hiring requirements, emphasizing ECE qualifications. However, based on this research, many kindergarten teachers lack specialized training, leading to instructional misalignment and classroom management challenges. Without a solid foundation in early childhood education, they struggle with age-appropriate teaching strategies, behavior management, and fostering an engaging learning environment. These findings highlight the need for targeted training, mentoring, and continuous professional development to bridge these gaps and ensure high-quality early education.

Challenges in Professional and Pedagogical Mismatches in Kindergarten Instruction

Teachers without a background in Early Childhood Education (ECE) assigned to kindergarten often face challenges due to insufficient preparation and confidence in managing kindergarten learners. The findings indicate that many of these educators have limited formal training in early childhood pedagogy, which affects their ability to effectively deliver instruction, manage classroom behavior, and sustain student engagement. Lacking a strong foundation in child development and kindergarten teaching strategies, they frequently feel unprepared and uncertain about implementing developmentally appropriate practices.

"It is not easy since I am a BSED graduate. I lack the knowledge and skills to handle kindergarten learners." KT02L32-33 Pg2

This gap underscores the need for structured professional development programs focused on early childhood pedagogy, classroom management, and effective instructional strategies tailored for young learners. Their background primarily equips them to teach older students, making adjusting to younger learners' learning styles and behaviors difficult. The absence of specialized training in child development and kindergarten teaching methods further contributes to uncertainty in implementing developmentally appropriate practices.

Struggles in Enhancing Student Engagement and Managing Behavior in Kindergarten Classrooms

The second emerging theme focuses on kindergarten teachers' challenges in maintaining student engagement and managing classroom behavior effectively. Many young learners have difficulty staying focused, managing their emotions, and minimizing disruptions, which makes it hard for teachers to create a well-structured and engaging classroom. The findings indicate that while strong behavior management strategies are essential, some educators struggle to apply them consistently. This concern was reflected in the experience of Kindergarten Teacher Participant 2, who shared her challenges in maintaining student engagement and addressing behavioral issues in the classroom:

"Managing classroom behavior is challenging, especially with the diverse needs of kindergarten learners. Their attention span is very short, and I find it difficult to sustain their engagement." KT02L25-27Pg02

Managing student engagement and behavior is a common challenge for non-ECE teachers in kindergarten classrooms. Kindergarten learners often struggle with attention regulation, emotional control, and social interactions, making it difficult for teachers to establish structured and engaging learning environments. Many participants expressed frustration over managing young learners' behaviors, particularly in sustaining engagement and minimizing classroom disruptions. Teachers with backgrounds in secondary education noted that their previous training did not adequately prepare them for the behavioral complexities of kindergarten learners. Short attention spans, emotional immaturity, and diverse classroom dynamics further complicate classroom management efforts.

The findings suggest that effective classroom management strategies, such as positive reinforcement, structured routines, and interactive teaching methods, should be integrated into training programs for non-ECE teachers. Sandoval (2023) highlights the importance of consulting educational psychologists and speech therapists to address young children's developmental and behavioral needs, underscoring the necessity of specialized training for kindergarten educators. Taylor et al. (2023) found that while structured routines are essential for classroom management, excessive strictness may hinder peer interactions, emphasizing the need for a balanced approach that promotes order and engagement. Therefore, mentorship and peer collaboration provide valuable support in navigating behavioral challenges in kindergarten settings.

Pedagogical Gaps in Play-Based Learning

The third emerging theme focuses on Pedagogical Gaps in Play-Based Learning, which presents significant challenges in kindergarten instruction. Several teachers rely on direct instruction due to inadequate training in play-based methodologies. This gap limits their ability to incorporate hands-on, exploratory, and experiential learning approaches, essential for fostering engagement and holistic development in kindergarten learners. The lack of familiarity with these strategies makes it difficult for teachers to fully integrate play as a central component of early childhood education.

The struggle to integrate play-based learning was a common concern among participants. This was emphasized by Participant 3, who stated:

"Play-based learning is a good approach, but balancing it is challenging on my part, especially for those who need extra support in grasping lessons." KT03L36-37Pg03

A key challenge in the study is the pedagogical gap in play-based learning. Several non-ECE teachers struggle to integrate play-based methods due to limited training, often relying on direct instruction, which may not suit young learners. Participants found it challenging to balance structured lessons with engaging activities, highlighting the need for better training in play-based strategies. To address these challenges, professional development should focus on hands-on, experiential learning aligned with early childhood principles. With proper training, teachers can create engaging environments that foster meaningful learning experiences while ensuring that play-based pedagogy is effectively integrated into structured learning outcomes.

3.2 Coping Mechanism in Adapting Instructional Strategies

Non-ECE teachers address instructional adaptation in kindergarten through continuous learning and collaborative support. They engage in professional development, self-directed learning, and mentorship to bridge gaps in early childhood pedagogy. Collaboration with experienced colleagues and access to learning resources further assist in overcoming instructional challenges. These coping strategies are systematically examined through the central theme, which is further analyzed alongside its emergent themes, synthesized from the core ideas presented in Table 2. Table 2 below presents the strategies teachers use to enhance instruction, highlighting their integration of multimedia, manipulatives, and play-based activities while facing challenges in effectively implementing and optimizing these methods in the classroom.

Table 2. *Core Ideas, Emerging Themes, and Major Themes on Teachers' Coping Mechanisms in Adapting Instructional Strategies*

Core Ideas	Emerging Theme	Major Theme
• Modification of instructional activities due to insufficient early childhood training • Conducting self-study and researching effective kindergarten strategies. • Limited guidance leading to self-training and trial-and-error approach	Navigating Instructional Adaptation in Kindergarten Amid Limited Training	Addressing Instructional Adaptation in Kinder Education with Learning Support and Collaborations
• Integration of multimedia, manipulatives, and play-based learning tools despite challenges • Balancing interactive strategies with curriculum demands and objectives • Compensation for resource shortages with self-made materials	Integration of interactive tools and creative strategies	
• Open communication with parents about child progress and involvement in learning at home • Dependence on parental involvement to reinforce learning beyond the classroom	Parental Collaboration as a Learning Support Strategy	

This reveals that teachers struggle with effective teaching strategies, interactive learning, and reliance on parental support. Insufficient training leads to unstructured adjustments, while difficulties persist in aligning interactive methods with academics. The heavy dependence on parents highlights the need for stronger classroom strategies and professional development. Delivering quality instruction in kindergarten requires specialized training, as this stage is crucial for shaping a child's foundational learning experiences. However, many teachers struggle with developmentally appropriate instruction due to limited formal preparation in early childhood education. They often rely on direct instruction methods without proper training, restricting opportunities for child-centered exploration and hands-on learning. While teachers incorporate storybooks, multimedia, and play-based activities, they face challenges in maximizing these interactive and exploratory learning tools while meeting academic expectations. Balancing structured instruction with engaging activities remains difficult, leading to a reliance on parental involvement to reinforce learning beyond the classroom. These challenges highlight the need for professional development and instructional support to enhance teaching effectiveness in kindergarten settings.

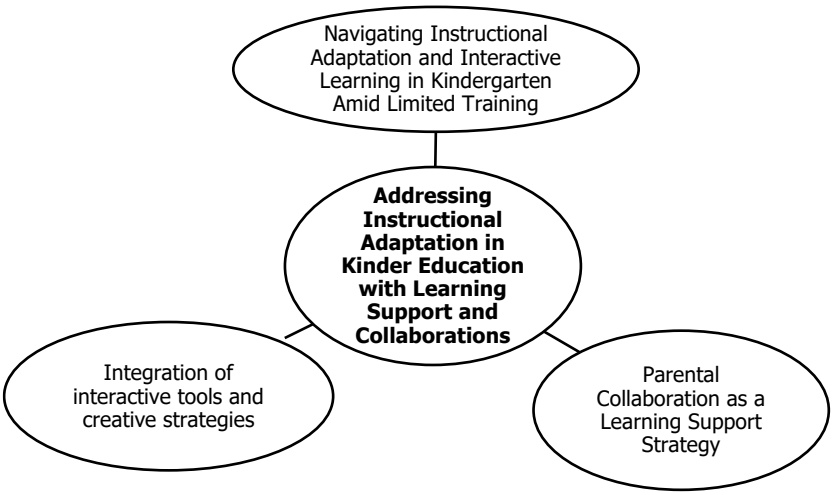

Figure 2. *Coping Mechanisms of Non-Early Childhood Education Teachers*

Navigating Instructional Adaptation in Kindergarten amid Limited Training

Teachers face challenges in utilizing effective teaching strategies due to insufficient training in early childhood pedagogy. As a result, they rely on unstructured adjustments rather than planned instructional methods, leading to inconsistencies in lesson delivery. This lack of structured approaches affects student engagement and learning outcomes, highlighting the need for professional development to enhance teachers' instructional skills and confidence. As evidence, Participant 1 shared her struggles in managing her class, stating:

"I research online for strategies and activities that are suitable for them. I also use learning videos to engage them." KT01L51-52Pg03

Moreover, Participant 3 shared that she relied on a trial-and-error approach in giving strategies to deliver her instruction effectively, stating:

"I try using strategies for higher grades in my kindergarten class, but they do not work as expected." KT03L40-41Pg03

In addition, due to a lack of training, Participant 10 resorted to researching effective strategies for lesson delivery, stated:

"I do research – I read articles and study different approaches in kindergarten education." KT10L67-68Pg04

Emerging theme one focuses on the challenges of utilizing effective teaching strategies, emphasizing the importance of targeted professional development and instructional strategies for effective lesson delivery in kindergarten education. The responses indicate that many teachers struggle with implementing appropriate instructional methods due to a lack of formal training. Consequently, they often rely on self-research, direct instruction, and trial-and-error approaches to find effective strategies. Some integrate learning videos and online resources, while others experiment with methods designed for higher grades, which may not always be effective for young learners. These findings highlight the need for structured training programs to support teachers in using developmentally appropriate strategies, ultimately enhancing foundational learning experiences and long-term student success.

One of the key challenges non-ECE teachers encounter is implementing structured, developmentally appropriate teaching strategies. Due to insufficient training, some participants resort to unstructured adjustments in lesson plans rather than adhering to planned instructional methods. This inconsistency affects student engagement and overall learning outcomes. To compensate, teachers explore alternative solutions such as researching instructional techniques, incorporating multimedia resources, or adapting strategies designed for older students. While these efforts demonstrate adaptability, they are not always effective in meeting the unique learning needs of kindergarten students.

According to El-Aasar et al. (2024), the reliance on self-research, direct instruction, and spontaneous modifications further underscores the need for structured training programs that equip teachers with research-based methodologies tailored for early childhood education. Research suggests that the effectiveness of kindergarten instruction depends on the quality of interactive learning experiences. Observational measures indicate that instructional methods—particularly those balancing structured and exploratory learning—can influence children's academic persistence beyond kindergarten (McCormick et al., 2022). This highlights the importance of engaging and adaptive teaching approaches that foster meaningful learning experiences in early childhood education.

While teachers develop various self-directed strategies to navigate these instructional challenges, Condiman (2024) emphasizes that kindergarten teachers frequently encounter physical exhaustion, classroom management difficulties, and stress. They rely on resilience, peer support, and self-care mechanisms, such as taking short breaks or seeking colleague assistance. However, these coping strategies, while beneficial, are often reactive rather than proactive solutions to the underlying issue of inadequate training. This reinforces the need for targeted professional development and structured mentorship programs, as Brown et al. (2021) emphasize, to equip non-ECE kindergarten teachers with the necessary skills to balance mandated standards with the holistic learning needs of young children. This underscores the importance of engaging and adaptive teaching approaches that foster meaningful learning experiences in early childhood education.

Integration of Interactive Tools and Creative Strategies

The use of interactive tools and creative strategies as coping mechanisms to overcome their lack of training in early childhood education. Incorporating multimedia, manipulatives, and activities like singing and movement to engage students and compensate for limited pedagogical knowledge. These strategies helped maintain students' attention and facilitated learning, despite the absence of formal training in kindergarten education.

Although there were challenges in balancing these methods with the curriculum, teachers effectively adapted their approaches to meet the developmental needs of their students, demonstrating resourcefulness in creating an engaging learning environment.

These strategies were described in the statements of Kindergarten Teacher 3, as shown below:

"I use videos from YouTube to help with topics like numbers and phonetics." KT03L58Pg04

Despite limited resources, participant 7 adapted by maximizing available materials, stated:

"Using printed materials since we don't have a TV for visual learning. I create engaging visuals and hands-on activities to keep students interested and help them understand lessons." KT07L48-50Pg03

Another statement from participant 9 shared her experience in incorporating play and music-based learning strategies, stating:

"Strategies like playing, letting them watch videos – I download and incorporate them in music." KT09L46-47Pg03

This emerging theme emphasizes how teachers employ various strategies to enhance student engagement and learning by adapting to available resources and classroom needs. Some incorporate multimedia, such as YouTube videos and audiovisual materials, but face challenges when students become more engaged with entertainment than the lesson content. Others compensate for the lack of technology by using printed materials, creating engaging visuals, and incorporating hands-on activities. Additionally, play and music-based strategies, such as singing and interactive exercises, help reinforce learning concepts. The use of colorful visual aids, storybooks, and flashcards further supports instruction, highlighting the need for adaptable and resourceful teaching methods in early childhood education.

Interactive and play-based learning is essential in early childhood education, yet many non-ECE teachers struggle with its effective implementation. While they integrate multimedia, manipulatives, and play-based activities, balancing these interactive methods with curriculum expectations is challenging. The tendency to rely on digital tools such as educational videos can sometimes lead to unintended distractions, where students focus more on entertainment than learning. Teachers lacking technology access resort to printed materials and other hands-on activities to maintain student engagement. Some incorporate music and movement to reinforce learning, while others create engaging visual aids to support instruction. Suazo and Almerez (2024) highlighted how kindergarten teachers adapted by digitizing materials and using interactive activities to enhance learning, demonstrating the effectiveness of technology-driven approaches.

Danniels et al. (2020) examined the role of technology in supporting classroom assessment within play-based kindergarten settings. Their findings suggest that while technology is primarily used to improve the efficiency of assessment practices, it also has the potential to enhance student learning when integrated effectively. This indicates that interactive tools can serve a dual purpose—streamlining assessment while reinforcing play-based instructional strategies. Educators can create engaging and developmentally appropriate learning experiences that support assessment and active exploration by incorporating technology.

However, research suggests that multimedia integration, gamification, and scenario-based learning foster active participation and critical thinking, making them essential for meaningful learning experiences (Dahlan et al., 2023). Despite these efforts, the struggle to maximize interactive learning strategies persists, underscoring the necessity of professional development programs that provide training on effectively integrating play-based learning techniques. Dzamesi and Heerden (2020) emphasize the significance of such training, demonstrating how a professional development program in Ghana successfully equipped kindergarten teachers with the knowledge and skills to implement indigenous play-based pedagogy. Their findings highlight the positive impact of structured training on teacher preparedness and student engagement, reinforcing the need for targeted support in integrating play-based strategies.

Integrating interactive tools and play-based strategies is crucial to effectively enhancing kindergarten instruction. Proper training, mentorship, and access to resources can help teachers implement developmentally

appropriate practices, ensuring meaningful and engaging learning experiences for young children.

Parental Collaboration as a Learning Support Strategy

Extending learning beyond the classroom heavily relies on parental involvement, as emphasized in emerging theme three. Teachers recognize that collaboration with parents enhances student engagement, reinforces lessons, and provides additional support tailored to individual learning needs. Teachers actively communicate with parents to keep them informed about their child's progress and encourage participation in home-based learning activities. This collaboration helps reinforce classroom lessons, as students benefit from additional guidance and support at home. However, reliance on parental involvement highlights the need for a balanced approach to ensure students receive adequate learning support at school and at home.

As evidence, participant 1 highlighted the need for parents to follow up on their children's lessons at home, stating:

"*Parents need to follow up with their children at home, so they do not forget their lessons.*" KT01L69-70Pg04

Another perspective shared from participant 2 was that support from parents plays a vital role in reinforcing children's learning at home:

"I ask parents to follow up on their child's learning at home. I provide them with worksheets and reading materials to help reinforce learning after class hours." KT02L60-62Pg04

In emerging theme three, which focuses on instructional strategies, teachers emphasize the importance of parental involvement in reinforcing student learning at home by encouraging follow-ups on lessons to enhance retention and engagement. Some provide worksheets and reading materials, while others conduct assessments to create individualized learning plans tailored to each child's needs. This collaborative approach between teachers and parents supports students' academic progress, ensures continuity of learning beyond the classroom, and fosters a more personalized and practical learning experience.

Recognizing the importance of instructional support, non-ECE teachers actively foster collaboration with parents to enhance student learning. By engaging families in reinforcing lessons at home, providing supplementary materials, and offering guidance, teachers create a seamless learning experience that extends beyond the classroom. This partnership strengthens children's foundational skills and allows for individualized learning support, ensuring students receive the reinforcement they need to succeed. Strengthening these programs ensures teachers are well-prepared to create dynamic and effective learning environments (Hidayat & Arini, 2022). Moreover, fostering strong school-family collaboration provides a supportive learning environment, as parental involvement significantly contributes to children's academic and emotional development (Paccaud et al., 2021). While home reinforcement plays a valuable role, meaningful home-school communication, active parental engagement in school activities, and structured learning support at home further enhance student learning (Bartolome et al., 2020).

In addition, effective home-school collaboration requires clear communication, teacher training for parent engagement, and policy-driven parental involvement strategies. Schools that address socio-economic barriers and varying parental education levels through inclusive policies can significantly strengthen parents' role in supporting their children's learning (Li, 2021). Empowering teachers with practical classroom strategies also strengthens independent learning. Professional development initiatives equip educators with innovative teaching techniques that minimize overreliance on parental support while maximizing engagement in school settings. Schools can create a balanced support system that fosters student success by integrating well-structured teacher training programs with strong parental collaboration. Ensuring teachers and parents are equipped with the necessary skills and resources will contribute to a more effective and engaging learning environment, ultimately enhancing children's academic and developmental growth.

3.3 Support System for Non-ECE Teachers in Kindergarten Instruction

Non-ECE teachers require comprehensive support to elevate their instructional competence in kindergarten education. Targeted professional development, including early childhood pedagogy and classroom management training, helps bridge their knowledge gaps. Mentorship from experienced educators guides the

implementation of developmentally appropriate practices, while access to quality teaching resources enhances lesson delivery. These essential support systems are systematically examined through the central theme, which is further analysed alongside its emergent themes, synthesized from the core ideas presented in Table 3. Table 3 presents institutional, community, and policy-level support provided in the school heads in multigrade education.

Table 3. *Core Ideas, Emerging Themes, and Major Themes in the Support System for Non-ECE Teachers in Kindergarten Instruction*

Core Ideas	Emerging Theme	Major Theme
• Need for professional development in early childhood education (ECE) • Lacking structured mentorship and hands-on professional development • Need for stronger institutional support for non-ECE teachers	Comprehensive Professional Development Training and Mentorship	Elevating Instructional Competence Through Professional Development, Mentorship, and Resource Support
• Struggling with insufficient and limited instructional resources for effective teaching • Need for specific instructional materials and modern resources.	Instructional Resources Support.	
• Facing inadequate parental support resulting in learning inconsistencies • Engaging parents in reinforcing learning at home	Collaboration and Home-School Partnership	

As a result, there is a need for more substantial support in early childhood education, particularly in professional development, instructional resources, and home-school collaboration. Limited opportunities for professional growth and mentorship may hinder teaching effectiveness, while inconsistencies in instructional resources create additional challenges. Weak parental involvement further affects learning continuity at home. These findings underscore the importance of enhancing teacher support, improving resource allocation, and fostering stronger home-school partnerships. At its core, the figure emphasizes the essential support systems that contribute to building instructional competence among non-ECE kindergarten teachers. It highlights how professional growth is strengthened through ongoing training, access to resources, and meaningful collaboration, all of which help educators meet the unique demands of early childhood education with greater confidence and capability.

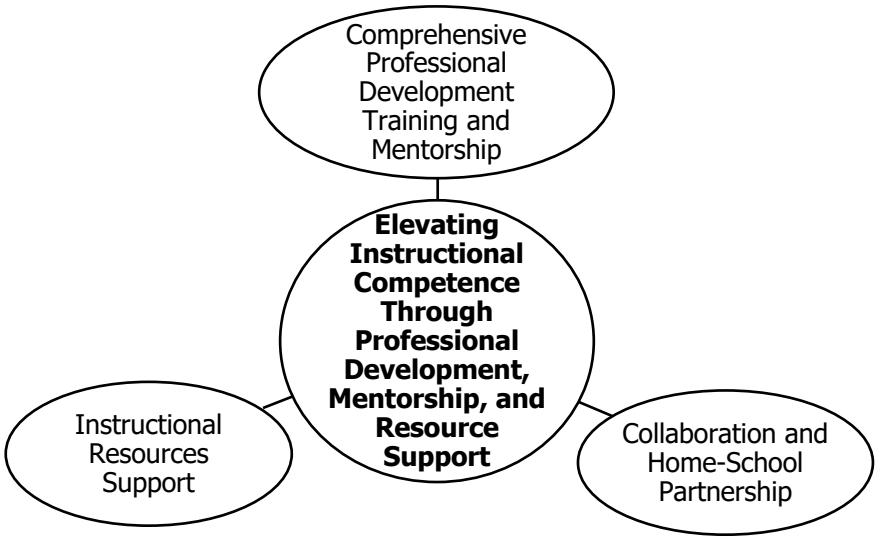

Figure 3. *Support System for Non-ECE Teachers in Kindergarten Instruction*

Effective early childhood education relies on strong support systems for teachers, particularly in professional development, mentorship, and resource support. Access to specialized training, seminars, structured mentorship programs, and instructional resources enables educators to enhance their skills and adapt to the evolving needs of kindergarten learners. However, limited opportunities for professional growth, especially for non-ECE teachers, create challenges in maintaining teaching effectiveness. Establishing comprehensive professional development initiatives and structured mentorship programs can help bridge this gap, providing teachers with the necessary support on instructional resources to improve their instructional practices and overall confidence in the classroom.

Comprehensive Professional Development Training and Mentorship

The need for professional development and mentorship in early childhood education (ECE) is evident, as teachers require specialized training, seminars, and workshops to enhance their skills and knowledge. However, limited opportunities for professional growth and the absence of structured mentorship programs for non-ECE teachers present significant challenges. Without adequate support, educators may struggle to implement effective teaching strategies and adapt to evolving educational standards. Addressing these gaps through a holistic approach to professional development and mentorship can help build a more competent and confident workforce, ultimately benefiting teachers and young learners. Participant 1 emphasized the need for training, especially for those transitioning from secondary education to kindergarten:

"I need support like training, seminars, and workshops. As secondary teachers handling kindergarten, we must be equipped as kindergarten teachers." KT01L65-67 Pg04

Moreover, participant 4 highlighted the importance of learning engaging and developmentally appropriate teaching strategies, along with mentorship from experienced kindergarten teachers:

"Workshops or training on engaging and developmentally appropriate approaches for kindergarten instruction would be invaluable. Also, having a mentor – an experienced and skilled kindergarten teacher – would be very helpful." KT04L76-79 Pg05

The emerging theme reflects a shared recognition among participants of the need for professional development and mentorship in early childhood education. Many expressed the necessity of training, seminars, and workshops to enhance their instructional strategies and better understand the developmental needs of young learners. The lack of structured mentorship was also highlighted, with participants emphasizing the value of learning from experienced kindergarten teachers to improve their teaching practices. Additionally, a participant suggested district-level training and scholarship opportunities to support professional growth. These findings underscore the importance of continuous learning and mentorship in equipping teachers with the skills and knowledge necessary for effective kindergarten instruction.

Non-ECE teachers require continuous professional development and mentorship to bridge the gap in their knowledge and skills related to early childhood education. The lack of structured training programs, specialized workshops, and mentorship opportunities hinders their ability to implement developmentally appropriate teaching strategies. Participants unanimously expressed their need for access to seminars, training sessions, and mentoring programs to equip them with the competencies required for kindergarten instruction. The responses reflect a shared recognition that training and mentorship are pivotal in enhancing instructional strategies and fostering confidence in kindergarten instruction.

Moreover, structured mentorship programs, where experienced early childhood educators guide non-ECE teachers, were identified as crucial in providing practical insights and support. Sandoval (2024) emphasized that equipping pre-kindergarten teachers with essential competencies, including consultations with specialists, enhances instructional effectiveness and supports holistic child development. Suazo and Almerez (2024) further noted that collaboration and resource-sharing foster innovation, particularly in adapting to new learning modalities. A structured support system, including mentorship and institutional backing, strengthens teachers' ability to provide quality instruction.

Caingcoy and Gallego (2022) highlight that even competent kindergarten teachers recognize the need for continuous learning, particularly in pedagogy, content knowledge, and classroom diversity. This reinforces the

necessity of structured professional development programs to support non-ECE teachers in adapting to early childhood instruction. Effective professional learning cycles, coaching, and differentiated support, as highlighted by Hilaire and Gallagher (2020), help mitigate instructional challenges kindergarten educators face. Providing structured professional development opportunities, such as modelling and scaffolding techniques, can significantly enhance teachers' instructional competence and confidence in early childhood education settings. These findings underscore the importance of institutionalizing professional development initiatives designed explicitly for non-ECE teachers in kindergarten. Offering district-level training, scholarship opportunities for ECE certification, and mentorship programs would significantly enhance their instructional competence, ultimately improving learning outcomes for young children.

Instructional Resources Support

In emerging theme two, strengthening support systems for quality early childhood education, the availability of kindergarten-specific instructional materials and sufficient resource support is essential for effective teaching and learning, expressing frustration over the lack of adequate instructional resources, which can hinder the implementation of developmentally appropriate teaching strategies. Consistent access to well-designed materials tailored to young learners is essential for creating engaging and meaningful learning experiences. Addressing these resource challenges through structured support systems can help kindergarten teachers deliver high-quality early childhood education, ultimately benefiting teachers and students.

As evidence, participant 5 highlights the lack of sufficient teaching materials, requiring teachers to be resourceful in supporting their students' learning:

"*Accessing teaching resources, books, and materials specifically designed for kindergarten instruction would further support my professional growth.*" KT05L97-98Pg06

Moreover, even when resources are provided, they are not always suitable for all students, as stated by participant 8:

"*It's much better if DepEd gives us the materials that we need because when materials are not provided, the struggle is real, especially with the new Matatag Curriculum.*" KT08L71-72Pg05

Participant 11 further added to the challenge, making it difficult to acquire durable and practical instructional materials, stated:

"*Adequate budget to provide effective and appropriate instructional materials for our learners.*" *KT11L66-67Pg04.*

Emerging Theme Two, which focuses on teacher support, highlights the need for enhanced assistance in kindergarten instruction, particularly in accessing adequate teaching materials and resources. Teachers face challenges in implementing effective strategies due to limited instructional tools, financial constraints, and the unsuitability of some provided materials. These limitations hinder both professional growth and student engagement. Addressing these concerns through improved resource allocation and targeted support would enhance the quality of early childhood education, allowing teachers to implement interactive and play-based learning methods effectively.

The availability of appropriate instructional resources is essential for effective kindergarten instruction. Many non-ECE teachers expressed frustration over insufficient teaching materials, which limit their ability to implement engaging and interactive learning experiences. Participants highlighted the necessity of kindergarten-specific instructional tools such as visual aids, books, and technology-based learning materials to enhance classroom engagement. Teachers also noted that while resources are sometimes provided, they may not always be suitable for the developmental needs of their students. The absence of essential tools, such as TVs for visual learning and durable instructional materials, further complicates the teaching process. Financial constraints and reliance on handmade materials present additional challenges that impact both instructional quality and teacher efficiency. Bongabong et al. (2023) highlight the importance of ensuring access to age-appropriate learning resources, emphasizing that well-selected instructional materials enhance teaching efficiency and student engagement. Their study underscores that adequate resource provision—both physical and digital—supports interactive and play-based learning approaches, making lessons more meaningful for

young learners. Similarly, Luo et al. (2020) emphasize the role of Open Educational Resources (OER) in addressing instructional material shortages, offering cost-effective and accessible digital resources to enhance teaching effectiveness. Suazo and Almerez (2024) also stress the importance of updated, well-structured instructional resources, including interactive and developmentally appropriate materials, to align with curriculum standards and improve teaching quality.

Integrating technology into kindergarten instruction requires tailored support, including administrative collaboration and educator-focused coaching (Hilaire & Gallagher, 2020), to ensure effective implementation of instructional resources. Enhancing instructional resource support through guided professional learning and access to technology-driven teaching tools can improve the quality of kindergarten instruction for non-ECE teachers. Ensuring access to adequate learning materials and digital tools is crucial in supporting teachers and fostering meaningful learning experiences for young children. To address these concerns, the education sector must prioritize resource allocation for kindergarten instruction, ensuring non-ECE teachers access high-quality, developmentally appropriate materials. Strengthening resource support systems through funding, innovative teaching tools, and digital learning platforms would improve the overall teaching and learning experience.

Collaboration and Home-School Partnership

In emerging theme three, parental involvement is crucial in reinforcing learning at home, supporting children's academic growth beyond the classroom. However, weak parental support can lead to learning inconsistencies, making it difficult for students to retain and apply concepts effectively. A strong collaboration between home and school is essential in addressing these challenges, ensuring teachers and parents work together to create a more structured and supportive learning environment. Strengthening this partnership can enhance student engagement, consistency in learning, and overall academic success. Emphasizing the importance of parental involvement, participant 2 shared:

"*Building relationships with parents, asking for their help, and implementing one-on-one instructions have been beneficial. Being open to parents allows me to extend learning beyond the classroom.*" KT02L67-69Pg04

Supporting this view, participant 10 noted that parental help at home leads to student progress:

"*Although not all parents can follow up at home, some do. When I reassess the students, I see improvements in those whose parents helped them.*" KT10L76-78Pg05

As a result, teachers acknowledge the role of parental involvement in reinforcing learning beyond the classroom. Building relationships with parents and encouraging their participation can help extend instruction and support student progress. However, not all parents can provide follow-up at home due to various factors such as time constraints, work commitments, or limited resources. Nonetheless, some teachers have observed improvements in students' learning outcomes when parental support is present, highlighting the potential benefits of home-school collaboration in early childhood education. Parental involvement is a key factor in reinforcing learning beyond the classroom. However, the study revealed that weak parental support contributes to inconsistencies in students' learning experiences. Many teachers noted that students show noticeable academic progress when parents actively participate in their child's education.

Despite the recognized importance of home-school collaboration, not all parents can provide the necessary follow-up support at home due to work commitments, time constraints, or lack of resources. This discrepancy creates challenges in ensuring continuous learning outside the classroom. According to the research, when parents actively engage in autonomy-supportive practices at home, children develop stronger independence and learning motivation, reinforcing the need for consistency between home and school environments (Linkiewich et al., 2021). Strong home-school partnerships can enhance adequate instructional resource support, as collaboration between teachers, parents, and school leadership helps facilitate access to essential teaching materials and learning aids (Ngadni & Shuang, 2024). Open communication and shared responsibility in early childhood education settings contribute to better academic and developmental outcomes, which are closely linked to the availability of instructional resources in the classroom.

Collier et al. (2020) emphasize that effective home-school collaboration relies on strong communication, problem-solving, and well-integrated interventions. Their study highlights that when educators receive

adequate training and institutional support, they develop the confidence and skills necessary to engage parents as active partners in their children's education. Moreover, fostering a school environment that promotes collaboration between educators and families can significantly enhance student learning outcomes and provide a more cohesive support system for young learners. To enhance home-school collaboration, schools should implement programs that encourage parental engagement, such as workshops on effective home learning strategies, regular teacher-parent communication, and community-based support initiatives. Dicataldo et al. (2022) emphasize that parents guided by educators on effective strategies to support learning at home can significantly enhance children's academic readiness. Their study highlights that structured parental involvement, such as dialogic reading interventions, can produce substantial gains in children's vocabulary, comprehension, and overall language skills. Strengthening this partnership will create a more structured and supportive learning environment, fostering better educational outcomes for kindergarten students.

4.0 Conclusion

The findings underscore the multifaceted challenges faced by non-ECE teachers in kindergarten classrooms and the critical role of systemic support in addressing these issues. By implementing comprehensive support systems, such as continuous professional training, mentorship opportunities, and resource allocation, educational institutions can help equip non-ECE teachers with the competencies to deliver developmentally appropriate and engaging instruction. These findings suggest that empowering teachers through structured interventions and collaborative efforts can significantly enhance the quality of early childhood education, particularly in contexts where teacher specialization is limited.

5.0 Contributions of Authors

Cherry R. Gastador – Editing, writing and finalizing the study, Queenie Lyn G. Almerez – Giving additional input and guidance for the betterment of the study, Amelie E. Trinidad – Giving additional input for the betterment of the study, Dulce Marie A. Martinez – Giving additional input for the betterment of the study, Augie E. Fuentes - supervising for the betterment of the study.

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7.0 Conflict of Interests

None.

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Spiral Progression Approach, Digital Literacy and Competency of Teachers: Basis for Learning Activity Guides

Jeanette M. Calzado*, Christine P. Abo
Sultan Kudarat State University – ACCESS Campus, Tacurong City, Philippines

*Corresponding Author Email: jeanette.calzado@deped.gov.ph

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Abstract. The K–12 curriculum adopted spiral progression and rapid digitalization of education, which exposed essential gaps in how science teachers integrated technology into their teaching framework. The study addressed the absence of empirical evidence about spiral progression implementation, digital literacy, and teacher competence to develop Learning Activity Guides. A descriptive-correlational research design included surveys of 23 junior high school science teachers and 45 Grade 10 students at Esperanza National High School to examine spiral progression implementation, digital practices, and teaching competencies through Likert-scale questionnaires, classroom observations, and self-evaluations. The mean and standard deviation results demonstrated that teachers strongly followed vertical and horizontal curriculum articulation principles and showed high confidence in their digital tool usage. Pearson's r analysis showed that spiral progression implementation had a significant positive relationship with teacher competence (r=.54, p=.001) and digital literacy had a significant positive relationship with competence (r=.66, p=.022). The research results directly shaped the development of Learning Activity Guides, which linked spiral progression principles to technology-enhanced teaching methods. At the same time, administrators received proof to support professional development programs that connect digital skills to curriculum implementation methods. Future research may investigate student achievement outcomes while studying the qualitative aspects of teachers' technology integration experiences.

Keywords: Competency of teachers; Digital literacy; Learning activity guide; Spiral progression.

1.0 Introduction

The global education landscape faces challenges like implementing progressive curricular models like spiral progression and the fast-paced digital transformation. The Philippines needs immediate evaluation of how teachers handle curriculum delivery and digital demands because the K–12 curriculum implements spiral progression. The current research lacks clear connections between these elements, especially within science education, which demands hands-on learning and technological integration. Digital literacy is an essential requirement for teaching in the 21st century, according to Jones et al. (2021), yet knowledge gaps exist. Ballano et al. (2022) demonstrate through their study that spiral progression remains poorly studied in educational environments that utilize technology. International studies show that Japan demonstrates a strong technological infrastructure. Still, its students demonstrate weak digital abilities (Taylor, 2018) which reflects the Philippine situation where rural teachers lack sufficient resources (Yu & Wang, 2024). Research shows a significant knowledge deficiency regarding how curriculum structures function with digital teaching approaches across different resource availability scenarios.

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The Philippine educational environment brings distinctive obstacles to the table. The adoption of digital tools by urban teachers continues to grow but rural educators face ongoing challenges with unstable internet access and insufficient training according to Yu and Wang (2024). The gap between urban and rural education systems hinders teachers from using spiral progression effectively, especially in science education, which needs continuous access to high-quality resources for iterative concept development. Current research investigates curriculum models or digital skills independently without exploring their combined effects. The research fills these knowledge gaps by studying three essential components: spiral progression implementation in science education alongside teachers' digital literacy and abilities to articulate curriculum and integrate technology. The research analyzes these factors simultaneously to create practical Learning Activity Guides that connect curriculum needs with actual classroom situations.

2.0 Methodology

2.1 Research Design

The study utilized the descriptive-correlational research design to investigate the relationship between the implementation of the spiral progression approach and digital literacy and teaching competence of science teachers. The independent variable, implementation of the spiral progression approach, comprises two specific indicators: vertical articulation and horizontal articulation. The dependent variable, digital literacy, is measured through four indicators: understanding digital practices, finding information, using information, and creating information, while the competence of teachers comprises four specific indicators: subject mastery, classroom management, instructional delivery, and assessment. The study examined how the indicators of implementation of the spiral progression approach potentially correlate with digital literacy and teaching competence among science teachers. The research objectively analyzed the natural relationships between these variables without attempting to manipulate or establish direct causation. Miksza and Elpus (2018) define descriptive research as observing behavior to describe attributes objectively and systematically, and describe correlational research as a method that predicts how variables are naturally related in the real world.

2.2 Research Participants

The respondents of this study were the 23 junior high school (JHS) science teachers and 45 grade 10 students at Esperanza National High School. The teachers were selected because they are responsible for implementing the spiral progression approach and using digital technologies in their science classes. The students were chosen because they are directly impacted by the teachers' instructional practices and provided valuable feedback on the developed learning activity guides (Dexter, 2019). To ensure the respondents are qualified and appropriate for the study, they should adhere to the following criteria: firstly, Science teachers should currently teach science subjects in grades 7-10 at Esperanza National High School. Secondly, they should have at least 3 years of teaching experience using the spiral progression approach. Lastly, they should be digitally literate and use technology in their lessons. Fourthly, they must be willing to participate in the study and provide honest feedback. Students must be currently enrolled in grade 10 at Esperanza National High School. And they must be willing to participate in the research and provide feedback on the learning activity guides.

Complete enumeration was used to select all junior high school (JHS) Science teachers at Esperanza National High School, while purposive sampling was employed to select 45 Grade 10 students as respondents. Complete enumeration, also known as census sampling, involves every member of the population in the study. In this case, all 23 JHS science teachers were included. Literature supports complete enumeration in educational research, as it thoroughly explains the population's characteristics and experiences. According to Taherdoost (2016), complete enumeration is beneficial when the population is small and manageable, allowing researchers to obtain accurate and detailed information.

On the other hand, a non-probability sampling technique was employed to select respondents based on specific characteristics or criteria pertinent to the research. In this study, 45 Grade 10 students were chosen purposively because they had had direct experience with the Spiral Progression Approach in their science classes. The use of purposive sampling is supported by literature, which emphasizes its effectiveness in qualitative research, where researchers seek to understand specific phenomena or experiences. According to McAuliffe and McGann (2016), purposive sampling allows researchers to focus on individuals with knowledge or experience related to the study, leading to more prosperous and relevant data.

2.3 Research Instrument

This study employed four (4) sets of research instruments with reliability established through pilot testing and previous validation studies. The first set is an adopted research survey questionnaire from Garay and Kim (2023). It determined the level of the implementation of the spiral progression approach in terms of vertical and horizontal articulation, with Cronbach's α ≥0.85 for both subscales. The second set is an adopted standardized Digital Literacy Checklist from (Ferrari et al., 2012). It determined the teachers' digital literacy level in understanding digital practices, finding information, using information, and creating information. After expert review, it was validated in 12 EU countries and modified terminology for the Philippine context. The third set is a questionnaire adopted and verified through pilot testing with α = 0.89. It comprises nine indicators that have been devised and nationally validated and are derived from the Philippine Professional Standards for Teachers (PPST). The indicators were derived from the DepEd's widely used classroom observation tool (COT), which was developed by the Philippine National Research Center (PNRC) to assess teacher quality. This tool was included in the Department of Education's policy through DepEd Order No. 42, s. 2017. Included in the survey questionnaire were the nine indicators from the COT.

The level of teaching competence of the science teachers, particularly subject mastery, was determined by indicators 1 and 7. Indicators 4, 5, and 6 were used to evaluate classroom management, indicators 2, 3, and 8 were used to assess instructional delivery, and indicator 9 was used to evaluate assessment. The nine indicators were grouped into four domains. A rubric incorporated from the Department of Education (DepEd) was implemented to assess teaching competence. The rubric includes a performance continuum for each career period. DepEd Order No. 42, s. 2017 was the foundation for the Philippine Professional Standards for Teachers (PPST) for Teachers I-III (Levels 3–7). Through well-defined domains, strands, and indicators, the PPST defines the qualities of a teacher, including professional learning, competent practices, and effective engagement throughout the various phases of a teacher's career. Deri, Janer, and Marbella (2021) were the sources of the fourth set of survey questionnaires, with test-retest reliability confirmed (r = 0.82) during the pilot phase. It assessed the student's level of acceptance of the learning activity guides regarding technical aspects, assessment, learning plan, and objective competency.

2.4 Data Gathering Procedure

The researcher employed survey questionnaires to inventory the teachers' perceptions of the Spiral Progression Approach. This was followed by tracing back the Classroom Observation Tool (COT) results for the past three years of the Science Teachers. This process helped identify teachers' lowest ratings or weak points, which served as one of the bases for developing learning activity guides. The researcher secured all necessary communication letters from the Graduate School of Sultan Kudarat State University to initiate this process, as stated in Ang Karugasik (2016). Following this, the researcher requested approval from the Schools Division Superintendent (SDS) of the Division of Sultan Kudarat to administer the survey questionnaire to the science teachers and conduct the study with the grade 10 students of Esperanza National High School. An approval letter from the SDS was attached to seek permission from the School Principal of Esperanza National High School. Once all survey questionnaires had been gathered, the results were consolidated for data analysis. The findings served as a basis for developing learning activity guides in science, which were implemented in the school during the second grading period of the school year 2024–2025. The results were consolidated for data analysis.

2.5 Ethical Considerations

This research study followed ethical guidelines, ensuring voluntary participation where respondents could leave anytime if uncomfortable. The dignity and well-being of teachers and students were rigorously protected, with no physical, social, psychological, or other harm incurred. All research information remained confidential through secure data storage protocols, with personally identifiable information anonymized to protect participant identities. Respondent rights were upheld to maintain scientific integrity, and the study adhered to plagiarism-free, misconduct-free standards throughout its execution.

3.0 Results and Discussion

3.1 Implementation of Spiral Progression Approach

The level of implementation of the spiral progression approach by science teachers was measured through two indicators: vertical articulation and horizontal articulation (see Table 1). It yielded an overall mean of 4.33, which

is very high. This indicates that secondary school teachers effectively implement the Spiral Progression Approach in their teaching practices. The high score reflects a robust alignment with the core principles of the spiral progression approach, which emphasize iterative revisiting of concepts and skills across grade levels to deepen understanding and mastery. Moreover, the overall standard deviation is 0.53, less than 1, indicative of a minimal range of dispersion.

Table 1. *Consolidated Findings of the Level of Implementation of the Spiral Progression Approach*

Indicators/Items	Mean	SD	Verbal Description
A. Vertical Articulation			
1. The topics discussed in the previous years are needed in the present year.	4.77	0.43	Very High
2. There is continuity of lessons in the same concept of science in all grade levels.	4.18	0.59	High
3. The topics are reviewed from the previous grade level before introducing new topics.	4.23	0.43	Very High
4. The progressions of learning competencies of science are discussed in all grade levels.	4.41	0.50	Very High
5. The presentations of the lessons are broadened and deepened each time a concept is revisited.	4.18	0.66	High
6. The lessons are easy to understand since the same topics are offered in all grade levels at varying level of complexities.	3.95	0.58	High
Section Mean	**4.29**	**0.53**	**Very High**
B. Horizontal Articulation			
1. The concepts and skills in Life Science, Chemistry, Physics and Earth Science are presented with increasing levels of complexity from one grade level to another.	4.36	0.49	Very High
2. There is an integration of knowledge and skills across different disciplines.	4.32	0.48	Very High
3. The presentations of the lessons are broadened and deepen each time a concept is revisited.	4.23	0.53	Very High
4. There is more integration of various concepts on each topic encountered.	4.45	0.51	Very High
5. The lessons are extended in more elaborate and comprehensive teaching style.	4.45	0.60	Very High
Section Mean	**4.37**	**0.52**	**Very High**
Overall Mean	**4.33**	**0.53**	**High**

Vertical Articulation of Science Teachers

The section mean of 4.29 is interpreted as Very High with a standard deviation of 0.53. This vertical articulation of teachers was confirmed by three indicators interpreted as very high and three with a high interpretation. It indicates that science teachers had a well-structured science curriculum with strong continuity, regular review of previous material, and progressive complexity across grade levels. It also suggests effective implementation of curriculum design principles that support student learning and understanding in science education. In particular, the highest mean of 4.77, interpreted as Very High, shows that the topics discussed by the teachers in the previous years are needed in the present year. Moreover, the teachers' lessons are easy to understand since the same issues are offered in all grade levels at varying complexities, manifested by 3.95, the lowest mean acquired, interpreted as High. This result aligns with the spiral progression approach introduced in the K to 12 curriculum, which Giray and Kim (2023) and Tirol (2022) described as crucial for national progress and addressing academic disadvantages. The finding that topics discussed by the teachers in the previous years are needed in the present year (mean of 4.77, interpreted as "Very High") strongly supports the spiral progression approach. Saeidmehr et al. (2023) explain that this approach involves revisiting topics throughout a student's education, increasing complexity with each revisit and using prior knowledge as a foundation for new learning. De Ramos-Samala (2018) noted that this aligns with Bruner's spiral curriculum model, which the K to 12 curricula in the Philippines has adopted. This finding is consistent with the new curriculum approach described by Batidor and Casinillo (2021), where Integrated Science, Biology, Chemistry, and Physics are taught simultaneously rather than as separate subjects over four years.

Horizontal Articulation of Science Teachers

This indicator reveals a section mean of 4.37, described as Very High with a standard deviation of 0.52. This level of horizontal articulation was established by five indicators interpreted as Very High. It connotes that the spiral progression approach was effectively implemented, with concepts presented in increasing complexity across grade levels and integration of knowledge across disciplines. It also implies that the instructional approach emphasizes comprehensive coverage of topics, with lessons consistently extended in a more elaborate teaching style and increased integration of various concepts within each topic encountered. Specifically, the highest mean of 4.45, interpreted as Very High, illustrates that there is more integration of multiple concepts on each topic encountered and that the lessons are extended in a more elaborate and comprehensive teaching style. These findings strongly emphasize the interconnected learning and in-depth exploration of topics within the science curriculum. Notably, while still interpreted as Very High, the presentations of lessons being broadened

and deepened each time a concept is revisited received a slightly lower yet still high mean of 4.23. This result supports the objective stated by Mariano and Mina-Roguel (2025) that strengthened science teaching following a spiral progression is a key feature of the K-12 Enhanced Basic Education Program. The finding that lessons are extended in a more elaborate and comprehensive teaching style supports the goal of enhancing scientific literacy, as Vidergor (2018) outlined.

3.2 Digital Literacy of Science Teachers

The level of research digital literacy of science teachers was measured in terms of understanding digital practices, finding, using, and creating information (see Table 2). It yielded an overall mean of 4.33, with a standard deviation of 0.53, which is described as very confident. This indicates that secondary school teachers possess high confidence in their digital literacy skills. The results reflect the growing emphasis on integrating digital tools into teaching practices, especially in response to the demands of modern education systems and technological advancements. Moreover, the overall standard deviation is 0.53, less than 1, indicative of a minimal range of dispersion in respondents' responses.

Table 2. *Consolidated Findings of the Level of Digital Literacy*

Indicators/Items	Mean	SD	Verbal Description
A. Understanding Digital Practices			
1. Using online tools and websites to find and record information online.	4.14	0.35	Confident
2. Knowing what categories of users, you can expect to find online.	4.04	0.58	Confident
3. Explaining what happens to information you put online: your digital footprint.	4.45	0.60	Very Confident
4. Choosing the right tool to find, use, or create information.	4.41	0.59	Very Confident
5. Establishing who owns information and ideas you find online.	4.23	0.53	Very Confident
6. Establishing what online information you can legally re-use.	4.41	0.67	Very Confident
7. Presenting yourself online: your digital identity.	4.32	0.65	Very Confident
8. Finding a person online, for example an expert in your discipline, and establishing their contact details.	4.05	0.49	Confident
Section Mean	**4.26**	**0.52**	**Very Confident**
B. Finding Information			
1. Knowing what information you can find in the web.	4.18	0.50	Confident
2. Using social networks as source of information.	4.32	0.57	Very Confident
3. Using keywords commonly used in your discipline to search for information online.	4.45	0.51	Very Confident
4. Knowing what information you can find in an online Library.	4.32	0.65	Very Confident
5. Knowing when to change your search strategy or stop searching.	4.27	0.63	Very Confident
6. Scanning / skimming a web page to get to the key relevant information quickly.	4.27	0.55	Very Confident
7. Using advanced search options to limit and refine your search.	4.27	0.55	Very Confident
8. Filtering large numbers of search results quickly.	4.27	0.55	Very Confident
9. Keeping up to date with information from authoritative people or organizations by subscribing to Really Simple Syndication (RSS) feeds.	4.45	0.51	Very Confident
Section Mean	**4.31**	**0.56**	**Very Confident**
C. Using Information			
1. Keeping a record of the relevant details of information you find online.	4.27	0.53	Very Confident
2. Using information in different media, for example, podcasts or videos.	4.45	0.51	Very Confident
3. Citing a reference to an online resource (e.g. in an assignment) using the correct format.	4.27	0.63	Very Confident
4. Assessing whether an online resource (e.g. web page, blog, wiki, video, podcast, academic journal article) or person is credible and trustworthy.	4.18	0.50	Confident
5. Sharing files legally with others.	4.55	0.51	Very Confident
6. Using other people's work (found online) without committing plagiarism.	4.32	0.48	Very Confident
7. Using social bookmarking to organize and share information.	4.27	0.46	Very Confident
Section Mean	**4.33**	**0.52**	**Very Confident**
D. Creating Information			
1. Adding comments to blogs, forums or web pages, observing netiquette and appropriate social conventions for online communications.	4.00 4.41	0.31 0.50	Confident Very Confident
2. Working with others online to create a shared document or presentation.	4.05	0.49	Confident
3. Writing online for different audiences, e.g. a web page or blog entry for private use, for reading by your fellow students, for reading by your tutor, or for reading by anyone in the world.	4.14	0.64	Confident
4. Using media-capture devices, e.g. recording and editing a podcast or video.	4.14	0.47	Confident
5. Writing in different media for people to read on-screen.	4.32	0.47	Confident
6. Communicating with others online (forums, blogs, social networking sites, audio, video, etc.).	4.32	0.48	Very Confident
Section Mean	**4.17**	**0.48**	**Confident**
Overall Mean	**4.33**	**0.53**	**Very Confident**

Understanding Digital Practices of Science Teachers

As shown, the section mean of 4.26 is interpreted as Very Confident, with a standard deviation of 0.52. This understanding of teachers' digital practices was confirmed by five indicators interpreted as very confident and three with an interpretation of confident. It indicates that science teachers had a well-structured science curriculum with strong continuity, regular review of previous material, and progressive complexity across grade levels. It also suggests effective implementation of curriculum design principles that support student learning and understanding in science education. In particular, the highest mean of 4.45, interpreted as Very Confident, shows that the topics discussed by the teachers in the previous years are needed in the present year. Moreover, the teachers' lessons are easy to understand since the same issues are offered in all grade levels at varying complexities, manifested by 3.95, the lowest mean acquired, interpreted as Often.

Finding Information of Science Teachers

This indicator reveals a section mean of 4.31 interpreted as Very Confident, with a standard deviation of 0.56. Nine indicators confirmed teachers' digital literacy level in finding information with a very confident interpretation. It indicates that science teachers are confident in obtaining online information. In particular, the highest mean of 4.45, interpreted as very confident, shows that they are very competent in using keywords commonly used in their discipline to search for information online and keeping up to date with information from authoritative people or organizations by subscribing to Really Simple Syndication (RSS) feeds. Moreover, they know what information they can find on the web, which is manifested by 4.18, the lowest mean acquired and is interpreted as very confident. This result aligns with the findings of Masrukhin (2025), who stated that digital literacy is a dynamic concept: as information and communication technology (ICT) advances, the notion of digital literacy must also evolve to ensure that students acquire and use skills in pertinent new technologies for information retrieval, transfer, analysis, evaluation, and communication.

Using Information of Science Teachers

The section mean of 4.33 is described as Very Confident with a standard deviation of 0.52. Six indicators confirmed this with an interpretation of very confident, and one indicator with an understanding of confident. This indicates that educators maintain an online record of essential information. They have less experience in organizing and disseminating content through social bookmarking. Moreover, they may plagiarize by utilizing others' work through inadequate citation practices. Notably, the highest mean of 4.55, with a description of very confident, indicates that teachers share files legally with their colleagues and friends. Moreover, they can also assess whether an online resource or person is credible and trustworthy. It is demonstrated by a mean of 4.18, which is described as confident and is the lowest mean score they have. This is consistent with a study by Giray and Kim (2023), which showed that scientific educators possess confidence in data collection via digital technologies and exhibit a high degree of digital literacy, especially in locating, comprehending, utilizing, and generating digital information. Nevertheless, according to Silvhiany et al. (2021), digital literacy involves complex skills essential for full participation in a knowledge society. It includes the ability to evaluate online information sources critically.

Creating Information on Science Teachers

This indicator reveals a section mean of 4.17 with a standard deviation of 0.48 and is interpreted as Confident. Two indicators were described as very confident, and four with a confident description confirmed this. The result indicates a robust ability to interact, create, and communicate effectively in online environments, spanning writing, multimedia production, and interactive engagement. Teachers' capacity to collaborate with others online to generate a shared document or presentation is demonstrated by the highest mean of 4.41, which is accompanied by a description of "very confident." In addition, the mean gain score of 4.00 indicates that instructors are proficient in adding comments to blogs, forums, or web pages and observance of netiquette and appropriate social conventions for online communications. In their study, Ballano et al. (2022) supported this finding by emphasizing the importance of digital literacy in enabling educators to articulate themselves and engage effectively in digital communication. In addition, Al-Khatib (2023) stresses the role of netiquette in fostering respectful and effective online communication. They noted that adhering to netiquette principles enhances collaboration and builds positive relationships in digital learning environments.

3.3 Competence of Teachers

Teachers' competence level was measured in terms of subject mastery, classroom management, instructional

delivery, and assessment (see Table 3). The overall mean score of 4.55 and a standard deviation of 0.59 indicate that teachers demonstrate exceptional skills across all aspects of teaching science. The high scores reflect a strong foundation in pedagogical practices and subject-specific knowledge.

Table 3. *Level of Competence of Science Teachers*

Indicators/Items	Mean	SD	Verbal Description
A. Subject Mastery			
1. Applied knowledge of content within and across curriculum teaching areas.	4.67	0.53	Outstanding
2. Established a learner-centered culture by using teaching strategies that respond to their linguistic, cultural, socio-economic and religious backgrounds.	4.58	0.62	Outstanding
Section Mean	**4.62**	**0.58**	**Outstanding**
B. Classroom Management			
1. Displayed proficient use of Mother Tongue, Filipino and English to facilitate teaching and learning.	4.71	0.46	Outstanding
2. Established safe and secure learning environments to enhance learning through the consistent implementation of policies, guidelines and procedures.	4.69	0.48	Outstanding
3. Maintained learning environments that promote fairness, respect and care to encourage learning.	4.59	0.50	Outstanding
Section Mean	**4.66**	**0.48**	**Outstanding**
C. Instructional Delivery			
1. Used a range of teaching strategies that enhance learner achievement in literacy and numeracy skills.	4.41	0.57	Outstanding
2. Applied a range of teaching strategies to develop critical and creative thinking, as well as other higher-order thinking skills.	4.31	0.64	Outstanding
3. Adapted and used culturally appropriate teaching strategies to address the needs of learners from indigenous groups.	4.47	0.64	Outstanding
Section Mean	**4.40**	**0.62**	**Outstanding**
D. Assessment			
1. Used strategies for providing timely, accurate and constructive feedback to improve learner performance.	4.53	0.67	Outstanding
Section Mean	**4.53**	**0.67**	**Outstanding**
Overall Mean	**4.55**	**0.59**	**Outstanding**

Subject Mastery of Science Teachers

The section means of 4.62 is presented, described as Outstanding, with a standard deviation of 0.58. Teachers' competence level in teaching science in terms of subject matter was established by two indicators described as outstanding. It connotes that teachers demonstrate high professional adaptability and pedagogical expertise, effectively integrating content knowledge with responsive teaching strategies that acknowledge and respect diverse student backgrounds. It is supported by the study of Schneider (2019), who emphasized the importance of science teachers' competencies, particularly their Subject Matter Knowledge and Pedagogical Content Knowledge, that effective science teaching requires integrating content knowledge with teaching strategies that address diverse learners' needs. Further, Sorge et al. (2019), cited in the European Journal of Humanities and Educational Advancements, confirm that competent science teachers possess strong subject matter knowledge and adapt their teaching methods to meet diverse student needs.

Classroom Management of Science Teachers

The section means of 4.66 is interpreted as outstanding, with a standard deviation of 0.48. This level of competence of teachers in teaching science in classroom management was confirmed by three indicators described as excellent. This implies that teachers demonstrate exceptional professional skills in creating inclusive, safe, and linguistically diverse learning environments, prioritizing student well-being, respect, and effective communication across multiple languages. This aligns with research by Zajda (2021), which emphasizes the importance of teachers' skills in creating inclusive and effective learning environments. Their study found that competent teachers demonstrate the ability to plan appropriate classroom physical environments, accommodate and adjust learning environments, counsel special needs students, provide conducive classroom environments, rearrange classroom seating positions, and set up comfortable environments.

Instructional Delivery of Science Teachers

The result indicates a section mean of 4.40, which is described as outstanding, with a standard deviation of 0.62. It was established by three indicators with a description of outstanding. It suggests that teachers demonstrate exceptional pedagogical expertise, employing diverse, culturally responsive, and intellectually stimulating

teaching strategies that effectively enhance student learning, critical thinking, and skill development across different learning contexts and student backgrounds. Pertinent to this study, Mamlok-Naaman (2024) states that effective science teaching requires integrating content knowledge with teaching strategies that address diverse learners' needs.

Assessment of Science Teachers

The section means of 4.53 was presented, which was described as outstanding. This level of competence of teachers in teaching science in terms of assessment connotes that teachers demonstrated exceptional skill in implementing strategic, timely, and constructive feedback mechanisms crucial for enhancing student learning, performance improvement, and academic growth. Ahmad (2021) supported the result and found that constructive feedback significantly improves students' academic performance and self-efficacy. He emphasizes that timely and specific feedback helps students identify areas for improvement and motivates them to achieve higher academic success.

3.4 Implementation of Spiral Progression Approach and Competence of Science Teachers

Table 4 shows that Pearson's Product-Moment correlation was run to examine the relationship between the implementation of the spiral progression approach and science teachers' competence.

Table 4. *Correlational Analysis between the Implementation of the Spiral Progression Approach and Competence of Science Teachers*

Variables	r	t	p	Interpretation
Implementation of Spiral Progression Approach and Competence of Science Teachers	.54	3.49	0.001	Significant

The results indicate a statistically significant positive correlation between these two variables ($r = 0.546$, $t = 3.49$, $p = 0.00149$). The Pearson correlation coefficient (r) of 0.546 suggests a moderate positive relationship. This indicates that as the implementation of the spiral progression approach increases, the competence of teachers in teaching science also tends to increase. The computed t-value of 3.49 is statistically significant, with a p-value of 0.00149. Since the p-value is less than the alpha level of 0.05, the null hypothesis (that there is no relationship between the two variables) is rejected. This provides evidence that the observed correlation is not due to chance. The findings suggest that utilizing a spiral progression approach in teaching science is associated with enhanced teacher competence. This approach, which revisits topics at increasing levels of complexity throughout the curriculum, may enable teachers to deepen their understanding of the subject matter and develop more effective pedagogical strategies. It aligns with Bruner's spiral curriculum model, where students build on what they have learned, reinforcing the teacher's knowledge and skill (de Ramos-Samala, 2018). In the Philippines, the K to 12 curricula, implemented to enhance the overall quality of education, incorporates the spiral progression approach in science, aiming to strengthen science teaching and improve students' scientific literacy (Giray & Kim, 2023). Competent teachers are pivotal in bridging academic gaps and elevating student achievement (Earley, 2024), and the spiral progression approach may contribute to this competence. Teachers implementing this approach may demonstrate enhanced teacher noticing, a perception, interpretation, and decision-making process that shapes their instructional practice (Astatike, 2024). Furthermore, a good teacher is also a good motivator for achieving the best academic results for their students (Zokir qizi, 2023).

3.5 Digital Literacy and Competence of Science Teachers

The correlational analysis, which aims to determine the relationship between digital literacy and science teachers' competence, indicates that they are significantly positively correlated ($r = 0.699$, $p = 0.0225$).

Table 5. *Correlational Analysis between Digital Literacy and Competence of Science Teachers*

Variables	r	t	p	Interpretation
Digital Literacy and Competence of Science Teachers	.69	3.35	.022	Significant

Note: ns - not significant at .05 level

The Pearson correlation coefficient (r) of 0.6991 suggests a strong positive relationship. This indicates that as digital literacy increases, the competence of teachers in teaching science also tends to increase. The computed t-value of 3.35 is statistically significant, with a p-value of 0.0225. Since the p-value is less than the alpha level of 0.05, the null hypothesis (that there is no relationship between the two variables) is rejected. The findings suggest that digital literacy is positively associated with teacher competence in science education. The

integration of technologies in teaching-learning processes is complex and multi-dimensional (Wanyama & Baetz, 2023). In today's world, it is impossible to think about education without technologies that support teaching-learning processes (Roushan et al., 2024). Teachers who are more digitally literate are likely better equipped to use technology effectively in their teaching, enhancing their overall competence. The significant positive relationship between digital literacy and teacher competence is crucial because effective technology integration requires teachers to demonstrate sufficient competence in choosing the right technologies (Ballano et al., 2022).

3.6 Performance of the Students

Table 6 presents the level of the students' performance in terms of their second-grading grade in science.

Table 6. *Performance of Students*

Grading Scale	Frequency	Percentage	Description
90 – 100	29	64	Outstanding
85 – 89	16	36	Very Satisfactory
80 – 84	0	0	Satisfactory
75 – 79	0	0	Fairly Satisfactory
Below 75	0	0	Did Not Meet Expectations
Overall	**45**	**100**	**Outstanding**

The data reveal that most students demonstrated high levels of achievement, with 64% (29 students) achieving an Outstanding rating (90-100) and 36% (16 students) achieving a Very Satisfactory rating (85-89). No students received a rating below 85, indicating a generally high level of performance in the subject.

3.7 Acceptability of the Developed Learning Activity Guides

The level of acceptability of the developed Learning Activity Guides (LAGs) was measured in terms of competency, learning plan, assessment, and technical aspect (see Table 7). The data reveal that the LAGs were generally very acceptable across all indicators, with an overall mean score of 4.68 (SD = 0.15), indicating a high overall acceptance level. Among the specific indicators, the Learning Plan received the highest mean score of 3.93 (SD = 0.70), suggesting that students particularly appreciated the structure, organization, and sequencing of the learning activities within the guides. The Technical Aspect also received a high rating, with a mean of 3.87 (SD = 0.73), indicating that students found the guides' layout, language, and error-free nature highly satisfactory.

Table 7. *Consolidated Findings of the Level of Acceptability of the Developed Learning Activity Guides*

Indicators/Items	Mean	SD	Verbal Description
A. Target Competency			
1. The Learning Activity Guides are very much aligned with the target competencies in science.	3.71	0.69	High
2. The Learning Activity Guides are very much appropriate for my grade level in science.	3.87	0.79	High
3. The Learning Activity Guides cover all the necessary target competencies in science.	3.76	0.77	High
Section Mean	**3.78**	**0.75**	**High**
B. Learning Plan			
1. The learning activities in the guides are very much suitable for the target competencies in science.	3.96	0.67	High
2. The learning activities are much well-sequenced and organized.	3.91	0.73	High
3. The Learning Activity Guides provide acceptable instructions for the learning activities.	3.93	0.69	High
Section Mean	**3.93**	**0.70**	**High**
C. Assessment			
1. The Learning Activity Guides include very much appropriate assessment tools to measure my understanding of science concepts.	3.82	0.83	High
2. The assessment tools are much well-designed and easy to use.	3.67	0.71	High
3. The assessment tools provide acceptable meaningful feedback to help me learn science better.	3.91	0.79	High
Section Mean	**3.80**	**0.78**	**High**
D. Technical Aspect			
1. The layout and format of the Learning Activity Guides are very much visually appealing and easy to navigate.	3.69	0.70	High
2. The language used in the guides is much clear and easy to understand.	3.98	0.84	High
3. The Learning Activity Guides are free from grammatical and typographical errors.	3.93	0.65	High
Section Mean	**3.87**	**0.73**	**High**
Overall Mean	**3.85**	**0.74**	**High**

The consistently high level of acceptance across all indicators suggests that the developed LAGs are a well-received and effective learning resource for students. This positive evaluation aligns with research highlighting

the importance of considering various factors, such as instructional design, assessment strategies, and technical aspects, in developing effective learning materials. Research by Leppink (2018) highlights the significance of incorporating user-friendly design principles and clear communication strategies to enhance the usability and effectiveness of instructional materials.

Target Competency

The evaluation of the Learning Activity Guides (LAGs) regarding their alignment with target competencies in science indicates a generally positive perception. The section means of 3.78, described as High, suggests that the LAGs are largely well-aligned with the intended learning objectives. The result reveals that the learning activity guides successfully addressed the key scientific parameters. The mean of 3.71 for the statement The Learning Activity Guides are very much aligned with the target competencies in science, along with the means of 3.87 and 3.76 for the remaining two statements (The Learning Activity Guides are very much appropriate for my grade level in science, and The Learning Activity Guides cover all the necessary target competencies in science) reinforce the notion that educators find the LAGs to be a valuable resource. These findings are consistent with the framework that promotes critical thinking, strategies, and new teaching practices that assist students in achieving the desired curriculum objectives (Deri et al., 2021).

Learning Plan

The section mean score of 3.93 with a standard deviation of 0.70 indicates that the students generally find the learning plan incorporated within the LAGs acceptable. Specifically, item 1, The learning activities in the guides are suitable for the target competencies in science, garnered the highest mean of 3.96 (SD = 0.67), suggesting that students perceive the activities as highly relevant and aligned with the intended learning outcomes in science. Item 2, the learning activities are much more well-sequenced and organized, obtained a mean of 3.91 (SD = 0.73), indicating that students find the structure and flow of the learning activities logical and easy to follow. Item 3, The Learning Activity Guides provide acceptable instructions for the learning activities, received a mean score of 3.93 (SD = 0.69), highlighting the students' understanding and ease of use with the instructions provided for each learning activity. The well-sequenced and organized nature of the activities aligns with the activation principle, which emphasizes the importance of activating prior knowledge and building upon it in a logical progression (Shamsitdinova, 2023).

Assessment

The section means 4.53 is interpreted as High, with a standard deviation of 0.78. This indicates that the students generally find the assessment methods incorporated within the LAGs acceptable. Specifically, item 1, The Learning Activity Guides, includes very appropriate assessment tools to measure my understanding of science concepts, garnering a mean of 3.82 (SD = 0.83), suggesting that students perceive the assessment tools as aligned with the learning objectives. Similarly, in item 2, the assessment tools are well-designed and easy to use, and a mean of 3.67 (SD = 0.71) was obtained, indicating that students find the assessment tools user-friendly and well-structured. The highest mean score of 3.91 (SD = 0.79) was observed for item 3. The assessment tools provided acceptable and meaningful feedback to help me learn science better. This is consistent with the principles of constructive alignment, where assessment tasks are designed to measure the intended learning outcomes and provide students with opportunities to demonstrate their understanding (Munikwa, 2024).

Technical Aspect

The result indicates a section mean of 3.87 with a standard deviation of 0.73, which suggests that the students generally find the technical aspects of the LAGs Much Acceptable. Specifically, item 1, the layout and format of the Learning Activity Guides, is very visually appealing and easy to navigate, receiving a mean of 3.69 (SD = 0.70), suggesting that students generally find the visual presentation and organization of the LAGs pleasing and user-friendly. Item 2, the language used in the guides is straightforward to understand, garnered the highest mean of 3.98 (SD = 0.84), indicating that students perceive the language used in the LAGs as highly accessible and comprehensible. Item 3, The Learning Activity Guides are free from grammatical and typographical errors, obtained a mean of 3.93 (SD = 0.65). This highlights the students' appreciation for the attention to detail and the absence of errors in the LAGs. According to research in cognitive load theory (Leahy & Sweller, 2019), the visual layout, clarity of language, and absence of errors can significantly impact a learner's cognitive load, which affects their ability to process and retain information. A visually appealing and easy-to-navigate layout reduces extraneous cognitive load, allowing students to focus on the essential content (Wu et al., 2022). Clear and understandable language and the absence of grammatical errors further minimize unnecessary cognitive

demands, promoting more effective learning. This is supported by White and Newby (2025), who emphasize the importance of usability and clarity in instructional design to ensure learners can easily access and understand the presented information.

3.8 Academic Performance of Students and the Acceptability of the Developed Learning Activity Guide

Table 8 presents the correlation coefficients (r) and corresponding p-values to determine if there is a significant association between learners' academic performance and their acceptance of the developed Learning Activity Guides (LAGs), as measured across four key indicators: Target Competency, Learning Plan, Assessment, and Technical Aspect.

Table 8. *Correlation between Learners' Academic Performance and their Acceptance of the Developed Learning Activity Guides*

Acceptability	Academic Performance	
	r	p
Target Competency	.00	.517
Learning Plan	.09	.145
Assessment	.05	.737
Technical Aspect	.00	.475

The correlational analysis results indicate no statistically significant association between student acceptance of the LAGs and their academic performance for any measured indicators. Specifically, the correlation between acceptance of the Target Competency aspect of the LAGs and academic performance was weak and non-significant ($r = 0.005$, $p = 0.517$). The correlation between acceptance of the Learning Plan aspect of the LAGs and academic performance was also weak and non-significant ($r = 0.091$, $p = 0.145$). Similarly, there was no significant correlation between acceptance of the Assessment aspect of the LAGs and academic performance ($r = 0.058$, $p = 0.737$). Finally, the correlation between acceptance of the Technical Aspect of the LAGs and academic performance was weak and non-significant ($r = 0.006$, $p = 0.475$). Since all p-values are much higher than the significance level of 0.05, it fails to reject the alternative hypothesis of no association. Therefore, based on this data, the student's acceptance of the Learning Activity Guides, as measured by the four indicators, is not significantly associated with their academic performance. This suggests that while students may perceive the LAGs as acceptable, this perception does not directly translate into a statistically significant improvement in their academic outcomes.

4.0 Conclusion

This study investigated the effectiveness of integrated learning activity guides in Grade 10 Science, focusing on the spiral progression approach. In this curriculum design, topics are revisited with increasing complexity across grade levels, teacher digital literacy, and competence. Key findings revealed that consistent implementation of the spiral progression approach strengthens teacher competence, while strong digital literacy further enhances teaching proficiency. Notably, student acceptance of the learning guides did not correlate with academic performance, emphasizing the greater influence of teacher expertise and curriculum design. These results highlight the critical role of interdisciplinary strategies in improving science education and emphasize the need for targeted teacher training in curriculum articulation and digital tools. Future research may explore how specific digital resources and curriculum adaptations can maximize learning outcomes, particularly in contexts where teacher competence and student engagement intersect.

5.0 Contributions of Authors

The principal author contributes to the study's writing and implementation. The co-author edits and supervises the data.

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7.0 Conflict of Interests

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The Benefits and Drawbacks of Sustainable Tourism in Siargao Islands, Philippines: An Exploratory Inquiry

Stephinejane E. Musico[1*], Monsour A. Pelmin[2]
[1,2]School of Graduate Studies, Central Philippine University, Iloilo City, Philippines
[1]Surigao del Norte State University, Surigao City, Philippines

[*]Corresponding Author Email: stephinejane.musico-20@cpu.edu.ph

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Abstract. Siargao Islands, Philippines, is globally renowned for its world-class surfing spots, powdery white beaches, and vibrant local culture, positioning it as one of the world's leading island destinations. However, sustainable tourism remains a critical area of inquiry given the limited research on how local stakeholders manage the balance between tourism and conservation. This study addresses this gap by exploring the diverse local perspectives and providing context-specific insights into how the island can balance tourism growth with sustainability. An exploratory qualitative case study methodology was employed, utilizing thematic analysis of semi-structured, in-depth interviews with 19 purposively selected stakeholders including four municipal tourism officers, three accommodation providers, two tour operators, two tour guides, four food and beverage providers, one transportation provider, one local business owner, one startup entrepreneur, and one tourism educator. The findings reveal economic benefits of tourism, such as increased economic growth and livelihood opportunities, environmental conservation, and social and cultural enhancement. Drawbacks include resource strain, erosion of local culture, displacement, rising costs of commodities, and tourism-driven price increases. Reserving natural assets, economic and social development, and competitive advantage driven by tourism are essential for maintaining Siargao as a leading island destination. Nevertheless, fundamental sustainable tourism imperatives such as environmental stewardship, economic equity, and social balance must be prioritized to ensure the attainment of long-term development objectives, including robust infrastructure, financial sustainability, and social and ecological resilience. This study concludes that tourism is essential for building a resilient, balanced, and future-ready island economy. Furthermore, it advocates for the establishment of a unified regulatory framework, community-driven waste management systems, the support of local MSMEs and startups, the preservation of cultural heritage, investment in sustainable infrastructure, the promotion of complementary sectors, enhancement of participatory governance, and land-use protections to protect residents from the drawbacks of tourism.

Keywords: Sustainable development; Sustainable tourism; Philippines.

1.0 Introduction

The tourism industry has significantly contributed to the economic growth of nations across the globe. As both private and public sectors pursue tourism development, there has been a growing awareness of the sociocultural and environmental degradation caused by unchecked growth. This tension has prompted a shift toward sustainable tourism, which the United Nations World Tourism Organization (UNWTO) defines as tourism that considers "its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities." While this definition has become central to tourism discourses, real-world applications often fall short, particularly in fragile island ecosystems where unsustainable

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practices threaten cultural identity and ecological integrity (Shen et al., 2020; Zhuang et al., 2019; Ramkissoon, 2023).

Siargao Islands in the Philippines exemplify this paradox. Once a remote locale known for its rich marine biodiversity and world-class surfing spots, Siargao has become a significant tourism destination over the past two decades. This boom has invigorated the local economy through employment generation, growth of microenterprises, and increased public revenue. While Small Island Developing States (SIDS) such as Grenada illustrate the possibility of incorporating ecosystem accounting to inform nature-based decision-making and sustainably manage natural capital (Mengo et al., 2022), such instances are relatively infrequent, and several islands, such as the Siargao Islands, confront escalating tourism pressures without thorough stakeholder-driven resolutions. These consequences underscore the need to assess whether current tourism practices on the island align with sustainable principles.

Siargao offers diverse natural and cultural attractions beyond its world-renowned surf breaks. Additionally, it hosts a range of luxury resorts, such as Nay Palad Hideaway and Siargao Bleu Resort and Spa, as well as budget-friendly hostels designed for backpackers and surf enthusiasts. With all these assets, Siargao attracted approximately 529,822 visitors in 2023, reflecting a significant increase from 125,088 tourists in 2022 (Travel and Tour World, 2023). This growth comprised 476,074 domestic travelers and 53,748 international visitors, showcasing a robust post-pandemic recovery (Department of Tourism, 2023). The increasing number of visitors highlights Siargao's resilience and capacity for economic revitalization through tourism (Manila Times, 2023). Nevertheless, this continued expansion has raised concerns about sustainable development, land use, and environmental conservation.

Literature on sustainable tourism acknowledges its transformative potential but also reveals persistent challenges in its implementation. For instance, studies emphasize the importance of evaluating indirect effects of tourism and promoting inter-sectoral collaboration, private sector accountability, and community empowerment (Hampton et al., 2018; Comerio & Strozzi, 2019). Despite the growing body of work, empirical evidence often reveals a dissonance between policy and practice. Wilkinson (2011), in his compilation of case studies on island tourism, highlighted the recurring failure to achieve genuine sustainability. Similarly, Vu and Ngo's (2019) investigation of Phu Quoc, Vietnam, showed that, despite their apparent success in promoting sustainable tourism, deeper inquiry revealed unresolved issues that required a more structured roadmap. These findings reflect a common gap in the literature: the absence of localized, context-sensitive understandings of sustainability from the ground level.

This responds to that gap by exploring tourism development's perceived benefits and drawbacks among key stakeholders in the Siargao Islands. Through an exploratory case study approach, it aims to provide a deeper, narrative-driven understanding of sustainable tourism from the locals' perspectives. The study helps with ongoing conversations about managing sustainable tourism by sharing these stories. It gives ideas on how island destinations in developing countries can balance tourism growth with lasting environmental and social health. Furthermore, this study corresponds with the United Nations Sustainable Development Goals (SDGs), namely SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), and SDG 14 (Life Below Water). In doing so, it hopes to guide more effective and inclusive development strategies that reflect the realities on the ground while reinforcing the global call for sustainable tourism practices.

2.0 Methodology

2.1 Research Design

This study adopts an exploratory qualitative case study design to investigate the benefits and drawbacks of sustainable tourism in the Siargao Islands. This design facilitates a comprehensive and contextualized understanding of tourism practices and stakeholder perspectives, aiming to produce a narrative-rich account of sustainable tourism. Exploratory case study designs enable flexibility in discovering themes without being restricted by predefined categories. Semi-structured interviews and participant observations were employed to gain detailed insights into stakeholder experiences and perceptions.

2.2 Research Participants

The study was conducted in the Siargao Islands, Surigao del Norte, the Philippines' "Surfing Capital." The

Siargao Islands encompass nine municipalities: Burgos, Dapa, Del Carmen, General Luna, Pilar, San Benito, San Isidro, Santa Monica, and Socorro. Purposive sampling was used to identify key informants directly involved in tourism, governance, business, or academia related to Siargao's tourism sector. Inclusion criteria required participants to be residents or long-term stakeholders (minimum five years) in the region, with informed consent obtained before data collection. 19 Participants included four municipal tourism officers, three accommodation providers, two tour operators, two tour guides, four food and beverage providers, one transportation provider, one local business owner, one startup entrepreneur, and one tourism educator. Exclusion criteria eliminated individuals with no direct engagement in tourism or insufficient residency duration. Those who declined to give informed consent were also excluded.

2.3 Research Instruments

The primary instrument for data collection in this qualitative case study was a semi-structured interview guide that the researcher devised. Three micro-theories served as the foundation for the instrument's development: Stakeholder Theory (Freeman, 1984), Social Exchange Theory (Ap, 1992), and the Theory of Planned Behavior (Ajzen, 1991). A panel of four experts initially evaluated the interview guide, three of whom possess doctoral degrees aligned or allied to Tourism Management. One is a seasoned practitioner in sustainable tourism policy at the local government level. Additionally, two scholars are experts in thematic analysis and qualitative research. The guide was subsequently subjected to ethical review and approval by the Research Ethics Review Board of the Central Philippine University. To safeguard the rights and well-being of participants, ethical safeguards such as informed consent, voluntary participation, confidentiality, and the right to withdraw were rigorously enforced.

Each of the five open-ended questions in the final version of the interview guide was tailored to the specific research problems of the study. These inquiries aimed to investigate participants' perspectives on the benefits, drawbacks, and long-term effects of sustainable tourism, as well as its overall necessity for island development and key imperatives. The interview guide's adaptable framework facilitated a rich and authentic dialogue with participants, allowing for contextual elaborations and probing inquiries. Each interview session was approximately 30 minutes to an hour, which was designed to accommodate the depth and comfort of the participants' responses. The interview guide and sample questions utilized in this study can be obtained from the corresponding author upon request.

2.4 Data Gathering Procedure

Semi-structured interviews were arranged through coordination with the Surigao del Norte Tourism Office and referrals from local government offices. Interviews were in person at mutually agreed-upon private locations and recorded using an encrypted audio device. All interviews were transcribed verbatim. Transcripts were anonymized, with identifying details removed, and securely stored in encrypted digital folders. Physical documents such as consent forms were locked in secure cabinets accessible only to the researcher.

2.5 Data Analysis

Following Braun and Clarke's (2021) six-phase approach, thematic analysis was used to analyze qualitative data. The researcher conducted iterative coding, theme identification, and pattern recognition across stakeholder narratives. Atlas.ti Version 23 (License ID L-C7C-D4E, valid until April 29, 2025) was utilized for data management, facilitating organized coding, network mapping, and theme development. Document analysis of local tourism policies, development plans, and sustainability reports served as triangulation, strengthening the validity and contextual grounding of the study (Bowen, 2009).

2.6 Ethical Considerations

This research strictly adhered to ethical guidelines set by the Central Philippine University Research Ethics Review Board. The study protocol was approved on July 19, 2023, under CPU-RERB Protocol Number 2023-192-PG-MUSICO. Informed consent was obtained from all participants, and their participation was voluntary and revocable at any stage without penalty. Measures were taken to ensure anonymity, confidentiality, and data security, including encrypted storage and pseudonym use. Minimal risks, such as emotional discomfort during interviews, were mitigated through a supportive and flexible interview environment. Participants were not offered monetary compensation and were informed that their data would solely be used for academic purposes.

2.7 Trustworthiness

In assessing criteria for high-quality qualitative research, methodological rigor, representativeness, reflexivity, and transferability must be focused on. Clarification and justification of methods were established through transparent reporting of sampling, data collection, and analysis procedures. Reflexive journaling was maintained to minimize bias, and findings were grounded exclusively in collected data. The use of Atlas.ti ensured systematic analysis, while triangulation with documentary sources bolstered data validity.
Integrity.

3.0 Results and Discussion

3.1 Benefits of Sustainable Tourism in Siargao Islands

Economic Growth and Livelihood Opportunities

A significant increase in employment opportunities is observed in Siargao Islands, specifically in guiding, transportation, accommodation, and culinary services. A Del Carmen (P2) local guide disclosed that numerous unemployed individuals have been integrated into the tourism industry, while others have effectively established small businesses. Indeed, tourism-related jobs are essential for reducing poverty and promoting economic development (Liu & Xie, 2022). Additionally, residents celebrated how the island's employment opportunities have diminished their need to relocate to urban areas. A tour guide in Pilar (P1) observed that the number of individuals migrating to cities such as Manila has decreased, as there are now viable income sources in the area. The increased wage rate of PHP 1,500 for tour guides, as reported by a municipal tourism officer (P7), represents a substantial advance over conventional income sources such as farming and fishing. The global evidence that tourism strengthens local economies and increases household income is reflected in these developments (Bank, 2021).

Tourism promotes entrepreneurship in island destinations such as Siargao Islands. As the number of visitors to Siargao increases, residents have reported a significant increase in the demand for culinary services and retail businesses. A municipal tourism officer (P11) observed a rise in MSME registrations, encompassing traditional food items such as budbud and pan de totoy, and innovative products such as homemade ice cream in native flavors. Similarly, Guo et al. (2023) emphasized the significant changes in rural tourism entrepreneurship, demonstrating that flourishing tourism sectors generate business opportunities for residents. Community-Based Tourism Enterprises (CBTEs) have been instrumental in expanding inclusive business opportunities. A municipal tourism officer in Del Carmen (P19) described a revenue-sharing model at Sugba Lagoon that guarantees an equitable income distribution among property owners, barangays, and laborers. These findings contrast with Nugraha and Flora (2022), who cautioned against oversimplifying CBTE benefits since property owners and local elites frequently capture a disproportionate share of tourism revenues, resulting in social tensions and disparities within communities.

According to a homestay supervisor, tourism revenues are also allocated to essential social services, notably medical assistance programs that prioritize underprivileged residents (P9). However, P9 clarified that residents in General Luna receive a waiver of these fees as a measure to ensure equity and accessibility. Nguyen (2021) acknowledged that incorporating environmental governance into tourism strategies is a method to increase government revenues by stimulating business activity and improving the overall performance of tourism-dependent economies. Meanwhile, in Del Carmen, a single journey to Sugba Lagoon contributes PHP 50 to the municipal treasury, which equates to more than PHP 5,000 per day during peak periods (P19). Additionally, she cited the annual increase in business tax collections, which she attributed to increased visitor activity. In contrast, apprehension regarding the long-term stability of this economic model, as tourism-dependent economies may be volatile and susceptible to external factors such as global pandemics, economic downturns, or climate change (Yuniningsih et al., 2022).

Environmental Conservation and Resource Management

One of the key benefits of sustainable tourism in the Siargao Islands is the continued implementation of waste management and eco-friendly policies that aim to minimize ecological degradation brought by tourism. Municipalities such as Pilar and Del Carmen were the first to implement single-use plastics regulations, including the mandatory use of reusable containers and the prohibition of PET bottles (P1, P19). In addition to these endeavors, General Luna implemented a plastic-for-rice exchange program that promoted community compliance. Nevertheless, enforcement has been inconsistent. For example, waste segregation is still frequently

disregarded, a practice further exacerbated by the relaxation of enforcement measures during the COVID-19 pandemic (P7). The accumulation of garbage in Barangay Malinao in General Luna has worsened due to the expansion of resorts, which has compelled residents to either burn or unlawfully dispose of their trash. These findings align with Borazon's (2023) emphasis on the significance of environmental conservation and waste management in the context of island destinations being susceptible to revenue and job loss in the event of closures.

A municipal tourism officer (P11) noted that local authorities and communities have implemented stringent conservation and zoning measures, such as those on the coasts near Hope for the Islands. Construction is prohibited on this protected turtle nesting site. Another municipal tourism officer (P5) reports the establishment of Marine Protected Areas (MPAs), and mooring buoys to prevent reef damage, and community-led partnerships also facilitate beach cleanups and mangrove planting, notably in General Luna. This expands the previous findings on creating effective marine sanctuaries, where limiting human access is linked to better results, thus underscoring the need for collaborative efforts (Guabiroba et al., 2022). On a more extensive scale, the Department of Agriculture–BFAR provided fiberglass boats to fisherfolk in Pilar and Dapa, thereby promoting sustainable livelihoods and diminishing dependence on exploitative fishing (BFAR, 2024).

Social and Cultural Enhancement

Community empowerment is another benefit Siargao has reaped from tourism, where formerly marginalized voices have emerged to influence the island's tourism identity. Community members now oversee the tourism operations at Sugba Lagoon (P19). She observed that revenues are no longer diverted to external operators; they are directly allocated to local boatmen and adjacent property owners, some of whom are former mangrove loggers and dynamite fisherfolk. This power shift is exemplified by the localized control over livelihood, transforming the community from passive recipients to active architects of tourism value. This is consistent with Bozdaglar's (2023) assertion that community-based tourism initiatives, when locally owned and managed, generate significantly more benefits than externally controlled ventures. Similarly, a single tourism site in Barangay Maasin employs more than 50 inhabitants from the village, an unimaginable situation decades ago (P1). These narratives corroborate the assertions of Khair et al. (2020) and Suryawan et al. (2024) that empowered communities are more environmentally conscious and resilient. Nevertheless, Dagilienė et al. (2021) warn that to remain effective and transformative over time, such empowerment must be sustained through consistent institutional support and capacity-building.

Cultural preservation and education are profoundly ingrained in the local narratives and everyday governance, which reflect intergenerational learning, discipline, and pride. Municipal government implemented ordinances to reinforce local values, including prohibiting overly exposed attire in town centers and promoting cultural modesty (P11). This endeavor safeguards social norms without alienating travelers, thereby preserving the community's identity in the face of increasing external influences. This complements Sunardi et al.'s (2021) perspective on localized policies being strategies of culture-sensitive governance. P15, a tourism instructor, shared how homegrown programs uncovered young talents such as Anji Salvacion, who began her journey in local contests before attaining national acclaim. These programs serve as springboards of cultural pride and hope for young people, particularly in the presence of external pressures.

Integrating cultural expressions into tourism initiatives guarantees that development is rooted in the values of the community it serves (Uduji et al., 2019). P13, a food kiosk owner, affirms this by highlighting the growing awareness among locals to immerse travelers in respectful engagement through language, local practices, and behavior. This finding solidifies Bell & Reed (2022) and Wasela's (2023) assertions that participatory cultural endeavors enhance social sustainability. Additionally, Lasco et al. (2022) emphasize in their research on crisis-responsive cultural governance that local ordinances that promote cultural continuity also encourage cohesion in the community during periods of disruption, such as the COVID-19 pandemic. However, to remain inclusive, relevant, and empowering, these policies must remain adaptive, as Li et al. (2023) recommended.

3.2 Drawbacks of Sustainable Tourism in Siargao Islands

Environmental Drawbacks

Overcapacity in the Siargao Islands reflects a growing concern among its stakeholders, highlighting the disconnect between tourism expansion and the island's environmental and infrastructural thresholds. Apprehension that no formal study has been conducted to ascertain the island's overall carrying capacity,

despite the apparent strain in locations such as General Luna (P15). She observed that this disparity leads to frequent water and electricity shortages, unmanaged waste, and overcrowding. P1 echoed this sentiment, describing how the overwhelming volume of tourists burdens the island's fundamental services. He added, "*The water tanks run dry by midday*." These challenges are consistent with the findings of Fang et al. (2020), which indicate that destinations are at risk of degrading their natural assets and reducing the well-being of their residents in the absence of defined limits. Moreover, results affirm prior conclusions of Grofelnik et al. (2020) about excessive tourist inflows accelerating waste generation and resource depletion. The findings may further strengthen Fasa et al.'s (2023) claim that unregulated development threatens environmental sustainability and socio-economic stability.

Persistent waste management concerns significantly impede Siargao's sustainability, highlighting the growing disparity between policy and practice. Although environmental programs are documented, their implementation at the grassroots frequently fails to meet expectations. P6, a transportation provider in General Luna, observed that "*garbage accumulates daily*," attributing the problem to inadequate compliance with segregation regulations and the lack of public education. Similarly, despite various waste management initiatives, a significant amount of waste was still observed (P17). These challenges affirm previous research. Gamao and Caelian (2023) determined that ineffective waste practices in coastal communities are typically the result of minimal community involvement and inconsistent collection systems—conditions that Siargao stakeholders reiterate. Waste accumulation becomes unmanageable when policies fail to adapt to local realities, eroding environmental health and resident quality of life (Ramadan et al., 2022). The issue in Siargao is not the absence of policies, but rather their failure to acquire traction in everyday community life.

Cultural and Social Disruptions

The erosion of local culture is increasingly observed in the Siargao Islands through behavioral changes among the locals, especially the youth. Many of them are embracing tourism-influenced lifestyles that contradict the long-standing community values. A tour operator (P17) noted that younger locals now adopt the same behaviors as foreign visitors, such as riding motorbikes in bikinis, frequenting beach bars, and engaging in a nocturnal culture previously absent. P12, a food business owner, reiterated this transformation, expressing his regret over the community's transformation from a tranquil and family-oriented environment to a Westernized and party-oriented one. Late-night noise and bar activities have become more commonplace, which has caused tension among the older generation, who remember a more disciplined and modest Siargao (P9). These observations are consistent with Panth's (2024) research in Nepal, which revealed that Western media significantly influenced the behaviors of young people, particularly in the areas of alcohol consumption and social behavior. Moreover, tourism can weaken local identity and lead to cultural fatigue in areas affected by tourism, where global trends overshadow local customs (Bell & Reed, 2022; Tabudlo & Saligan, 2022). This study further emphasized the necessity of community-led cultural preservation, particularly considering the increasing generational gap (Wasela, 2023). Without deliberate efforts to preserve cultural identity, the community may lose its traditions and sense of self.

Displacement and accessibility loss are other growing concerns in Siargao, where locals are increasingly pushed out of their original communities due to soaring land values and unchecked commercial development. P8, a 57-year-old storeowner from General Luna, described how her family was compelled to vacate their seaside residence after the landowner reclaimed the property for future resort expansion. The landowner refused to sell the property to them, as they knew they could not compete with commercial offers. They have been relocated inland; they are now separated from the sea that once influenced their daily existence. These narratives reinforce Panth's (2024) findings and indicate the cultural and spatial dislocation resulting from land commodification. These developments prioritize investors while alienating long-term residents from their heritage. This pattern is further agreed upon by Grisdale (2019), who demonstrates that the increasing demand for short-term rentals in tourist destinations frequently results in the displacement of natives, as profitability precedes community preservation. In these cases, tourism risks becoming a divisive force that fragments communities, creates resource competition, and erodes the cultural foundations of any destination that relies too much on it (Jayakody et al., 2022; Lasco et al., 2022).

Economic Drawbacks

Rising costs and inflation in Siargao reflect a deepening mismatch between the island's growing tourism sector and the declining purchasing power of locals. Rice is priced between ₱80 and ₱100 per kilogram, whereas

popular veggies such as bitter gourd may reach ₱120 (P17). Price control appears to be a fantasy as food and transportation prices rise (P12). This finding agrees with that of Zhang et al. (2023), stating that the increasing local market prices pose a challenge for residents in tourism areas with stagnant revenues to maintain their standard of living. This also aligns with previous research (Bischoff & Sandusky, 2023; Hu et al., 2022; Pappa et al., 2023), which shows that tourism frequently increases local prices at a quicker rate than wage growth, thereby exacerbating economic dissatisfaction and inequality. Due to this, residents' perspectives regarding tourism may be influenced by the equitable distribution of its financial benefits, rather than its overall economic benefits.

The concentration of land ownership and tourism profits among a few individuals and external investors in Siargao also demonstrates an unequal benefit distribution. While it is true that tourism has created opportunities, these are most likely accessible to the wealthy or politically connected (P13), as they have the mechanisms to secure the best locations, access funding, and navigate bureaucratic processes. These assessments show that tourism-driven prosperity can exacerbate economic disparities. Inclusive planning and community participation may reduce these inequalities and share tourism advantages more fairly (Sumanto, 2022; Tian et al., 2021). Further, land concentration may lead to social inequality, arguing that marginalized populations remain economically excluded without redistribution (Lee, 2025).

3.3 Effects of Sustainable Tourism on Development Goals

Infrastructure Development

Improved public facilities in Siargao illustrate how tourism can realize long-term development goals of an island destination such as the Siargao Islands. The emergence of sustainable tourism has resulted in the establishment of paved roads, public restrooms, power, and water systems—improvements that were previously lacking in her locality (P13). The quantity of resorts and business establishments signifies tourist demand and enhanced services available to residents (P15). These accounts corroborate findings that tourism-related investments augment access to vital services such as markets, healthcare, and education, simultaneously enhancing the quality of life for both residents and visitors (Adeola & Evans, 2019; Duc et al., 2023; Nazneen et al., 2019; Sánchez-Oro Sánchez et al., 2020). Similarly, community-oriented and inclusive infrastructure planning is vital for guaranteeing that these advantages are sustainable and equitable (Arabov et al., 2024; Tian et al., 2021). This aspect is particularly crucial in Siargao, where governance significantly influences the trajectory of tourism. When effectively administered, infrastructure development enhances economic prospects and the attractiveness of destinations (Yunus, 2021).

One primary objective of tourism development in Siargao is to achieve environmental sustainability. This has been increasingly pursued through resource management solutions that address both ecological and economic challenges. In General Luna, implementing solar panels and rainwater harvesting systems has diminished dependence on fluctuating electricity and water services. Meanwhile, organized tourism fees, which derive from Php 50 per boat trip and Php150 for wharfage, directly contribute to the maintenance of infrastructure and community services (P19). These localized systems illustrate the reinvestment of tourism earnings into sustainability-focused infrastructure. These reveal a unique perspective on the significance of circular and adaptive models that enhance ecological resilience and foster rural entrepreneurship (Kania et al., 2021; Pongsakornrungsilp & Pongsakornrungsilp, 2021). Additionally, tailored solutions are crucial for long-term sustainability, especially in environments with varying institutional capacities (Reverte, 2022). These findings further complement previous research, highlighting that with the resurgence of tourism following the pandemic, incorporating green technology and decentralized utilities in island destinations has become essential for sustainability and competitiveness (Tsai & Chen, 2019; Vartolomei, 2018).

Economic Sustainability

Sustainable tourism is integral to Siargao's long-term development objectives, as it fosters economic sustainability by broadening livelihood prospects beyond conventional tourism occupations. A local startup founder (P3) highlighted the promise of digital innovation via platforms such as “E-diskubQRe,” a mobile application that links travelers to local wisdom and tourist attractions, thus promoting inclusive entrepreneurship. Similarly, the Municipality of Pilar fosters a synergistic interaction between tourism and traditional sectors, including agriculture and fishing, facilitating greater community engagement in the local economy (P7). These programs demonstrate attempts to marry tourism with cultural identity and heritage-oriented livelihoods, fostering economic resilience and community empowerment (Mahmoud, 2024). Research indicates that sustainable tourism development must incorporate local values and engage several sectors to

achieve long-term success (Badoc-Gonzales et al., 2022; Wakil et al., 2021; Okafor et al., 2022). In contrast, lacking a comprehensive framework incorporating greater developmental goals may result in shortsighted and disjointed initiatives (Boluk et al., 2019).

Long-term revenue generation from tourism is evident through recurring events and partnerships. A representative from the Siargao Tour Guides and Organizers Association (SITGOA) observed that events such as KUMBATI, a locally organized annual boodle fight competition that SITGOA leads, generate consistent revenue through sponsorships and community involvement (P18). This demonstrates how festivals can transform into reliable economic catalysts (Sulistiowati et al., 2020; Purnamawati, 2021). A restaurant supervisor (P14) added that the proliferation of environment-friendly companies has augmented employment opportunities and diminished reliance on peak seasons, facilitating more stable livelihoods year-round (Lestari & Yusra, 2022). These initiatives signify shifting from transient tourism profits to diversified, year-round economic engagement. Community-centered planning in Siargao incorporates cultural identity into tourist initiatives, enriching visitor experiences while strengthening local heritage and pride (Mironova et al., 2024). According to previous studies, these programs foster resilient tourism ecosystems by harmonizing economic objectives with cultural preservation and environmental stewardship (Ernawati et al., 2022; Rahman et al., 2022). This further establishes findings on how cooperatively designed long-term strategies involving stakeholders yield more inclusive and flexible tourism economies, enhancing local governance and social cohesion (Suardana et al., 2024; Bentley & Halim, 2024).

Environmental and Social Resilience

Conservation for future generations in Siargao is increasingly embedded in local tourism and planning practices, prioritizing marine biodiversity and natural landscapes vital to the island's identity and livelihood. A resort supervisor (P16) underscored that infrastructure is currently engineered to uphold long-term environmental objectives, guaranteeing the preservation of beaches and marine ecosystems for future use. Local initiatives, like prohibiting seawall building adjacent to the sea turtle nesting spot at Hope for the Islands, demonstrate ecologically responsible zoning practices (P19). Aligned with global research, community-driven initiatives, strengthened by efforts such as coral reef preservation, mangrove rehabilitation, and the implementation of sustainable design standards, collectively demonstrate a transition towards conservation-focused development (Cisneros-Montemayor et al., 2021; Gustiarini et al., 2023; Pantalena et al., 2020). The focus on environmental education, stakeholder involvement, and compliance with international eco-resort standards underpins Siargao's strategy for harmonizing development with ecological conservation (Davies et al., 2021; Firmansyah et al., 2023). These localized initiatives demonstrate that combining tourism development with conservation goals guarantees environmental resilience and enduring economic and cultural sustainability.

Community involvement in Siargao is also central to building social resilience, with locals playing key roles in environmental stewardship and tourism governance. Local tourist initiatives are designed to guarantee direct benefits for community people (P19). P4, a homestay owner, highlights the necessity of enhancing awareness and reinforcing sustainable practices at the grassroots level. She maintains that residents significantly contribute to sustainability through community-led initiatives, including clean-up efforts, conservation activities, and the enforcement of local rules. These behaviors promote collective accountability, improve adaptive capacity, and incorporate sustainability into daily life. These corroborate with established findings emphasizing the value of participatory frameworks for cultivating resilient, equitable, and sustainable tourism systems (Bentley & Halim, 2024; Duc & Thanh, 2023; Rahman & Baddam, 2021; Rahmawati et al., 2023).

3.4 Sustainable Tourism Imperatives Drawn from Sustainable Development

Environmental Stewardship

In light of increasing tourism pressures, waste management systems have emerged as a crucial imperative for sustainable development in the Siargao Islands. Certain tourism enterprises have begun implementing zero-waste principles—resorts are utilizing biodegradable packaging and managing composting systems to reduce their environmental impact, particularly on marine environments (P1). A municipal tourism officer shared the successes of local regulations, including prohibitions on PET bottles and external food in Sugba Lagoon, addressing persistent sanitary concerns. These studies highlight that carefully developed local policies can substantially enhance environmental conditions by reducing waste and pollution linked to tourism activities (Guo et al., 2022; Mokhtarulbari & Rashid, 2024). However, even a well-organized waste management system may diminish if communities do not recognize substantial direct advantages from their engagement

(Yuniningsih et al. 2022).

Renewable resources have become a critical sustainability imperative in Siargao as stakeholders increasingly seek clean energy alternatives to prevent reliance on fossil fuels and for the future. P1 underscored the necessity for solar power as a feasible alternative because of the island's detachment from mainland networks. Several local enterprises have proactively installed solar panels and implemented rainwater collection to reduce operational expenses and environmental footprint. These grassroots transformations affirm previous findings indicating a transition from temporary solutions to enduring ecological resilience (Bhattarai, 2024; Nugroho et al., 2024). Renewable technology in tourism operations safeguards ecosystems while improving cost efficiency and community resilience (Wu et al., 2023). Nevertheless, energy advancements alone may not avert ecological degradation without concurrent improvements in waste and water management (Ahmad & Ma, 2021; Sun & Zheng, 2020). Furthermore, limited resources and infrastructure, prevalent in island environments such as Siargao, may impede the comprehensive deployment of renewable systems, requiring cooperative planning and Cross-sectoral assistance (Fang & Feng, 2024).

Economic Equity

Supporting local businesses is a cornerstone of economic equity in Siargao's tourism development. One food business owner (P12) articulated that heightened visitor interest in local delicacies and products has broadened livelihood opportunities, underscoring tourism's need to cultivate more engagements with local producers. She operates a modest food shop in a less trafficked area of the island, where she prepares home-cooked meals utilizing products procured from local farmers. She observed that travelers frequently discover her establishment on their explorations, and their patronage contributes to her family's revenue. These exemplify inclusive tourism strategies that amalgamate culinary and cultural experiences to strengthen identity and equitably divide advantages (Vuksanović et al., 2024; Wati et al., 2024; Guo et al., 2022). Advocating for MSMEs and broadening its offers beyond the traditional way of marketing may enhance tourist resilience and reduce economic leakage prevalent in tourism-centric locales (Nugraha & Flora, 2022; Nair, 2021; Paulauskaite et al., 2017). Furthermore, diverting visitors to lesser-known locations may enhance resilience among grassroots communities (Nair, 2021), while equipping entrepreneurs in remote barangays with digital literacy skill sets eases business participation (Mihardja et al., 2020).

Regulatory frameworks are essential to ensuring that tourism development aligns with the community's and the environment's needs. SITGOA representative highlighted the lack of a definitive legal framework to facilitate tourism development, emphasizing the urgent need for unified and enforceable laws throughout towns. He further suggests that participatory governance and transformational leadership are significant in achieving sustainable growth (P18). This aligns with previous research, which indicates that well-structured governance helps protect local communities from harmful investments, increases benefits for the community, and supports environmental protection (Sulfardin et al., 2024; Vuksanović et al., 2024; Adetola et al., 2024). Regulatory measures like travel limits and land-use regulations in environmentally sensitive regions can mitigate overtourism and safeguard vulnerable ecosystems (Ivănescu & Săvan, 2024; Aprilani et al., 2021). Critics highlight implementation deficiencies, such as insufficient political will, inadequate enforcement measures, and poor cooperation among local governments (Sonbai & Resen, 2024). In certain circumstances, imbalanced power dynamics and information disparities have obstructed collaborative governance, which leads to policy disputes and reduced sustainability outcomes (Sulfardin et al., 2024). Even in strong educational initiatives, the absence of adequate enforcement frequently results in municipal policies failing to have their intended impact (Aprilani et al., 2021).

Social Balance

Cultural preservation in Siargao embodies a sustainable tourism imperative rooted in community identity and intergenerational continuity. One municipal tourism office integrates cultural values into environmental training programs, emphasizing that preserving history necessitates the protection of the ecosystems that support local customs (P19). Hence, there is a necessity to harmonize municipal legislation with national directives through proactive cooperation with the Department of Environment and Natural Resources and the Protected Area Management Board under SIPLAS (P7). These initiatives demonstrate the growing integration of cultural heritage into tourism planning, policy, education, and destination management in Siargao. Based on earlier findings, incorporating cultural preservation into tourism frameworks facilitated by stakeholder collaboration and institutional support enhances community cohesion and local resilience (Sihombing et al., 2024; Lamoria et

al., 2024; Guo et al., 2022). Nevertheless, challenges persist in guaranteeing that these efforts are authentically inclusive, well-financed, and resistant to the commodification of culture influenced by tourist expectations (Oladeji et al., 2022; Nguyen, 2021; Rachman, 2024; Yuniningsih et al., 2022).

Community safety and inclusion remain essential for maintaining social balance in Siargao's sustainable tourism, particularly in the face of tourism pressures and rising climate. One municipality constructed seawalls to safeguard coastal towns from storm surges, recognizing that although these facilities modify the aesthetic landscape, the protection of residents is paramount (P11). In Del Carmen, sustainability centered on profit, planet, and people, ensuring that development does not compromise community welfare (P19). These accounts draw from prior research, highlighting an increasing dedication to integrating safety into tourism design and research-based policy to safeguard vulnerable populations (Guo et al., 2022; Parady et al., 2019). However, problems with enforcing rules and not having enough representation can weaken how well these plans work, especially if communities feel left out or overly stressed (Jaiswal et al., 2024). Imbalanced access to tourism benefits aggravates social inclusion concerns, necessitating frameworks that guarantee the protection and representation of all stakeholder groups (Mihardja et al., 2020). This initiative in Siargao to emphasize safety in conjunction with inclusive planning is a significant advancement toward equitable and resilient tourism.

3.5 Importance of Sustainable Tourism

Preservation of Natural Assets

Preserving environmental integrity is essential for Siargao's sustainability as it safeguards the island's natural appeal, which is the lifeblood of island livelihoods and tourism. The absence of pristine shorelines and crystal-clear waters will adversely affect tourism and local lives, highlighting that environmental protection is imperative, not discretionary (P16). Additionally, community clean-ups and beautification initiatives enhance client retention (P14). Measures such as mangrove replanting and coral reef conservation are essential for resource sustainability (P13). These viewpoints indicate an increasing recognition that Siargao's natural resources are communal assets necessitating collective stewardship. A study by Cavalcante et al. (2021) suggests that the absence of competent management and protection of natural, cultural, and social resources jeopardizes the fundamental elements that render tourist destinations appealing and habitable.

Resource sustainability emphasizes the enduring conservation of natural ecosystems, with community members and local leaders actively engaged in ecological management. Significance of measures such as mangrove restoration and coral reef conservation promote environmental equilibrium and enhance tourism diversification through guided paddling and snorkeling activities (P13). Preserving these natural resources is crucial for present livelihoods and future generations (P7). These initiatives exemplify a broader movement to incorporate conservation into tourism governance, consistent with research indicating that grassroots actions enhance environmental resilience and economic diversification (Suryawan et al., 2024; Oka et al., 2021). This further solidifies the essential role of collaborative frameworks among government entities, the commercial sector, and local communities in preserving ecological integrity while promoting tourism (Mardianton et al., 2024; Masitoh & Rahmawati, 2023; Özgit, 2022). Nonetheless, if communities view tourism benefits as exclusive to a particular group of people or incompatible with community priorities, it may result in opposition or withdrawal. In Siargao, promoting resource sustainability entails safeguarding ecosystems while ensuring that tourism develops in alignment with the communities and environments it relies upon.

Economic and Social Development

Sustainable tourism is crucial for Siargao's development since it generates stable and accessible income sources that enhance community welfare. A GL-MODA driver (P6) reported that some former farmers had shifted to tourism-related occupations, such as chartered driving, resort employment, or tour guiding, securing a more stable income to sustain their family. The surge in tourists had revived not just one's establishment but also those of acquaintances employed as sellers, boat operators, and hospitality personnel (P12). The transformations are especially pronounced in regions such as General Luna, Dapa, Del Carmen, and parts of Pilar, where tourism now constitutes a significant portion of the local economy (P12). Studies confirm that tourism engagement in rural regions enhances household income, diversifies livelihood opportunities, mitigates outmigration, and sustains rural land utilization (Ambarawati & Artini, 2022; Sun & Cao, 2024; Song & Li, 2024). In contrast, the seasonality of tourism can lead to job instability, and dependence on a singular industry exposes vulnerabilities during crises, as evidenced by the COVID-19 pandemic (Matanzima & Nhiwatiwa, 2022). The erosion of traditional farming practices may impact local food systems and cultural continuity, especially if

development sidelines local voices or disproportionately benefits elite stakeholders (Ba et al., 2018).

Siargao's development depends on sustainable tourism, which empowers locals to lead, shape, and benefit from the business. Preparing future leaders who can advance sustainable development is essential, as many citizens want to engage in tourism, but few are ready to lead (P18). P18 aims to address that gap, enabling young locals to train, lead, and own Siargao's future, starting with the Digital Nomads Summit and Youth Pitching Competitions. Meanwhile, P19 suggested structured training programs that build technical skills and environmental values, which align with the community-based tourism model's focus on local management and inclusive service delivery. This corresponds with earlier studies, stating that youth leadership, education, and community-led governance promote sustainable, resilient tourism systems (Fernández-Villarán, 2024; Yati et al., 2024). Quality education and leadership development must be matched with participative planning to guarantee that tourism promotes economic and social equity in Siargao.

Competitive Advantage

Siargao Islands provides eco-cultural experiences that attract conscientious, high-value guests. A homestay owner (P4) recalled that her clients are attracted to the island's natural allure and environmentally sustainable practices and community-oriented designs of local establishments. Her family business promotes local entrepreneurship and cultural integrity by hiring locals and incorporating environmental ethics, such as collaborating with fishermen for fresh seafood and implementing resource-efficient water systems. She highlighted that authentic place-specific experiences grounded in local values draw tourists who desire a meaningful connection over commercial recreation. Her thoughts resonate with demands for sustainable tourism strategies that harmonize development with cultural identity and conservation. Studies confirm that tourist destinations prioritizing authenticity, environmental sustainability, and community engagement can enhance their attractiveness and promote enduring economic stability (Wang, 2024; Tulbure & Eduard, 2024; Raveendran, 2024). This potential must be protected from overtourism and market saturation (Nguyen, 2021). Siargao's capacity to preserve its unique value proposition while fostering inclusive and community-oriented tourism practices positions it as a destination that offers recreation and authentic connections.

Sustainable tourism increases Siargao's long-term viability and endures environmental, social, and economic stresses to benefit future generations. P17 strongly mentions that affection for Siargao goes beyond being born on the island; it encompasses individuals who call the island home. She described how non-natives now participate in coastal cleanups and waste management to preserve the island's beauty. For her, Siargao's distinction lies not only in the engagement of organizations such as DOT, DENR, and PAMB, but also in the authentic dedication of the local people to safeguard their environment. She emphasized that affection for the island is not limited to its natives; rather, it is a relationship that develops over time via nurturing, connection, and accountability. She contends that this ingrained culture of communal stewardship is key to Siargao's sustainability and its most significant advantage in confronting future difficulties. This resonates with earlier research, claiming that tourism can be a long-term development tool if inclusive and transparent (Mihardja, 2020; Paulauskaite et al., 2017). In Siargao, this entails safeguarding the land on which tourism is built and empowering the local people.

4.0 Conclusion

This study examined the benefits and drawbacks of sustainable tourism in Siargao Islands, Philippines, shedding light on its vital role in shaping the island's developmental trajectory. The findings reveal that sustainable tourism in Siargao has fostered economic growth through job creation, strengthened environmental conservation, and enhanced cultural identity and community participation. However, it has resulted in ecological strain, cultural disruption, and economic disruption, mainly due to escalating costs and disparate distribution of benefits. Moreover, sustainable tourism substantially advances Siargao's long-term development objectives by enhancing infrastructure, promoting economic sustainability, and strengthening environmental and social resilience. Rooted in sustainable development principles, it underscores ecological stewardship, economic equality, and social balance, guaranteeing that tourist growth is inclusive and responsible. Sustainable tourism is essential for Siargao's future, as it conserves natural resources, improves local economies, and enhances the island's competitiveness as a unique and resilient destination.

Ultimately, this study concludes that sustainable tourism is essential for building a resilient, balanced, and

future-ready island economy when guided by inclusive, environmentally responsible, and community-driven strategies. A unified regulatory framework throughout all municipalities must be developed to guarantee standard and fair policies. Community-driven waste management systems should also be established, alongside enhanced infrastructure, public education, and consistent enforcement. Local micro, small, and medium enterprises (MSMEs), startups, and community-based tourist ventures must also be prioritized through skills development, local funding, and digital resources. Preserving cultural heritage and local values can be integrated into municipal ordinances and youth-led programs. Investment in sustainable infrastructure, encompassing renewable energy systems, rainwater harvesting, and environmentally friendly public facilities, is also advised. Other sectors, including agriculture and fisheries, are equally vital as tourism and must thus be nurtured and developed alongside it. To maintain long-term sustainability, enhancing stakeholder participation by establishing participatory governance platforms that engage citizens, companies, and local government entities is imperative. Ultimately, implementing price regulation and land-use protections is essential to shield residents from inflationary impacts and displacement caused by tourists.

Future research may expand on this study by exploring the role of digital transformation in sustainable tourism governance, assessing the impact of climate resilience strategies on island tourism economies, or conducting comparative studies with other island destinations. These directions enhance local understanding and enrich the global discourse on sustainable tourism in fragile, high-value ecosystems. Siargao's challenges mirror the global concerns experienced by several island destinations. Hence, its emerging solutions can guide international frameworks for climate adaptation, community empowerment, and sustainable economic recovery within the tourism sector. Ultimately, stakeholders, including policymakers, tourism providers, and local communities, must act decisively and collaboratively by implementing data-driven, inclusive, and environmentally sustainable initiatives to ensure Siargao's long-term viability and inspire sustainable transformation in parallel island contexts.

5.0 Contributions of Authors

Stephinejane E. Musico—The main author is responsible for the manuscript's conception and composition, encompassing data collection, analysis, presentation, and revision. This position entails establishing research objectives, implementing data collection methods, and presenting results in an organized format in compliance with academic and methodological standards.

Dr. Monsour A. Pelmin- The co-author functions as the research adviser, contributing to evaluating the manuscript's overall quality. The co-author also offers essential oversight to ensure the research's integrity, coherence, and academic rigor.

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7.0 Conflict of Interests

Researchers declare no conflict of interest.

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Leadership Complexities of School Heads in Multigrade Education

Windel M. Bojos[1]*, Queenie Lyn G. Almerez[2], Amelie E. Trinidad[3], Jeric Anthony S. Arnado[4], Augie E. Fuentes[5]
[1,3,4,5]Buguis Elementary School, Davao del Sur, Philippines
[2]Davao del Sur State College, Digos City, Philippines

*Corresponding Author Email: windel.bojos@deped.gov.ph

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Abstract. This study explored the experiences of multigrade school heads, focusing on the challenges they face in balancing teaching and administrative duties amid staffing shortages and limited resources. Using a phenomenological qualitative approach, eight multigrade school leaders who served as school leaders and classroom teachers were interviewed. The data were manually transcribed, coded, and analyzed using thematic analysis, with confidentiality maintained throughout the process. The results highlighted the challenges faced, strategies employed, and the support multigrade school heads need in carrying out their complex roles. The challenges were summarized under the central theme: Thriving Through Innovation, Resilience, and Effective Management. The strategies were captured in the theme: Enhancing Multigrade Education Through Adaptability and Support. Lastly, the support needs were reflected in the theme: Strengthening Multigrade Education Through Policy, Support, and Collaboration. The study results revealed that multigrade school heads face significant challenges, which were encapsulated in the theme "Thriving Through Innovation, Resilience, and Effective Management," highlighting their need to constantly adapt and lead despite limited resources and staffing shortages. In response to these challenges, they employed various strategies, captured in the theme "Enhancing Multigrade Education Through Adaptability and Support," demonstrating their flexibility and reliance on internal and external support systems. Furthermore, their expressed needs for sustained assistance were reflected in the theme "Strengthening Multigrade Education Through Policy, Support, and Collaboration," emphasizing the importance of clear policies, adequate resources, and strong partnerships to ensure multigrade education's long-term effectiveness and sustainability.

Keywords: Multigrade education; School leadership.

1.0 Introduction

In underprivileged communities, multigrade education is not just a teaching model—it is a daily reality for dedicated school heads who must balance leadership responsibilities with hands-on classroom instruction. Imagine a school head teaching children of different ages and grade levels in one small classroom, making the most of limited resources and adapting lessons to meet varied learning needs while also managing the school's operations. From a global perspective, Shareefa (2021) noted that for schools to sustain their path toward delivering high-quality instruction, school heads must provide ongoing, impactful professional development to broaden teachers' range of instructional strategies. Equally important is establishing a strong system for monitoring and supervision to support this growth. Another point by Thaba-Nkadimene (2020) mentioned that

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in South Africa, to improve teaching and learning in multigrade schools, it's essential to address the specific needs of learners and teachers in rural schools.

Nationally, Naparan and Alinsug (2021) highlighted that multigrade teachers in the Philippines must possess strong classroom management skills, promote collaborative learning, and implement differentiated instruction that connects lessons to real-life situations. They must also integrate technology through digital tools and demonstrate flexibility in their teaching approach. In addition, Abocejo et al. (2023) highlighted that teachers and school heads in multigrade education experience significant stress and challenges due to the demands of managing multiple classes, extensive reporting, and numerous school activities. Similarly, Basilio (2024) identified shortcomings in teacher professional development programs, citing quality, relevance, and funding issues. At the same time, efforts are being made to introduce professional development programs at various levels. Teachers and school leaders acknowledge the barriers that hinder their participation in training, which may contribute to gaps in student learning.

Although there is plenty of research on teaching strategies and student performance in multigrade classrooms, we know much less about the day-to-day experiences of school heads who also teach. These leaders often balance the demands of running a school while managing a classroom, especially in areas with limited resources. Their challenges are poorly understood, and there's a clear need for more research on how they handle these dual responsibilities and ensure their schools continue to function effectively.

2.0 Methodology

2.1 Research Design

This study was on a phenomenological qualitative research design-based approach. Phenomenology is a good fit for this study because it seeks to understand school heads' complex and real-world experiences deeply. By capturing their detailed, context-rich insights, this approach ensures that any program developed will be relevant, practical, and genuinely responsive to the unique demands of multigrade leadership. As Zahavi (2020) noted, phenomenology does not focus on delivering precise, detailed descriptions of objects, nor does it attempt to understand how we experience things and explore phenomena in all their varying forms of existence.

2.2 Research Participants

The study participants were the eight school heads who had experienced managing multigrade schools and classes in Sulop District, in Davao del Sur division, regardless of age and gender. The number of participants is adequate for this study to generate themes since this is a phenomenology study. Ahmed (2025) noted that the recommended sample sizes for various qualitative research designs focusing on phenomenology studies are 5-25 participants. This study employed the purposive sampling method. Participants were intentionally chosen based on criteria aligned with the research goals, explicitly focusing on school heads in multigrade settings. Inclusion criteria include the following: (a) participants hold positions as teacher-in-charge, head teacher, or principal, (b) at least two consecutive years of experience managing multigrade schools at the same time handling multigrade classes, (c) participants should be a Department of Education personnel, and have a duly signed appointment from the division superintendent. Exclusion criteria include the following: (a) individuals who do not have direct experience managing a multigrade school, (b) those who have not continuously managed a multigrade school while teaching multigrade classes for at least two years, (c) school heads without an official appointment from the Department of Education who manage multigrade schools.

2.3 Research Instrument

The researcher developed the interview guide questions without pilot testing. Two educational management professors and a Department of Education multigrade focal person in the division of Davao del Sur validated their content validity. Participants underwent an in-depth interview.

2.4 Data Gathering Procedure

The data for this study were collected through interviews lasting forty to forty-five minutes using a set of guide questions prepared by the researcher. The researcher secured a signed permit to conduct the study from the institution, division office, and district principal supervisor or designated official overseeing the schools managed by the participants. Before data collection began, the researcher visited the school to present the signed permits from the division and district offices and confirm the interview date with the participants. At the start of the

interview, the researcher ensured that participants were fully informed and had signed a consent form. This form detailed the study's purpose, the estimated duration, and the intended use of the collected data. It also emphasized that participation was entirely voluntary and assured participants of the confidentiality of their responses.

Additionally, the researcher informed participants about using an audio recorder and reiterated that all information shared would remain strictly confidential throughout the process. After the interviews, the recorded audio responses were manually transcribed by the researcher, with participant confidentiality carefully maintained throughout. Once the transcription was complete, a member-checking process was conducted to ensure the credibility of the findings, allowing participants to review the transcribed data and emerging themes. This step enabled them to confirm the accuracy of their responses, correct any misunderstandings, and provide additional insights if necessary.

2.5 Ethical Considerations

Ethical considerations were essential to ensure that participants' rights were protected. Taquette and Taquette et al. (2022) emphasized that ethics was a vital part of research that influenced every step of the process. Also, Mirza et al. (2023) stated that ethics in research involved the researcher's responsibility to protect participants' rights, ensure transparency to the academic community, and consider the broader societal impact of their work. Thus, several ethical considerations in qualitative research were enumerated, including respect, relationships with participants, conflict of interest, informed consent, incentives, confidentiality and anonymity, reporting back to the participants, and trustworthiness of research.

Respect in ethical considerations requires researchers to treat all individuals involved in or impacted by their research with fairness, sensitivity, and dignity. This included recognizing and valuing differences such as age, gender, ethnicity, cultural identity, and other significant characteristics. Ensuring freedom from prejudice and upholding individuals' rights were essential in creating a respectful research environment. Respect for participants and conflict of interest requires researchers to maintain the integrity and flexibility of their research by fostering a professional yet approachable relationship with participants during data collection. Researchers needed to emphasize their unbiased stance, as any perceived bias could distort the data and compromise the accuracy of the findings.

Informed consent required researchers to obtain voluntary informed consent from each participant before data collection. This involved sending a consent letter that outlined the research's purpose, objectives, and ethical considerations, such as confidentiality and anonymity, ensuring that participants fully understood their involvement. By providing informed consent, researchers upheld ethical standards, protected participants' rights, and fostered trust in the research process. Incentives were considered a significant ethical concern, as offering material incentives for participation was deemed unethical. Instead, researchers motivated participants by highlighting the potential community benefits of the study.

Confidentiality and anonymity had to be communicated to participants and included in the researcher-participant agreement. All data was handled and stored in compliance with the Data Protection Act, ensuring only the researcher had access to the information. Reporting back to the participants was an essential step after data collection. Researchers ensured that participants received a copy of their responses, questionnaires, or transcripts. To avoid misinterpretation and promote transparency, participants were also provided with a summary of how their data was analyzed, allowing them to verify the accuracy and integrity of the findings. Trustworthiness of research was ensured by addressing credibility and consistency through prolonged engagement, triangulation, peer debriefing, reflexivity, and maintaining an audit trail. These practices helped strengthen the research's trustworthiness and allowed for thorough verification of the results. All data were securely stored in a password-protected digital folder, accessible only to the researcher and trusted team members, and stored for as long as needed based on the organization's policies.

3.0 Results and Discussion

3.1 Experiences of the School Heads in Managing Multigrade Education

Multigrade school heads experienced the constant challenge of balancing administrative duties with their educator role. They had trouble with paperwork, attending sudden meetings, and accommodating unexpected visitors, often leaving their classes unattended. This led to disruptions, with students becoming restless and

assigned activities left unchecked due to time constraints. They also experienced pressure to ensure students met required competencies, especially before exams. However, urgent district tasks sometimes pulled them away from their classes, making it challenging to cover all necessary lessons. As a result, some students struggled to keep up, leaving school heads torn between their administrative responsibilities and their commitment to quality education. These experiences reflect their daily struggles in managing leadership and teaching roles effectively.

As shown in Table 1, the experiences of multigrade school heads in multigrade education faced an overwhelming workload and significant time constraints as they manage teaching and administrative responsibilities. The burden of dual responsibilities requires them to balance school leadership with classroom teaching, often leading to exhaustion and stress. Despite these overwhelming demands, they demonstrate resilience and commitment, consistently persevering to ensure their students receive quality education. In response to the challenges, they employ innovative and adaptive teaching methods, creatively addressing the diverse needs of students across multiple grade levels. Their ability to stay dedicated and innovate, even under challenging circumstances, underscores their determination and passion for education.

Table 1. *Core Ideas, Emerging Theme, and Major Theme on the Experiences of the School Heads in Managing Multigrade Education*

Core Ideas	Emergent Themes	Major Themes
Since I am both a multigrade school head and a classroom teacher, I multitask a lot. While learners are working on their assignments or activities, I take the opportunity to complete administrative tasks.	Overwhelming Workload and Time Constraints	Thriving in Multigrade Teaching Through Innovation, Resilience, and Effective Management
School-head related tasks such as checking of lesson plans, provision of technical assistance to co-teachers and managing school operations and resources are most challenging since I also had my own class.		
The complex task of being a school head, because I am not only focusing on my task as school head because I also have a child to teach.		
Doubled efforts to meet both school management and instructional demands.	Burden of Dual Responsibilities	
Balanced administrative tasks with quality teaching through strategic planning and time management.		
Ensured efficient administration without compromising teaching and learning quality.		
Sacrificed personal time to fill in the gaps, making school work often feel like home work.	Resilience and Commitment Amidst Overwhelming Demands	
Felt tired and overwhelmed when teaching one class, while the other class is still progressing with their activities.		
Exhausted when Grade 3 finishes their activity, but I am still working on Grade 4's tasks.		
Mastered differentiated instruction to effectively manage time while addressing diverse learning needs.	Innovative and Adaptive Teaching Method	
Implemented explicit teaching to ensure learners grasp essential skills for mastery.		
Applied a variety of teaching methods and strategies to accommodate individual learning styles and needs.		

Figure 1 presents the challenges multigrade school heads face in multigrade education, summarized under the major theme: *Thriving in Multigrade Teaching Through Innovation, Resilience, and Effective Time Management*. This central theme emerged from four key sub-themes: overwhelming workload and time constraints, burden of dual responsibilities, resilience and commitment amidst overwhelming demands, and innovative and adaptive teaching methods.

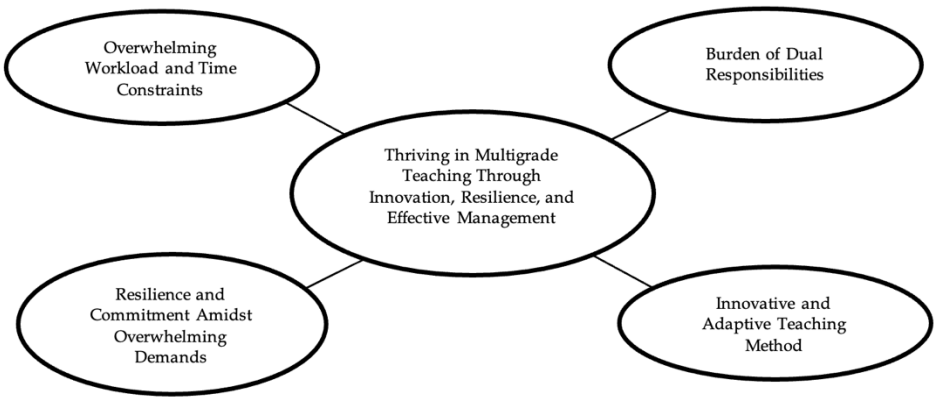

Figure 1. *Challenges of Multigrade School Heads in Multigrade Education*

Multigrade education is a complex yet vital approach that requires multigrade school heads to innovate, be resilient, and manage strategically to ensure effective learning for students of different grade levels and school improvement. Multigrade school heads faced the complex challenge of balancing instructional responsibilities and administrative duties while addressing their learners' diverse needs. As Bagay (2024) averred, a multigrade school leader managing administrative and instructional responsibilities understands the challenges of multigrade teaching. Also, Chabalala and Naidoo (2021) mentioned that it is crucial to understand that school leaders are not just administrators; they are instructional leaders who guide the teaching and learning processes across multiple grade levels within a single classroom. This underscores the need for improved policies, enhanced support systems, and increased collaboration to strengthen multigrade education.

Overwhelming Workload and Time Constraints

The findings revealed that multigrade school heads experienced significant challenges balancing administrative and instructional responsibilities. School heads in multigrade settings experienced a variety of administrative duties, including financial management, reporting, and coordination with higher authorities. These tasks require meticulous attention, often competing with their teaching responsibilities. This experience of a multigrade school head is challenging and overwhelming, as they struggle to balance teaching multiple classes in a single classroom while handling administrative tasks. The workload overload leads to confusion in prioritization, resulting in tasks being completed but with compromised quality due to a lack of focus.

"Since I am both a multigrade school head and a classroom teacher, I multitask. While learners are working on their assignments or activities, I take the opportunity to complete administrative tasks, such as the MOOE liquidation. Delays in liquidation can happen, but since there is a timeline and submission deadline (usually within 15 days upon receipt of the check), I must ensure it is liquidated within that period. " MGSL6L17-25Pg1-2

This reflects how school heads must be strategic in using their time, often working on administrative duties while students are engaged in independent activities as an instructional task of school heads. The results highlighted that managing an overwhelming workload goes beyond simply completing tasks efficiently; it also involves maintaining sustainability in the challenging role of a multigrade school head. As Cariaso (2019) averred, school heads in multigrade settings should ensure that teachers have manageable workloads and appropriate teaching preparations that align with the diverse needs of their students. Dulana et al. (2023) mentioned that multigrade school heads focus on or prioritize finding solutions to challenges such as classroom organization and management issues. Thereafter, overwhelming workloads and time constraints demand specific strategies to deal with the complexities of the role of multigrade school heads in multigrade education. School heads create a well-structured and supportive environment by prioritizing tasks, fostering collaboration, and utilizing resources effectively.

Burden of Dual responsibilities

Multigrade school heads experienced the overwhelming role in multigrade education, as they experienced dual

responsibilities in a multigrade setting, which is both physically and mentally demanding. The dual responsibilities they experienced in multigrade education arise from managing multiple grade levels while handling administrative tasks. This increases workload and stress, requiring effective strategies to maintain quality instruction and classroom management. School heads balanced administrative duties, such as managing school operations, providing technical assistance to co-teachers, and handling financial reports, while ensuring quality teaching. Move so, the experiences of school heads in multigrade settings revealed the overwhelming weight of their dual responsibilities. They are not just administrators ensuring that reports are submitted and policies are followed—they are also teachers, deeply committed to shaping young minds. The constant pressure of balancing these roles often leaves them physically and mentally exhausted.

"The biggest challenge of handling administrative and instructional tasks is meeting administrative deadlines, especially for reports, since I handle everything myself. I am both the teacher and the administrator, which makes it overwhelming. Another challenge is the implementation of DepEd programs and projects, particularly in informing teachers and stakeholders. Some teachers and parents tend to be negative about changes, and another challenge is maintaining partnerships with external stakeholders." MGSL6L76-82Pg4

The main challenge of managing administrative and teaching duties is meeting deadlines, especially for reports, as the school head handles everything alone. Balancing these tasks is overwhelming, and implementing DepEd programs is difficult, especially when faced with resistance from teachers and parents. These results reflected the daily struggle of many school heads who dedicate themselves to leadership and instruction, often at the cost of their well-being. Schweiger et al. (2020) reminded that managing these schools well is not just about skills but a leader's willingness to keep learning and stay resilient when things don't go as planned. Taole et al. (2024) note that school heads in rural multigrade schools face the formidable challenge of balancing teaching responsibilities with school management. Therefore, the dual responsibilities of multigrade school heads in multigrade education are overwhelming, often leading to stress and workload challenges for teachers. Juggling multiple grade levels while handling administrative tasks can affect teaching quality and well-being. Without proper support and strategies, this burden may impact classroom efficiency, making it essential to find ways to balance these responsibilities effectively.

Resilience and Commitment Amidst Overwhelming Demands.

Multigrade school heads in multigrade education experienced the challenge of work-life balance, wherein their demanding task often led to stress and tiring, since some of their functions or unfinished tasks in school brought to their home and sometimes made it during weekdays. Despite these overwhelming demands of their dual roles as multigrade school heads in multigrade education, their resilience and commitment shone through their unwavering dedication. Multigrade school heads are responsible, as instructional tasks demand patience, dedication, and flexibility in a multigrade classroom. Also, they face the challenge of balancing different grade levels, but their commitment and resilience enable them to create meaningful learning experiences. Every day, they juggle lesson preparation, teaching multiple grade levels, and handling administrative tasks, ensuring their students receive quality education while managing school responsibilities.

"I sometimes felt so stressed and drained, especially when administrative-related reports are due, making me feel less effective and physically tired. I sacrificed my time to fill in the needed gaps; that is why schoolwork is also homework." MGSL1L43-46Pg2

The experience reflects the stress and fatigue experienced by multigrade school heads due to administrative duties, often sacrificing personal time to complete tasks, which results in work spilling over into their personal life. The resilience of multigrade school heads is not about enduring hardship—it is about their unwavering commitment to making multigrade education work, no matter the cost. As Karaçoban and Karakuş (2022) mentioned, teachers who are newly assigned to schools with multigrade classrooms face greater challenges than those placed in single-grade classrooms. Also, Jabiñar and Mustacisa (2024) found that teachers expressed an overall positive perspective on multigrade classrooms despite their challenges. Afsar and Umrani (2020) mentioned that positive leadership boosts employees' motivation to learn and fosters innovation in their work. Multigrade school heads relied on resilience and commitment to manage diverse classrooms and overcome challenges, while administrative tasks were always on their side. Their dedication and adaptability ensured meaningful learning experiences, allowing students and educators to thrive despite limitations.

Innovative and Adaptive Teaching Method

Multigrade school heads experienced limited teaching resources and manpower in multigrade education. The responses from the participants highlighted the significance of innovative and adaptive teaching methods in multigrade education. Multigrade school heads emphasized the necessity of selecting appropriate activities and assessment strategies tailored to students' grade levels and diverse learning needs, despite sometimes leaving their class unattended and unsettled activities because of unexpected administrative duties like entertaining surprise visitors, parents' concerns, and abrupt meetings.

"For me, the most effective approach is the Practical Work Approach (PWA), which is based on John Dewey's 'learning by doing' philosophy. Students learn better through hands-on activities rather than paper-and-pencil tests or chalkboard lessons. They enjoy the learning process when they engage in activities, especially when they involve reporting. After an activity, I always include a collaborative task because, in my experience, this is the most effective strategy." MGSL6L68-73Pg4

The statement emphasized how multigrade school heads use the Practical Work Approach (PWA) to enhance learning. By prioritizing hands-on activities and collaboration, they make learning more engaging and compelling, aligning with the philosophy of "learning by doing." Multigrade school heads effectively met the diverse needs of their students despite their demanding role in multigrade education by combining differentiated instruction, explicit teaching, practical work, collaborative learning, and structured time management. As Puzio et al. (2020) mentioned, educators recognize that a single approach does not meet the needs of all learners, so they incorporate differentiation, explicit instruction, and collaboration to enhance student learning. Tiernan et al. (2020) mentioned that students of different ages and abilities learn together; differentiation is crucial for addressing the varied needs of each pupil. Moreover, Elston et al. (2022) mentioned that explicit teaching involves systematically instructing strategies, skills, and rules in a clear, structured manner to enhance learners' understanding and abilities. Thereafter, innovative and adaptive teaching methods are essential in multigrade education to meet the diverse needs of students. Multigrade school heads effectively manage multiple grade levels by incorporating differentiated instruction and collaborative learning while performing administrative responsibilities. These strategies encouraged student engagement and peer interaction, fostering an inclusive and dynamic learning environment for the pupils.

3.2 Strategies to Address the Challenges and Optimize the Benefits of Multigrade Education

Being a multigrade school head with a teaching load is a demanding role that requires exceptional time management, adaptability, and dedication—balancing school administration while actively teaching means juggling multiple responsibilities, overseeing school operations, preparing lessons, and guiding students. To make this dual role more manageable, school heads often find effective strategies such as prioritizing tasks, implementing strong classroom management, engaging in continuous professional development, fostering a collaborative and inclusive learning environment, and managing workloads wisely. With the right approach, they can lead their schools effectively while ensuring quality education for their students.

As shown in Table 2, the strategies of multigrade school heads were implemented to manage the challenges of handling dual responsibilities in multigrade settings. These strategies included effective workload and classroom management by establishing structured routines and flexible rules, helping students understand when to work independently, in pairs, or groups. Authority was maintained through respect, and consistent discipline fostered a positive learning environment. Task prioritization, scheduling, and delegation managed workloads effectively, ensuring balanced responsibilities and improved productivity.

Petrescu et al. (2022) mentioned that integrating collaborative decision-making support into educational platforms is crucial for addressing the unique challenges and improving the learning experience for diverse learners. Also, Longaquit (2024) mentioned that effective resource allocation is essential for meeting the diverse needs of students while aligning with the school's goals. Lohmann et al. (2021) averred that effective classroom management involves the strategies and practices teachers implement to set and uphold behavioral and academic expectations, creating a supportive and engaging learning atmosphere.

Table 2. *Core Ideas, Emerging Theme, and Major Theme on the Strategies to Address the Challenges and Optimize the Benefits of Multigrade Education*

Core Ideas	Emergent Theme	Major Theme
Establishing structured and clear daily routines, flexible classroom rules help students stay engaged and understand when to work independently, in pairs, or in groups.	Effective Workload and Classroom Management	Enhancing Multigrade Education Through Adaptability and Support
Maintaining authority through respect and consistently enforcing discipline fosters a positive, well-managed learning environment.		
Efficient workload management through task prioritization, scheduling, and delegation ensures balanced responsibilities and improved productivity.		
Ongoing professional development through LAC sessions, division-based training, and joint multigrade instruction programs equips teachers with updated skills and knowledge on current teaching trends.	Continuous Professional Development	
Maintaining journals enables to track challenges, document problem-solving approaches, and share flexible, collaborative solutions for continuous improvement in multigrade instruction.		
Peer and cooperative learning, along with hands-on activities, promote collaboration, independence, and deeper understanding among students, enhancing overall performance.	Collaborative and Inclusive Learning	
Strong community support through School Governing Councils (SGCs), PTAs, local organizations, and local government units (BLGU & LGU) facilitates resource mobilization, program support, and addressing teacher shortages.		
Parental involvement as "little teachers" further strengthens the learning environment by assisting students with reading and other academic activities.		

Figure 2 presents the strategies of multigrade school heads in multigrade education, centered on the major theme: *Enhancing Multigrade Education Through Adaptability and Support*. This theme emerged from three key sub-themes: effective workload and classroom management, continuous professional development, and collaborative and inclusive learning.

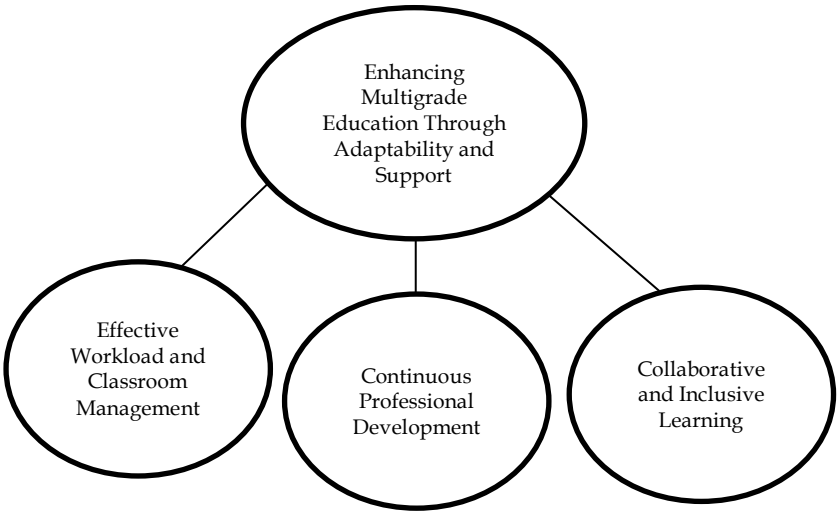

Figure 2. *Strategies of Multigrade School Heads in Multigrade Education*

Multigrade education thrives on flexibility, innovation, and strong support systems to address the challenges of teaching multiple grade levels in a single classroom. Multigrade school heads must skillfully manage diverse learning needs, curriculum integration, and administrative tasks while maintaining an engaging and structured environment.

The key to success lies in adaptive instructional methods, effective classroom management, and collaboration with school leaders, communities, and policymakers. Strengthening these areas ensures that multigrade education remains effective, inclusive, and capable of providing quality learning experiences for all students.

Effective Workload and Classroom Management

Multigrade school heads implemented strategies to address the challenges of managing administrative and instructional duties. They established clear daily routines and flexible classroom rules, which helped students understand when to work independently, in pairs, or groups, ensuring engagement. They maintained authority through respect and consistently enforced discipline, creating a positive and well-managed learning environment. To handle the heavy workload, school heads focused on task prioritization, effective scheduling, and delegation, which helped balance responsibilities and improve productivity. These strategies enabled them to navigate the challenges of multigrade education while maintaining a productive learning environment.

Establishing clear expectations helps students understand appropriate behavior and responsibilities, creating an orderly classroom. Effective classroom management, including setting rules and enforcing discipline, is crucial in maintaining engagement and a positive learning environment in a multigrade setting. By setting clear expectations, encouraging peer collaboration, and using creative strategies, multigrade school heads ensure students remain focused and motivated to learn together**.** Strict discipline is essential to prevent disruptions, as without it, students struggle to grasp competencies, leading to ineffective learning. At the same time, establishing authority in a non-corporal manner is crucial, as teachers who are too lenient may lose control of the class, hindering overall classroom management. Strict discipline is necessary for effective learning, as noise and disruptions prevent students from grasping key concepts. Multigrade school heads must respectfully establish authority, avoid physical punishment, and use strategies like rewards to maintain control and motivate students.

You must establish authority, not in a corporal way, not by physically punishing them, but by having something that makes them respect and listen to you. They won't follow you if you are too lenient in your classroom. You need to have a strategy to manage them properly. Also, using rewards as motivation. MGSL5L68-73-30Pg4

The statements emphasize that strict discipline is necessary for effective learning, as noise and disruptions prevent students from grasping key concepts. Multigrade school heads must respectfully establish authority, avoid physical punishment, and use strategies like rewards to maintain control and motivate students. Effective workload and classroom management in a multigrade setting involves setting clear rules, enforcing discipline, establishing authority, managing time efficiently, and maintaining motivation. Multigrade school heads must balance administrative and instructional duties, ensuring that teaching strategies align with classroom management to create an engaging, organized, and productive learning environment for all grade levels. As Lathifah et al. (2020) mentioned, successful classroom management involves fostering positive relationships, maintaining behavioral expectations, and implementing effective instructional strategies. Daga (2021) suggested that school leaders should provide tailored resources like lesson plans, instructional materials, and assessment tools to help teachers address the diverse needs of students across grade levels, ensuring effective instruction and improved learning outcomes.

Continuous Professional Development

The results highlighted the critical role of continuous professional development in improving the skills and effectiveness of multigrade school heads. Training programs, workshops, and collaborative learning sessions provided school heads with the tools to tackle the unique challenges of managing multiple grade levels within one school.

"Sending training on multigrade instruction. Participate in the joint LAC session with other multigrade school heads." MGSL2L63-64Pg4

Multigrade school heads engage in training and joint learning action cell sessions with fellow multigrade school leaders, collaborating and exchanging effective strategies to enhance instruction in multigrade settings. Ongoing professional development was crucial for multigrade school heads to improve their leadership skills and address diverse student needs. Through continuous learning, collaboration with peers, and exploring innovative

strategies, they strengthened classroom management and ensured effective instructional delivery. Minaz et al. (2024) averred that multigrade teachers need professional training and practical experience to effectively prepare and absorb the strategies they learn. Jabiñar and Mustacisa (2024) highlighted that multigrade teachers strongly needed more professional development opportunities. Thereafter, ongoing professional development enabled multigrade school heads to enhance their leadership strategies, adapt to diverse student needs, and support effective instruction. Through continuous learning and collaboration, they improved classroom management and ensured the delivery of quality education in multigrade settings.

Collaborative and Inclusive Learning

Multigrade school heads employed strategic approaches to address the complexities of managing school administration and instruction. They established structured routines and flexible classroom management strategies to ensure smooth transitions between lessons and maintain student engagement across different grade levels. They created an organized and positive learning environment by reinforcing authority through respect and consistent discipline. School heads implemented effective scheduling, task prioritization, and delegation to manage overwhelming workloads and balance responsibilities efficiently. They also promoted continuous professional development by facilitating training programs and collaborative sessions to enhance instructional techniques. Furthermore, strong community partnerships and parental involvement were crucial in mobilizing resources, supporting instructional activities, addressing teacher shortages, and ensuring a more effective multigrade education system.

"Inter-Multigrade School Collaboration - Leadership exchange programs allow principals from different schools to observe successful multigrade classrooms and apply best practices." MGSL3L95-97Pg5

Multigrade school heads benefit from leadership exchange programs, allowing them to observe successful practices in other schools and apply effective strategies in their classrooms. Collaborative and inclusive learning benefits student engagement and academic success in multigrade classrooms. As Ansari and Khan (2020) expressed, collaborative learning and active engagement were shown to have a positive impact on academic performance. Also, Herrera-Pavo (2021) expounds that instructional design can incorporate various tools to enhance interaction and foster collaborative learning.

Moreover, Reyes and Meneses (2024) mentioned that an inclusive collaborative learning approach in multigrade education requires institutional support for multigrade school heads, enabling them to balance their dual responsibilities in administration and instruction by providing the necessary knowledge, resources, and tools. Also, Ní Bhroin and King (2020) emphasized the crucial role of multigrade school heads, whose leadership ensures that all collaborative team members clearly understand their roles, responsibilities, and accountability, fostering interdependence and effective teamwork in multigrade education. Therefore, the vital role of multigrade school heads in ensuring effective administration and instructional leadership was recognized. Balancing workload and classroom management, prioritizing continuous professional development, and fostering collaborative and inclusive learning were key to optimizing school operations and improving multigrade education. Through adaptability and commitment, multigrade school heads drove meaningful change and enhanced learning outcomes.

3.3 Support Needs to Address Challenges in Multigrade Education

Balancing managing a school while teaching in a multigrade classroom is no easy feat. Multigrade school heads wear many hats—mentor, administrator, teacher, and even problem-solver—while navigating limited resources and support. Despite their unwavering commitment, the lack of assistance often overwhelms their workload. To lighten this burden, practical solutions like administrative support, better workload management, and stronger community involvement are essential. When school heads are given the help they need, they can focus on what matters most: guiding their students, creating a positive learning environment, and administrative responsibilities.

As shown in Table 3, the multigrade school heads need support in their complex role in multigrade education, and strengthening policy implementation and monitoring was crucial for multigrade school heads to ensure the effective delivery of multigrade education. Training and mentorship programs, differentiated instruction, and innovative classroom strategies played a key role in improving student outcomes and school performance under the leadership of multigrade school heads. Supporting multigrade school heads is crucial for strengthening

education through policy, support, and collaboration. Enhancing community and government partnerships ensures that multigrade schools receive the resources and assistance needed to address unique challenges. Implementing training and mentorship programs empowers multigrade school heads with the skills, confidence, and knowledge to lead effectively, while enhancing policy implementation and monitoring ensures that the right strategies are consistently applied. With continued support, multigrade school heads are empowered to create a more resilient and effective education system, improving outcomes for educators and students in multigrade settings.

Table 3. *Core Ideas, Emerging Theme, and Major Theme on the Support Needs to Address Challenges in Multigrade Education*

Core Ideas	Emergent Themes	Major Themes
Active Stakeholder Participation like Parents, barangay officials, and local business leaders engage in School Governing Councils (SGCs) and community-driven fundraising efforts to support school development.	Strengthening Community and Government Collaboration	Strengthening Multigrade Education Through Policy, Support, and Collaboration
Community & Parental Involvement in Learning like Parents volunteer as "little teachers," assisting children with reading and learning, while barangay officials support student participation in programs like BSP and GSP registration.		
Collaboration with Local Government Unit or Provincial level for Teacher Support like School heads work with the LGU to address teacher shortages by requesting PSB or LSB teachers and tapping into local resources.		
Multigrade school heads are supported through continuous leadership training and opportunities to collaborate with other schools.	Training and Mentorship Program	
School heads work closely with the community to gather resources and improve school facilities, ensuring that the needs of multigrade education are met despite limited resources.		
Even without a master teacher, school heads step up to mentor fellow educators through Learning Action Cell (LAC) sessions, creating a strong support system to enhance teaching and learning.		
Multigrade school heads are supported through clear and transparent policies, which are regularly evaluated to ensure proper implementation in schools.	Enhancing Policy Implementation and Monitoring	
School heads receive specialized multigrade training to equip them with the necessary skills to manage and support multigrade education effectively.		
School heads are provided with monitoring and evaluation (M&E) tools to assess the effectiveness of multigrade education and address challenges.		
School heads play a role in requesting additional teachers and ensuring that financial benefits, such as multigrade allowances, are fairly distributed.		

Additionally, the findings emphasized the importance of community and government collaboration in providing essential resources, infrastructure, and support to sustain multigrade programs. Furthermore, addressing teacher motivation and retention through continuous professional development, career growth opportunities, and incentives was vital for multigrade school heads in maintaining a dedicated and skilled teaching workforce.

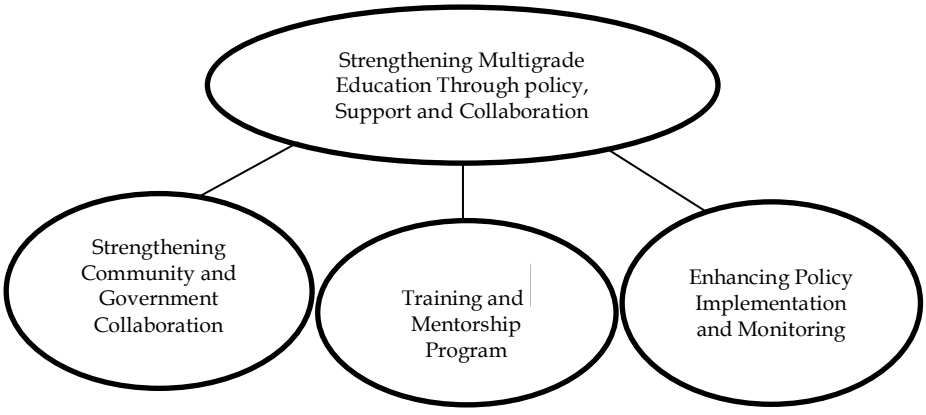

Figure 3. *Support to Multigrade School Heads in Multigrade Education*

Figure 3 presents the support needed by multigrade school heads in multigrade education, centered on the major theme: *Strengthening Multigrade Education Through policy, Support and Collaboration*. This theme emerged from three key sub-themes: strengthening community and government collaboration, , training and mentorship program and enhancing policy implementation and monitoring.

Strengthening Multigrade Education through Policy, Support, and Collaboration

Multigrade education is essential for providing quality learning, particularly in rural and underserved areas. Multigrade school heads, who balance both teaching and administrative duties, play a key role in making this approach successful. To enhance their effectiveness, they need well-designed policies, adequate support, and strong collaboration with educators, policymakers, and communities. By tackling the unique challenges of managing mixed-grade classrooms while overseeing school operations, they can create inclusive and effective learning environments that cater to the diverse needs of every student.

Strengthening community and government collaboration. The results showed that community and government collaboration was essential in supporting multigrade education, particularly in addressing teacher shortages, enhancing learning conditions, and ensuring overall school improvement.

Multigrade school heads were significantly supported in this process, as they were assisted in requesting additional teachers through the Provincial School Board (PSB) or Local School Board (LSB) to help manage the workload in multigrade classrooms. Parental and community involvement played a key role in supporting multigrade school heads in addressing challenges. Many parents actively assisted multigrade school heads by providing remediation to students who struggled with their lessons, helping to alleviate some of the difficulties faced by the school heads. Local organizations such as PTAs, School Governing Councils (SGCs), and LGUs have been instrumental in supporting multigrade school heads by mobilizing resources and providing financial and logistical assistance. The Bayanihan spirit, a Filipino tradition of communal cooperation, has been evident in school-based projects. Communities actively participated in fundraising events, school repairs, and infrastructure development, helping to create a better learning environment for students.

> *"Some parents voluntarily take on the role of "little teachers" by reading with the children or assisting them. They extend their help despite their own work and responsibilities. I can't say that 80% of parents are involved, but at least some of them truly are. They are present and engaged in their own way." - MGSL7L239-244Pg11*

> *"The LGU (Local Government Unit) and PTA (Parents-Teachers Association), along with other collaborating groups, help us address issues and concerns regarding the difficulties of teaching in a multigrade setting. This is why we ask the LGU to request PSB teachers, to tap into their resources, and connect with them to address teacher shortages. This also helps reassure parents and encourage them to enroll their children, as the setup now feels more like one-on-one learning." - MGSL7L254-259Pg12*

The results highlighted that the support and collaboration between schools, communities, and government agencies were crucial in helping multigrade school heads overcome challenges and ensure the success of multigrade education. As, Fatima et al., (2024) mentioned that if lack of official government support and policies for multigrade pedagogy creates a significant barrier to its effective implementation. And Dontogan et al. (2024) mentioned that engaging the community is essential for the success and sustainability of multigrade education.

Thereafter, Cleveland et al. (2023) specified that without strong commitment and financial support from national or local authorities, school principals, teachers, and governing boards must navigate community education improvements on their own, often lacking proper guidance, resources, and sustainable solutions. Therefore, strong collaboration between the community and government helped improve support for multigrade school heads in addressing challenges. By working together, they were able to enhance teacher training, upgrade facilities, and develop programs that met students' needs, ultimately creating a more effective learning environment.

Trainings and mentorship programs. The results showed that improving multigrade teaching and learning

conditions required the support of multigrade school heads, targeted training, and proper resource allocation. One key aspect identified was the provision of quality professional development programs for multigrade school heads. Continuous professional development helped ensure that multigrade school heads were equipped with the strategies needed to address the complexities of multigrade education.

Multigrade school heads stress the importance of specialized training for both teachers and leaders to ensure effective management and delivery of education in these challenging settings stipulated in Department Order No. 96, s. 1997 outlines the guidelines for organizing multigrade classes, particularly in remote areas. Inter-multigrade school collaboration through leadership exchange programs allows multigrade school heads to observe and learn from successful practices in other schools. This exchange enables them to apply effective strategies in their own classrooms, improving management and teaching practices in multigrade settings. The newest DepEd Order No. 17, s. 2023, which outlines guidelines for providing a special hardship allowance, is specifically limited to pure multigrade schools. This highlights the recognition of the unique challenges faced by school heads and teachers in multigrade settings, although it applies only to schools with a purely multigrade structure.

> *" Department Order No. 96, s. 1997: "Policies and Guidelines in the Organization and Operation of Multigrade (MG) Classes"- This order establishes the framework for organizing and operating multigrade classes, particularly in remote barangays. It emphasizes the need for specialized training for teachers and school leaders to effectively manage multigrade settings." - MGSL2L145-149Pg7-8*

Enhancing multigrade education required a holistic approach focused on supporting multigrade school heads through specialized leadership development, targeted training, and collaboration with schools, government initiatives, and external support. These efforts were essential in helping them address the challenges they faced in dual responsibilities. As, Brecio (2023) highlighted that in the Philippines multigrade education, parents played an active role as home educators, offering essential support and collaboration that significantly impacted the learning process. Karlberg-Granlund (2019) stated that the close-knit nature of these communities means the school and village are deeply interconnected, offering both benefits and challenges.

Enhancing multigrade education required providing multigrade school heads with the necessary resources, training, and adaptable teaching methods for both instruction and administration. With the right support, they were able to create a more supportive environment, effectively engage students, and improve overall school management, leading to better outcomes for all students.

Enhancing policy implementation and monitoring. The results showed that enhancing policy implementation and monitoring was crucial in supporting multigrade school heads to address challenges not only in instruction but also in administration. Current policies were either not fully implemented, inconsistently applied, or lacked transparency, making it difficult for school heads to manage effectively.

One of the main concerns raised by participants was the special hardship allowance (SHA) under DepEd Order No. 17, s. 2023, which only applied in pure multigrade schools, leaving out those handling mixed multigrade classes. Another key issue was the utilization of financial support for multigrade schools, as outlined in Department Order No. 52, s. 2012. Multigrade school heads reported that welfare benefits, such as the special hardship allowance, were not properly implemented. While Department Orders No. 96, s. 1997, and No. 63, s. 2010 provided guidelines for organizing multigrade classes and strengthening the Multigrade Education Program, multigrade school heads argued that more targeted interventions were necessary.

> *"We are always being monitored, but the policy for the welfare of multigrade teachers—such as the special hardship allowance—is not being monitored in our case. We do not receive any welfare benefits related to this. The policy should be transparent to everyone, and there should be a regular evaluation or assessment every year to check on the status of multigrade schools." - MGSL7L275-280Pg13*

The policies for multigrade education existed, issues such as inequitable financial support, lack of additional workforce, and gaps in training programs hindered multigrade school heads from effectively managing and implementing the programs. Tayoni and Abocejo (2023) mentioned that multigrade teachers are key to implementing the Multigrade education Program policy, ensuring student engagement and facilitating impactful learning experiences. The results highlight that policy implementation and monitoring require significant

improvements.

As, Jung et al. (2020) suggested that involving teachers and students in decision-making and giving them more autonomy increases their dedication to the school. Also, Afsar and Umrani (2020) mentioned that positive leadership boosts employees' motivation to learn and fosters innovation in their work.

Another view of, Seelig and McCabe (2021) emphasized the importance of supportive relationships with colleagues and administrators in teachers' decisions to stay, focusing on their commitment to students and leadership opportunities. Also Daga (2021) noted that financial incentives, professional development, and teaching support motivate multigrade teachers and reduce stress. And, Piper (2021) stressed the need for lasting state policies for multigrade schools, ensuring that each administration is accountable for advancing initiatives.

To sum up, strengthening policy implementation and monitoring in multigrade settings supported multigrade school heads by providing clear guidelines, regular evaluations, and necessary resources, leading to improved management and effectiveness. Additionally, supporting multigrade school heads helped boost their motivation, retention, and overall leadership effectiveness in managing multigrade education.

4.0 Conclusion

The study highlighted the significant challenges faced by multigrade school heads, such as managing heavy workloads, balancing administrative and teaching duties, and coping with limited resources and staff. To address these, school heads have implemented strategies like effective classroom management, continuous professional development, and strengthening partnerships with stakeholders. However, they pointed out that existing support systems are insufficient, stressing the need for more targeted policies, specialized training, and a deeper collaboration between schools, communities, and the government.

The findings underscore the need for policies specifically tailored to the unique demands of multigrade schools. These policies must be not only adaptable to evolving needs but also actively monitored to ensure they are working in practice. Furthermore, providing school leaders with the tools to manage their dual responsibilities—through capacity-building programs and leadership coaching—can significantly enhance their effectiveness. Collaboration emerged as a vital component, but beyond merely fostering partnerships, it's clear that creating sustainable, resource-sharing networks can greatly reduce pressure on individual school heads.

Equally important is addressing the well-being of school leaders. A focus on mental health, stress management, and work-life balance will enable them to thrive in their roles. This requires specific strategies, such as reducing workloads and establishing peer support systems, to help school heads navigate their demanding positions without compromising their health.

Finally, the study calls for continuous monitoring and evaluation of leadership strategies to ensure that they remain effective. Future research should investigate new teaching methods, explore the long-term impact of multigrade education on student learning, and assess its contribution to educational equity, especially in under-resourced communities.

5.0 Contributions of Authors

Windel M. Bojos – Conceptualization, Methodology, Writing, Data Collection- original draft.
Queenie Lyn G. Almerez – Formal analysis, Supervision, Project administration
Amelie E. Trinidad – Supervision -review and editing.
Jeric Anthony S. Arnado – Supervision -review and editing.
Augie E. Fuentes - Supervision -review and editing.

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7.0 Conflict of Interests

The authors declare no financial or personal affiliations that could have influenced the research presented in this manuscript.

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Effects of the Conditional Cash Transfer Program on the Socio-Economic Conditions of Beneficiaries

Mary Vir P. Pancho[1], Ma. Teresa B. Ballados*[2]
[1]Department of Social Welfare and Development, Bacolod City, Philippines
[2]Carlos Hilado Memorial State University, Bacolod City, Philippines

*Corresponding Author Email: teresa.ballados@chmsu.edu.ph

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Abstract. This study investigated the effects of the Conditional Cash Transfer (CCT) program on the social and economic conditions of household beneficiaries in Kabankalan, Negros Occidental. It focused on key areas such as education, health, nutrition, women's empowerment, household consumption, income, investment, and savings. A descriptive-correlational research design was utilized, with data gathered through a researcher-made questionnaire distributed to 383 women grantees from registered, clean, and active households as of January 10, 2025. Participants were selected using stratified random sampling and were categorized into lowland and upland barangays. The results indicated that the extent of the CCT program's effects on household beneficiaries' social conditions, particularly regarding education, health, nutrition, and women's empowerment, was very great. These effects were evident across different household sizes, locations, and how many years beneficiaries had participated in the program. Additionally, the program had a pronounced impact on the economic conditions of the beneficiaries, specifically concerning household consumption, income, investment, and savings. A significant difference was observed in the extent of the effects of the CCT program on the social conditions of household beneficiaries when grouped by location. Location emerged as a predictor of economic outcomes. In conclusion, the CCT program significantly enhances beneficiaries' social and financial well-being, though its effectiveness varies by location. Future enhancements to the program should incorporate additional support services tailored to the unique needs of different households to maximize the effects of the CCT program.

Keywords: Conditional cash transfer program; Socio-economic effects; Women grantees.

1.0 Introduction

Poverty represents a complex and multifaceted social issue that alienates individuals and families from essential opportunities and resources, leading to significant limitations in their quality of life (Santos et al., 2024; Crossman, 2019). Although Conditional Cash Transfer (CCT) programs have been introduced in many countries as a solution, the effectiveness of these programs in truly alleviating poverty is still in question. While CCT programs financially support low-income families, they typically require recipients to invest in education, healthcare, and nutrition (Kumakura, 2019; Barbado et al., 2024). However, there is limited research on how well these requirements are being met and whether they lead to sustainable improvements in living conditions. Understanding these gaps is crucial for enhancing the design and impact of CCT initiatives and ensuring they provide meaningful help to those in need.

One notable example of a CCT initiative is the Pantawid Pamilyang Pilipino Program (4Ps) in the Philippines,

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which draws inspiration from successful models implemented in various Latin American countries. Launched officially in 2008 after a pilot project began in 2007, the 4Ps program aims to empower households by promoting human capital development, thereby addressing the cycle of intergenerational poverty affecting many Filipino families (Arcayna et al., 2021; Orbeta et al., 2023). Empirical studies have consistently demonstrated that the 4Ps program enhances beneficiaries' living standards and quality of life. For instance, Malinao et al. (2022) found that the program improves economic stability and fosters social upliftment and community empowerment, allowing beneficiaries to navigate socio-economic challenges better.

Supporting this positive narrative, Organo (2023) and Eleoran et al. (2023) highlighted significant improvements in beneficiary well-being, enhanced financial resources, and better educational and health outcomes—key factors in the ongoing battle against poverty. Furthermore, research by Talimio and Salagubang (2021) indicated that the 4Ps enhances awareness, participation, and self-confidence among Filipino beneficiaries, ultimately contributing to their empowerment within households and communities. However, the recent statistics present a paradox that raises essential questions about the effectiveness of the 4Ps program. Despite reports indicating that over four hundred thousand households experienced improvements in their circumstances—an assertion made during the July 2024 State of the Nation Address by President Ferdinand R. Marcos Jr. an alarming 90% of the 4Ps beneficiaries, amounting to 3,820,012 households, remain below the poverty line (Commission on Audit, 2022). This striking statistic highlights significant concerns regarding the program's capacity to foster lasting socio-economic changes for its beneficiaries.

This present study aimed to investigate the specific effects of the Pantawid Pamilyang Pilipino Program (4Ps) on its beneficiaries' socio-economic well-being. By carefully analyzing the strengths and weaknesses of the program, this research seeks to provide nuanced insights into the efficacy of the CCT initiative. Ultimately, this study endeavors to contribute to policy discussions that aim to enhance the development impact of such interventions, thereby fostering more effective strategies for poverty alleviation in both the Philippines and similar contexts.

2.0 Methodology

2.1 Research Design

This study employed a descriptive-correlational research design to understand the effects of the conditional cash transfer (CCT) program on the socio-economic conditions of household beneficiaries. The descriptive component of the research focused on gathering detailed data to illustrate the profiles of the participants, including factors such as household size, geographical location, and duration of participation in the program. Furthermore, the study rigorously evaluated the CCT program's effects on various social dimensions, including education, health and nutrition, and women's empowerment. By examining these areas, the research sought to illuminate how the CCT program may affect the overall well-being of households. In addition to the social implications, the study explored the economic impact of the CCT program. It assessed key indicators such as household consumption, income, investment, and savings. This thorough analysis aimed to establish a clearer picture of how the CCT program affects the economic conditions of participating households. The correlational aspect of the research played a crucial role in identifying relationships between demographic variables and the social and economic effects associated with the CCT program.

2.2 Research Locale

The study on the effects of the Conditional Cash Transfer (CCT) Program, specifically the Pantawid Pamilyang Pilipino Program (4Ps), is strategically centered in Kabankalan City, Negros Occidental. This locale is particularly significant for several reasons. Firstly, Kabankalan City represents a blend of urban and rural characteristics, allowing for exploring varied socio-economic conditions. The city is home to both lowland areas, which are often more developed, and upland barangays, where households may face more significant challenges related to accessibility and resource availability. By selecting this diverse locale, the research aims to capture a broad spectrum of experiences and outcomes related to the CCT program, providing a comprehensive view of its effects on different community segments. Moreover, the city has many beneficiaries enrolled in the 4Ps program. As of January 10, 2025, there were 9,718 registered, clean, and active household beneficiaries in Kabankalan; female grantees represented 8,627.

2.3 Research Participants

Three hundred eighty-three women grantees participated in the study, which facilitated a robust sample size,

enabling detailed statistical analysis and ensuring the findings reflect the larger population's experiences. The sample size was determined using Yamane's formula, which was applied to a total population of 8,627 registered, clean, and active 4Ps household beneficiaries with female grantees in the City of Kabankalan, Negros Occidental, as of January 10, 2025. This method ensured a statistically significant sample size, appropriate for the scope of the study. The participants were chosen using a random sampling method.

The criteria for selecting women grantees as participants in this study are equally important. First, the majority of the CCT program grantees are women. Furthermore, women are often the primary recipients of the CCT benefits due to their roles as caregivers and decision-makers within their households. Targeting female grantees allows the research to emphasize their unique experiences and challenges, particularly in poverty alleviation and family welfare. Additionally, examining the experiences of women grantees can provide valuable insights into the effectiveness of the CCT program in empowering women and enhancing their socio-economic status. By understanding how these women navigate the program's requirements and benefits, the study can evaluate the program's effects on promoting gender equity and social inclusion. Ultimately, the focus on women grantees enhances the research's depth and aligns with broader objectives of promoting gender-sensitive policies and programs within the framework of social welfare initiatives.

2.4 Research Instrument

This study utilized a researcher-developed questionnaire as its primary data collection instrument, which was divided into three parts. The first part gathered participant information, including the household status in the program as of January 10, 2025, barangay address, household set, year of registration, and household size. Each element of the first part was defined as follows: Household status in the program describes the current status of the household's participation in the Conditional Cash Transfer (CCT) program as of January 10, 2025. The barangay address indicates the specific barangay where the participant is registered as a beneficiary of the 4Ps program. The household set refers to the batch number assigned to the household at the time of registration. The year of registration is when the household first joined the program and began receiving cash grants. Lastly, the household size refers to the number of individuals living together as one family at the time of data collection.

The second and third parts of the questionnaire aimed to determine the extent of the CCT program's effects on the social and economic conditions of the household beneficiaries. Part 2 included items assessing the program's impact on social conditions, featuring five items related to education, nine items for health and nutrition, and ten items addressing women's empowerment, making a total of 24 items. Part 3 focused on the economic effects, including 15 items for household consumption, five items for income, ten for investment, and twelve for savings, totaling 42 items.

The items in the questionnaire were developed based on relevant studies and literature. The responses were interpreted using a 4-point Likert scale. To ensure validity, the researcher-made questionnaire underwent testing using Lawshe's Content Validity Ratio (CVR). Ten social work, health, education, and economics experts evaluated the items. The results showed that all 24 items in the social conditions were kept after the validation. In the economic conditions, the number of items dropped from 42 to 34. The overall CVR for the questionnaire was 82.94%, meaning most items were considered essential and valid by the panelists. A reliability test was conducted with 30 identified 4Ps grantees not involved in the study, using Cronbach's Alpha to evaluate reliability. The reliability test results showed a Cronbach's Alpha value of 0.942 for social and economic conditions. This indicates excellent internal consistency and reliability for the scale used to measure the variables in the study. The Cronbach's Alpha value significantly exceeds the 0.70 threshold, which is considered acceptable for this research. This confirms that the questionnaire reliably measures the effects of the CCT program on beneficiaries' socio-economic conditions.

2.5 Data Gathering Procedure

This research involved several steps to collect the necessary data for the study. Before beginning the data collection process, a formal request letter was submitted to the Regional Director of the DSWD Field Office VI. The DSWD Field Office VI responded by requesting the submission of a completed Research Request Form and a Research Brief Form. The request then underwent an ethical review by the DSWD. Once the research request was approved, a copy of the endorsement was emailed to the Negros Occidental Provincial Operations Office 2, Cluster 2 Operations Office, and Kabankalan City Operations Office of the Pantawid Pamilyang Pilipino Program before starting the data collection. Printed copies of the research instrument were distributed to the City Links assigned

to various barangays in Kabankalan City. This distribution was proportionate to the number of households in each barangay, using data provided by the DSWD. Informed consent was obtained from all participants, who signed a consent form available in English and Hiligaynon before the questionnaire was administered. All participants approached initially agreed to take part in the study.

After signing the Informed Consent Form, participants were given the research instrument and asked to respond based on how much the Conditional Cash Transfer (CCT) program had affected their socio-economic conditions. The research questionnaire was available in both English and Hiligaynon, allowing participants to respond at their convenience with no time limit. Once the completed survey questionnaires were collected, they were compiled, organized, statistically analyzed, and treated.

2.6 Ethical Considerations

The research ethics were prioritized at every study stage, demonstrating a deep commitment to participant welfare and ethical standards. Prior to the onset of data collection, a formal written request was submitted to the Department of Social Welfare and Development Field Office VI, seeking their authorization to research the Pantawid Pamilyang Pilipino Program (4Ps). The acquisition of approval from the agency's regional director signaled the readiness to commence the data-gathering phase. To uphold ethical standards during the administration of the research instrument, the researcher and the enumerators presented a detailed Informed Consent Form to each potential participant. This process ensured that participation was entirely voluntary, with participants giving informed consent by signing the form. The study's purpose, methodologies, potential benefits, confidentiality measures, and detailed participation information were thoroughly explained in both English and Hiligaynon, ensuring clarity and understanding among participants. It was made explicitly clear that participants had the right to withdraw from the study at any point without any repercussions. This open communication fostered a trusting environment where participants felt comfortable seeking clarification and were well-informed before participating. The questionnaire was intentionally structured to exclude identifying information, safeguarding respondent anonymity.

Additional precautions were made to ensure that participants were protected from adverse consequences arising from their involvement in the study. The researcher mitigated potential risks by considering participants' vulnerabilities and needs, safeguarding their well-being. Implementing a coding system for anonymizing personal information ensured participant confidentiality was maintained throughout the research process, including data analysis and reporting. The significance of Republic Act No. 10173, commonly referred to as the Data Privacy Act, which outlines essential provisions for safeguarding individuals' privacy rights and personal information within the Philippines, was emphasized in this study. The handling of all participant information is in adherence to its guidelines. This compliance added an essential layer of protection to participant confidentiality, aligning with the established legal framework for data privacy in the Philippines. All completed questionnaires are stored securely in a locked cabinet for one (1) year. After this period, the questionnaires will be securely shredded or permanently destroyed to enhance confidentiality further.

Post-data collection, all survey results were securely stored and accessed solely by the researchers, ensuring data integrity throughout the analysis process. Employing standardized data entry and coding methods contributed to the reliability and accuracy of the findings. The participant selection process was executed relatively and without bias, striving for a representative sample from the target population of Pantawid Pamilyang Pilipino Program household beneficiaries in Kabankalan City, Negros Occidental. By rigorously adhering to these ethical principles, this research endeavor not only honored the rights and well-being of its participants but also upheld the credibility and integrity of its research findings. Committing to ethical research practices is a vital foundation for fostering trust and respect within the community. It contributes to the overarching goal of responsible and impactful research in the field of social welfare.

3.0 Results and Discussion

3.1 Extent of the Effects of the CCT Program on the Social Condition

In terms of Education

The findings presented in Table 1 underscore the significant impact of the Conditional Cash Transfer (CCT) program on the educational outcomes of household beneficiaries. With a mean score of M = 3.70 (SD = 0.44), participants perceive the effects of the program on their social conditions, specifically education, as very

significant. This suggests a profound transformation in educational attainment and engagement among beneficiaries, with the low standard deviation indicating consistent perceptions across the sample. Most participants' views are closely aligned, with a slight variation of 0.44 units from the average, signaling a unified recognition of the program's positive influence.

Table 1. *Extent of the Effects of the CCT Program on the Social Condition of the Household Beneficiaries in terms of Education*

Indicators	Mean	Interpretation	SD
Overall	3.70	Very Great Effect	0.44
1. School-age children are enrolled in school.	3.79	Very Great Effect	0.52
2. Attending school child/children is/are persistently attending classes and has/have obtained at least 85% attendance in school.	3.68	Very Great Effect	0.55
3. Attending school child/children is/are doing well academically.	3.67	Very Great Effect	0.58
4. Attending school child/children is/are actively participating in school academic and non-academic activities.	3.66	Very Great Effect	0.60
5. Attending school child/children/are eager to progress to a higher level of education towards completion of his/her/their studies.	3.68	Very Great Effect	0.59

Note: 3.50-4.0 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 Very Low

Among the items evaluated, the item related to school enrollment of school-age children received the highest mean score (M = 3.79, SD = 0.52). This indicates strong agreement on the effectiveness of the CCT program in facilitating school enrollment. Conversely, the item's lowest mean score was observed concerning active participation in academic and non-academic school activities (M = 3.66, SD = 0.60). This discrepancy highlights an area for further enhancement, suggesting that while the program has successfully secured school attendance and promoted academic performance, there may be challenges in fostering a more robust level of engagement in school activities beyond attendance.

These findings are consistent with the work of Aldaba et al. (2023) and Capulong and Cuevas (2024), who also noted that CCT initiatives, such as the Pantawid Pamilyang Pilipino Program, have brought about significant improvements in educational outcomes for beneficiaries. In addition, Barbado et al. (2024) corroborated these findings, emphasizing the CCT program's positive effects on children's school attendance and academic performance. The study by Flores et al. (2019) further supports these conclusions, demonstrating a significant positive correlation between participation in the CCT program and the academic success of beneficiaries. Moreover, the research conducted by Parreno and Eramis-Eslabon (2022) provides additional context, indicating that the CCT program has not only enhanced educational outcomes but has also improved retention rates, academic performance, and overall attitudes toward learning. These improvements suggest a long-term positive trajectory facilitated by the CCT program, corroborated by Millán et al. (2020), who highlighted similar outcomes in their analysis.

In terms of Health and Nutrition

Table 2 shows the extent of the CCT program's effects on the household beneficiaries' social condition in terms of health and nutrition. The result suggests that the importance of the impact of the CCT program on the social condition of the household beneficiaries in terms of health and nutrition (M = 3.64, SD = 0.39) is perceived as having a very great effect, which means that the program has had a profound or intense impact on the health and nutrition of the household beneficiaries. It also suggests that most household beneficiaries acknowledge a substantial and long-term difference in health and food due to the program. The relatively low standard deviation indicates consistent responses across the sample. This means that most data points deviated by only 0.39 units from the average value, reflecting consistency within the dataset.

Most of the items obtained very great results. And some items got great results. Among the results, the highest mean score was found in the item, Have enhanced participation in deworming initiatives for children aged 1 to 12, leading to improved health outcomes and nutritional status among young beneficiaries (M = 3.76, SD = 0.54). In contrast, the item's lowest mean score was identified: Have less likely to have family members with chronic illnesses requiring constant medical attention (M = 3.26, SD = 0.91). The health and nutrition indicators that garnered high marginal scores include participation in deworming initiatives, access to clean drinking water, and improved hygiene and sanitation behaviors, indicating that the CCT program has been highly effective in promoting and advocating precautionary measures to reduce disease occurrence, improving child development, and promoting overall health. Also, the CCT program favorably influences the increase of vaccination and immunization rates among household beneficiaries, reflecting the program's positive attributes in strengthening

family health against vaccine-preventable diseases. The CCT program has made a difference in every household, as families can eat at least three meals daily. Household beneficiaries also have access to better food choices to uphold their nutrition.

Table 2. *Extent of the Effects of the CCT Program on the Social Condition of the Household Beneficiaries in terms of Health and Nutrition*

Indicators	Mean	Interpretation	SD
Overall	3.64	Very Great Effect	0.39
1. Have more access to free health services, resulting in improved overall health outcomes for the household.	3.69	Very Great Effect	0.56
2. Have less likely to have family members with chronic illnesses requiring constant medical attention.	3.26	Great Effect	0.91
3. Have regular health checkups to prevent illnesses for better long-term health and well-being.	3.52	Very Great Effect	0.78
4. Have more participation in free vaccinations and immunization programs offered by the Department of Health which increase family members' immunity and reduce the prevalence of vaccine-preventable diseases.	3.73	Very Great Effect	0.58
5. Have enhanced participation in deworming initiatives for children aged 1 to 12, leading to improved health outcomes and nutritional status among young beneficiaries.	3.76	Very Great Effect	0.54
6. Have more consistent access to three nutritious meals a day, contributing to better physical development and cognitive function in children.	3.72	Very Great Effect	0.56
7. Have better healthy eating choices, resulting in fewer family members experiencing underweight, overweight, or nutritional imbalances.	3.60	Very Great Effect	0.61
8. Have improved access to clean drinking water, thereby reducing the risk of waterborne illnesses and promoting better health.	3.74	Very Great Effect	0.53
9. Have improved hygiene and sanitation behaviors, such as regular handwashing and safe food handling, which lead to reduced instances of gastrointestinal and other infectious diseases.	3.74	Very Great Effect	0.56

Note: 3.50-4.0 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 Very Low

Moreover, household beneficiaries are utilizing free health services even more as the CCT program has influenced the establishment of the accessibility of these services through a collaborative effort of the partner government agencies. The findings imply that the CCT program has lessened the financial strain associated with medical treatment and preventive healthcare the household beneficiaries face. Favorable outcomes on the health and nutrition of the household beneficiaries are attributed to the CCT program, exhibited by the invariably high responses across all health and nutrition indicators, which are also consistent with findings from other research studies (Ngamasana & Moxie, 2024; Chico et al., 2020). The findings note the significance of the CCT program in facilitating ease of availment of essential health services, preventive medical interventions, and better sanitation practices, resulting in enhanced health and nutrition outcomes, which are aligned with existing literature (Ahmed et al., 2022; De Souza et al., 2021).

It was also reinforced by Sánchez et al. (2018) and Jain and Mittal (2018) that the CCT program contributes to better physical and cognitive development in children towards long-term socio-economic benefits, as the program addresses malnutrition through deworming and dietary improvements. In addition, enhanced accessibility of safe drinking water and improved sanitation practices have likely reduced the incidence of waterborne diseases and gastrointestinal infections, as supported by the World Health Organization (2023). Aligning with Chandir et al. (2022), high vaccination and immunization uptake among household beneficiaries suggests that the CCT program effectively bridges health gaps and addresses inequalities in disadvantaged areas. Nevertheless, there is still a need for growth and improvement in managing chronic conditions and persistent preventative health checkups of the household beneficiaries. To further boost the long-term benefits for beneficiaries, the CCT program could enhance health monitoring services, strengthen nutritional education, and offer more support for chronic diseases.

In terms of Women Empowerment

Table 3 shows the extent of the CCT program's effects on the social condition of household beneficiaries regarding women's empowerment. The result suggests that the importance of the impact of the CCT program on the social condition of the household beneficiaries in terms of women empowerment (M = 3.61, SD = 0.40) is perceived as having a very great effect, which means that the program has had a profound or intense impact on women empowerment of the household beneficiaries. It also suggests that most household beneficiaries acknowledge a substantial and long-term difference in women's empowerment and overwhelmingly credit it to the CCT program. The relatively low standard deviation indicates consistent responses across the sample. This means that

most data points deviated by only 0.40 units from the average value, reflecting consistency within the dataset. Many of the items obtained very great results. And some items got great results. Among the results, the highest mean score was found in the item, Become a positive role model for my children, demonstrating the importance of education, hard work, and personal growth (M = 3.78, SD = 0.48). In contrast, the lowest mean score result was identified in the item, have encouraged and supported to prioritize my self-care and well-being (M = 3.40, SD = 0.79).

Table 3. *Extent of the Effects of the CCT Program on the Social Condition in terms of Women Empowerment*

Indicators	Mean	Interpretation	SD
Overall	3.61	Very Great Effect	0.40
1. Have an equal voice in managing household financial decision-making.	3.56	Very Great Effect	0.63
2. Have involved in making important decisions about future well-being of my family.	3.74	Very Great Effect	0.49
3. Have the freedom to make my own choices about personal advancement in life.	3.65	Very Great Effect	0.59
4. Have control over my own finances.	3.62	Very Great Effect	0.55
5. Have access to education and training opportunities to enhance my skills and career prospects.	3.49	Great Effect	0.67
6. My opinions and ideas are respected and valued by my family members.	3.67	Very Great Effect	0.57
7. Free from domestic violence and abuse.	3.52	Very Great Effect	0.77
8. Household responsibilities are shared equally among family members, reducing my workload and burden.	3.63	Very Great Effect	0.58
9. Have encouraged and supported to prioritize my own self-care and well-being.	3.40	Great Effect	0.79
10. Become positive role model for my children, demonstrating the importance of education, hard work, and personal growth.	3.78	Very Great Effect	0.48

Note: 3.50-4.0 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 Very Low

The result reveals that the CCT program has significantly empowered women in household decision-making and personal development. Women in the program report a strong voice in financial decisions and involvement in important family decisions. The results suggest a notable autonomy in the individual development of women within the household and economic control, though some variability is present depending on household dynamics. Women feel their opinions are highly valued, indicating strong respect and recognition. However, while most women report freedom from domestic violence, some still face significant challenges. The CCT program also encourages shared household responsibilities, reducing the workloads of women, especially the mothers in the household, though cultural factors may still influence distribution. Women report feeling supported to prioritize self-care, though this effect varies. Women perceived themselves as positive role models for their children, consistently promoting education and hard work. The results suggest the program has a broad positive impact, with slight variations in specific areas like self-care and domestic violence, indicating opportunities for further improvements.

The CCT program has more likely empowered women, particularly in household decision-making, financial control, and involvement in family planning, in agreement with previous research (Almås et al., 2018; Sugiyama & Hunter, 2020; Laszlo et al., 2023). The CCT program's effectiveness is apparent in education and personal growth. Also, the program has empowered women to become role models. This shows enhanced women empowerment and independence. Despite this, notable gaps remain in ensuring that all women benefit equally. As argued by Hagen-Zanker et al. (2017), the variability in the influence of the program over household decisions participation of women, challenges in accessing education due to economic or geographical constraints, and significant disparities in experiences of domestic violence highlight areas where further intervention is needed. Additionally, the struggle to prioritize self-care and unequal sharing of household responsibilities suggest that cultural norms and family structures continue to influence the extent of empowerment.

3.2 Extent of the Effects of the CCT Program on the Economic Condition

In terms of Household Consumption

Table 4 shows the extent of the CCT program's effects on the household beneficiaries' economic condition in terms of household consumption. The result suggests that the importance of the impact of the CCT program on the financial condition of the household beneficiaries in terms of household consumption (M = 2.98, SD = 0.70) is perceived as having a great effect, which means that the program has had a considerable or essential effect on the household consumption of the household beneficiaries. It also suggests that most household beneficiaries acknowledge a noticeable difference in household consumption due to the program. The moderate standard deviation indicates some variation in the responses. This means that most data points deviated by only 0.70 units from the average value, reflecting moderate variability within the dataset.

Table 4. *Extent of the Effects of the CCT Program on the Economic Condition in terms of Household Consumption*

Indicators	Mean	Interpretation	SD
Overall	2.98	Great Effect	0.70
1. The household allocates more budget for food, improving the quality and quantity of meals.	3.56	Very Great Effect	0.64
2. The household consumes a balanced diet.	3.44	Great Effect	0.70
3. The household experiences reduced hunger and malnutrition.	3.37	Great Effect	0.86
4. The household can afford healthcare services, including hospitalization and medication.	3.42	Great Effect	0.70
5. The household allocates budget for vitamins, supplements, and/or other wellness products.	3.54	Very Great Effect	0.68
6. The household allocates more budget for education.	3.55	Very Great Effect	0.62
7. The household allocates budget on utilities such as but not limited to electricity, water, and internet.	3.33	Great Effect	0.85
8. The household allocates budget for other food and nonfood groceries/items.	3.33	Great Effect	0.78
9. The household allocates budget for improving living or housing condition.	3.38	Great Effect	0.71

Note: 3.50-4.0 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 Very Low

Three items achieved a great effect, while six scored a great effect. Among the results, the highest mean score was found in the item, The household allocates more budget for food, improving the quality and quantity of meals (M = 3.56, SD = 0.64). In contrast, the lowest mean score result was identified in the items, The household allocates budget on utilities such as but not limited to electricity, water, and internet and The household allocates budget for other food and nonfood groceries/items (M = 3.33, SD = 0.85, M = 3.33, SD = 0.78, respectively). The results suggest that the household beneficiaries have experienced the effects of the CCT program on their household consumption aspect of economic condition. The highest scores were observed in indicators such as household allocation for food, vitamins, wellness products, and education, with a great effect rating. The findings also showed a moderate response variability, highlighting the most significant deviations in household consumption indicators, such as the household beneficiaries' incidence of reduced hunger and their practices towards fund allocation for utilities. This suggests that some household beneficiaries may have distinct experiences in these aspects.

In general, the CCT program has a positive effect on household consumption. The CCT program has effectively educated households through program interventions like the monthly family development session to improve their consumption patterns, prioritize their needs to improve their quality of life, and reduce hunger and health issues to achieve better overall economic conditions. While the CCT program has shown significant effects, some areas, such as hunger reduction, utility budgeting, and living conditions, exhibit more varied effects across household beneficiaries. While the CCT program effects vary across households, the overall trend positively affects household economic conditions. Recent studies support or align with the findings regarding the impact of the CCT program on household consumption, especially in areas such as food allocation, healthcare, and education. The CCT program significantly increased consumption expenditures among beneficiaries (Hadna et al., 2022). Hudang et al. (2024) reinforced that the CCT program significantly positively affects food consumption expenditure. Capulong and Cuevas (2024) found that the 4Ps have substantially enhanced the consumption patterns of household beneficiaries, especially in food and healthcare. A study suggests expanding the program to reach more vulnerable groups and families nationwide to address malnutrition and its long-term adverse effects (Eluwa et al., 2023).

In terms of Income

Table 5 shows the extent of the CCT program's effects on the household beneficiaries' economic condition in terms of income. The result suggests that the importance of the impact of the CCT program on the financial condition of the household beneficiaries in terms of income (M = 2.98, SD = 0.70) is perceived as having a great effect, which means that the program has had a considerable or essential impact on the income of the household beneficiaries. The result shows that most household beneficiaries recognize a noticeable difference in their income due to the program. The moderate SD suggests some variation in the responses, highlighting that most data points deviated by only 0.70 units from the average value, reflecting moderate variability within the dataset.

Table 5. *Extent of the Effects of the CCT Program on the Economic Condition in terms of Income*

Indicators	Mean	Interpretation	SD
Overall	2.98	Great Effect	0.70
1. The household receives regular cash transfers, which increase their household income.	3.62	Great Effect	0.69
2. The household engages in livelihood projects, such as but not limited farming, fishing, or small businesses, which generate additional income.	3.16	Great Effect	0.88
3. The household has household member/s with better-paying jobs or experience increased earnings from their existing jobs.	2.60	Great Effect	1.10
4. The household has income-generating assets, such as livestock, farming equipment, or small businesses.	2.81	Great Effect	1.01
5. The household has household member/s who is/are employed and receiving wage/salary.	2.68	Great Effect	1.09

Note: 3.50-4.0 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 Very Low

One item achieved a very great effect," while four scored a great effect. Among the results, the highest mean score was found in the item, The household receives regular cash transfers, which increase their household income (M = 3.62, SD = 0.69), while the lowest mean score result was identified in the item, The household has household member/s with better-paying jobs or experience increased earnings from their existing jobs (M = 2.60, SD = 1.10). The findings emphasize that the CCT program increases household income, with the most pronounced effect on the regular receipt of cash grants by the household beneficiaries every two months through their cash cards, significantly boosting income levels. The results also indicate that the CCT program has influenced the household beneficiaries' engagement in livelihood programs and projects like farming and retail merchandising, in addition to their source of income.

Additionally, while the program invests in human capital development to land better-paying jobs or increase earnings, this effect is less pronounced than other variables. The results also noted that the households with income-generating assets, like livestock and farming equipment, and those with employed family members have a significant increase in income, credited to the program's effect. Emphasis on the impact of the CCT program in improving the economic condition of the household beneficiaries in terms of income is placed on direct financial assistance and the promotion of income-generating activities. While the program's effect is generally positive across all aspects, further strengthening livelihood initiatives and enhancing job opportunities could increase the overall income benefits for households. There is a clear opportunity to focus on improving employment and wage outcomes for CCT household beneficiaries.

The key findings also aligned with recent literature. The CCT programs can enhance the beneficiaries' financial capability, as explored by Eleoran et al. (2023). As also corroborated by Organo (2023), the CCT program has improved the overall lifestyle of beneficiaries and increased household income. Talimio and Salagubang (2022) found that some beneficiaries have alternative sources of income and do not rely solely on the cash grant, supporting the findings of this study as household beneficiaries venture into livelihood projects such as farming, fishing, and small businesses, contributing to income growth. Evidence of longer-term gains of the CCT program in employment and income is mixed (Özler, 2020). Baird et al. (2018) noted that CCT programs may lead to increased employment, earnings, consumption, and wealth among participants, attributed to the combination of interventions, aside from cash grants, leading to occupational changes among beneficiaries.

In terms of Investment

Table 6 shows the extent of the CCT program's effects on the household beneficiaries' economic condition in terms of investment. The result suggests that the extent of the impact of the CCT program on the economic condition of the household beneficiaries in terms of investment (M = 3.06, SD = 0.65) is perceived as having a great effect, which means that the program has had a considerable or essential effect on the investment of the household beneficiaries. It also suggests that most household beneficiaries acknowledge a noticeable difference in their investment due to the program. The moderate standard deviation indicates some variation in the responses. This means that most data points deviated by only 0.65 units from the average value, reflecting moderate variability within the dataset.

Table 6. *Extent of the Effects of the CCT Program on the Economic Condition in terms of Investment*

Indicators	Mean	Interpretation	SD
Overall	3.06	Great Effect	0.65
1. The household invests more in their children's education.	3.35	Great Effect	0.84
2. The household invests more in healthcare, including medical consultations, hospitalization, and medication.	3.29	Great Effect	0.78
3. The household invests in skills training and vocational education to enhance the household working member/s' employability.	3.18	Great Effect	0.86
4. The household invests more in housing, including construction, renovation, and repair of their homes.	3.31	Great Effect	0.78
5. The household invests more in livestock and agriculture, including purchase of farm animals, seeds, and fertilizers.	3.11	Great Effect	0.87
6. The household invests more in small businesses, including purchase of equipment, inventory, and rent.	2.62	Great Effect	1.06
7. The household invests more in insurance products, protecting themselves against financial risks.	2.81	Great Effect	1.07
8. The household invests more in microfinance services, enabling them to start or expand small businesses.	2.71	Great Effect	1.09
9. The household invests in social capital through participation in community activities.	3.23	Great Effect	0.89
10. The household invests in social networks by building stronger relationships with family, friends, and neighbors.	3.03	Great Effect	1.02

Note: 3.50-4.0 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 Very Low

All items obtained a great effect result. Among the results, the highest mean score was found in the item, The household invests more in their children's education (M = 3.35, SD = 0.84). In contrast, the lowest mean score result was identified in the item, The household invests more in small businesses, including purchase of equipment, inventory, and rent (M = 2.62, SD = 1.06). The findings imply that the CCT program has encouraged household beneficiaries to invest in viable endeavors or projects that will improve their economic conditions in the long term. Investment indicators perceived by the household beneficiaries to have been influenced more positively by the program were their behavior toward investing in children's education and housing, both of which show a strong commitment to improving the quality of life for household members. The CCT program also positively affects the behavior of the household beneficiaries when it comes to investment in healthcare, including medical services, emphasizing the health improvements experienced by beneficiaries. The CCT household beneficiaries ventured to enhance employability and entrepreneurship through investment in skills training and entrepreneurial ventures.

The CCT program has also promoted social capital development, with beneficiaries engaging in community activities and strengthening social networks. The findings provide a foundation to establish additional support to further empower beneficiaries in areas such as investment in small businesses and utilization of microfinance services as a jumpstart for a livelihood undertaking, which would provide more sustainable income-generating opportunities. The CCT program could further enhance the beneficiaries' long-term economic stability and resilience by improving support in these areas. Recent studies exhibit similar findings on the CCT program's effect on investment. Beneficiaries invested heavily in children's education and housing. Chico et al. (2020) concluded that the CCT programs can have lasting, positive effects on children's education outcomes. The key findings of Evans et al. (2022) are the effect of the CCT program on economic outcomes, specifically in increased investments in livestock, insurance, and children's shoes. CCT programs positively impact social capital, attributed to household beneficiaries' change in behavior towards building social networks (Mesfin & Cecchi, 2023). Assistance to access training related to business and financial literacy, which can be done through referrals to program partners and stakeholders such as LGUs and other government agencies with a focus on skills training and enhancement, can further empower beneficiaries, leading to improved economic stability and resilience, as supported by Fischer et al. (2016).

In terms of Savings

Table 7 shows the extent of the CCT program's effects on the household beneficiaries' economic condition in terms of savings. The result suggests that the extent of the impact of the CCT program on the economic condition of the household beneficiaries in terms of savings (M = 3.20, SD = 0.55) is perceived as having a great effect, which means that the program has had a considerable or essential impact on the savings of the household beneficiaries. It also suggests that most household beneficiaries acknowledge a noticeable difference in savings behavior due to the

program. The moderate standard deviation indicates some variation in the responses. This means that most data points deviated by only 0.65 units from the average value, reflecting moderate variability within the dataset.

Table 7. *Extent of the Effects of the CCT Program on the Economic Condition in terms of Savings*

Indicators	Mean	Interpretation	SD
Overall	3.20	Great Effect	0.55
1. The household develops a habit of regular savings, setting aside a portion of their income each month.	3.15	Great Effect	0.87
2. The household saves for emergency and other unforeseen disasters/calamities.	3.23	Great Effect	0.83
3. The household learns to budget well, leading to better savings habits.	3.50	Very Great Effect	0.70
4. The household reduces their debt burden, freeing up more income for savings.	3.19	Great Effect	0.85
5. The household avoids unnecessary expenses, such as excessive spending on luxuries or vices.	3.36	Great Effect	0.87
6. The household opens and maintains bank accounts, increasing their access to formal savings services.	2.51	Great Effect	1.15
7. The household utilizes microfinance services, including savings and loan products.	2.56	Great Effect	1.15
8. The household saves for their children's education.	3.63	Very Great Effect	0.60
9. The household saves for healthcare expenses.	3.53	Very Great Effect	0.65
10. The household saves to start or expand a business or livelihood, increasing their income and economic stability.	3.33	Great Effect	0.77

Note: 3.50-4.0 (Very Great); 2.50-3.49 (Great); 1.50-2.49 (Low); 1.00-1.49 Very Low

Three items achieved a very great effect, while six scored a great effect. For the result of the extent of the impact of the CCT program on the economic condition of the household beneficiaries in terms of savings, the highest mean score was found in the item, The household saves for their children's education (M = 3.63, SD = 0.60), while the lowest mean score result was identified in the item, The household opens and maintains bank accounts, increasing their access to formal savings services (M = 2.51, SD = 1.15). The findings suggest that the CCT program has fostered the development of regular savings habits, with households setting aside funds for emergencies, debt reduction, and other sudden setbacks. The CCT program provides financial education intervention through family development sessions, which implies that the intervention has effectively influenced the behavior of the beneficiaries when it comes to savings. The effects are mirrored in their habit of allocating more of their income for deferred use, enhancing their economic stability. While the program has led to positive changes in savings and financial habits, some challenges exist, such as accessing formal financial services and maintaining a bank account. The results suggest barriers to fully integrating the household beneficiaries into utilizing formal savings systems offered by banks and other reliable financial institutions.

Findings on the effect of the CCT program on the savings outcomes reinforced by Nesbitt-Ahmed et al. (2018), reporting the beneficiaries' reduced reliance on borrowing from neighbors or others. Siu et al. (2022) and Schjoedt (2016) showed that cash transfers enabled people to reduce their debts. Capulong and Cuevas (2024) concluded that the CCT program improved savings among the poorest households. As supported by multiple recent studies, the results also highlight obstacles to reaching complete financial inclusion. According to Calma (2023), traditional banking institutions are not primarily found in rural and isolated areas, which may be a significant barrier to beneficiaries' access to formal savings in upland or mountainous regions. It is essential to keep in mind that the program has limitations. The Philippine government launched a CCT program to address immediate needs for education and health and break the intergenerational cycle of poverty (David & Maroma, 2025). The program's focus on immediate needs may overshadow long-term savings goals.

3.3 Difference in Social Condition

Table 8 shows the significant difference in the extent of the effects of the CCT program on the social condition of the household beneficiaries when grouped according to household size, location, and number of years availed of the CCT program. The result revealed no significant difference in the extent of the effects of the CCT program on the social condition of the household beneficiaries when grouped according to household size ($t = 0.35$; $p = .995$). Therefore, the null hypothesis stating that there is no significant difference in the extent of the effects of the CCT program on the social condition of the household beneficiaries when grouped according to household size is not rejected.

Table 8. *Difference in Social Condition according to Profile Variables*

Variables	t	df	p
Household Size	0.35	381	.995
Number of Years Availed of	0.80	381	.465

The independent t-test result suggests that the extent of the effects of the CCT program on the social conditions of beneficiaries does not significantly vary whether they are from small to medium-sized households (2-5 members) or large households (6-11 members). The result shows that the CCT program has a uniform effect across different household sizes in improving social conditions. This result suggests that, within the variables examined, small to medium household size (2–5 members) versus large household size (6–11 members), household size has no bearing on the program's efficacy. Regardless of the size of the households - small, medium, or large - the CCT program consistently improves social conditions. This result could be important for program stakeholders since household size does not significantly affect the success of the CCT program; it indicates that interventions based on household size may not be necessary. The program could be effective for households of various sizes, and its benefits are equally distributed between small and large households.

The results do not conform to the findings of Blaabæk et al. (2019), which state that household size has an adverse causal effect on educational attainment, suggesting that children from larger families tend to have lower educational attainment, on average, compared to children from smaller families. Parada (2022) and Onsay and Rabajante (2024) suggested the necessity for targeted interventions for large households to address poverty and health dynamics, suggesting that household size matters in crafting responses to identified social problems. Also, the study results are not aligned with Bhattacharjee (2019), highlighting a clear link between family size and poverty. Additionally, the result revealed no significant difference in the extent of the CCT program's effects on the household beneficiaries' social condition when grouped according to the number of years availed of ($t = 0.803$; $p = 0.465$). Therefore, the null hypothesis stating that there is no significant difference in the extent of the effects of the CCT program on the social condition of the household beneficiaries when grouped according to the number of years availed of is not rejected.

The independent t-test result suggests that the CCT program's effect on the social conditions of the beneficiaries is not significantly affected by the number of years the program has been in effect. Whether the beneficiaries are within the program's limit (7 years or less) or beyond (more than 7 years), the program's impact on social conditions seems similar. This suggests that, for the duration studied (within 7 years and beyond), longer participation in the program does not necessarily result in greater improvement in social conditions. The program's benefits may plateau after a certain number of years, or there may be other factors beyond the duration of the program that influence the social conditions. Further exploration of different influencing factors and program adjustments could enhance its effectiveness. Section 4 of the Republic Act 11310 states that the 4Ps will provide conditional cash transfers to qualified household beneficiaries for seven (7) years to improve their health, nutrition, and education. The study's findings suggest that the duration of program availment has no significant difference in the extent of the program's effects on the social condition of the household beneficiaries; it is prudent that beneficiaries utilize the program within the prescribed 7-year period under Republic Act 11310.

Table 9 revealed a significant difference in the extent of the CCT program's effects on the social condition of the household beneficiaries when grouped according to location ($x^2 = -1.25$; $p = .001$). Therefore, the null hypothesis stating that there is no significant difference in the extent of the CCT program's effects on the social condition of the household beneficiaries when grouped according to location is rejected.

Table 9. *Difference in Social Condition according to Location*

Variables	x^2	df	p
Location	-1.25*	224.50	.001

*Significant at $p \leq .05$

The Kruskal-Wallis test result showed that the extent of the effects of the CCT program on the social conditions of beneficiaries significantly varies depending on the location of the household beneficiaries living in lowland or upland barangays. The result shows that the CCT program has varied effects on improving social conditions across different locations. The difference might indicate that upland barangays are more likely to gain from the CCT program because of the social circumstances of the household beneficiaries, which call for the program's intervention. While the location has been identified as a factor affecting the CCT program's outcomes, it is

important to dive deeper into what specific factors cause the difference. The findings of the study on the program's significant effect on rural areas, supported by Capulong and Cuevas (2024), emphasize that the CCT program significantly affects social conditions like education for household beneficiaries in rural areas or areas outside towns or cities. Flores et al. (2019) concluded that it had a significant effect on the educational outcomes of the beneficiaries, which is inconsistent with the result of this study.

3.4 Difference in Economic Condition

Table 10 shows the significant difference in the extent of the effects of the CCT program on the economic condition of the household beneficiaries when grouped according to household size. The result revealed no significant difference in the extent of the CCT program's effects on the household beneficiaries' economic condition when grouped according to household size ($t = 1.65$; $p = .663$). Therefore, the null hypothesis stating that there is no significant difference in the extent of the effects of the CCT program on the economic condition of the household beneficiaries when grouped according to household size is not rejected. The independent t-test result suggests that the CCT program's effects on economic conditions do not differ significantly between small to medium-sized households (2-5 members) and large households (6-11 members). While there is a slight difference in the means (as indicated by the t-value), the difference is not enough to be considered statistically significant. Beneficiaries of the CCT program experience consistent improvements in their financial circumstances regardless of the size of their households.

Table 10. *Difference in Economic Condition according to Household Size and Number of Years Availed of*

Variables	t	df	p
Household Size	1.65	381	.663
Number of Years Availed of	0.72	381	.877

The study's findings differ from those of Bitana et al. (2024), who concluded the significant differences in economic conditions regarding savings and consumption between household size groups, implying that large household size groups had lower average yearly savings and higher consumption expenses. Also, it is not supported by the data of Esteve et al. (2024), implying that smaller households may have different consumption patterns that influence their household needs—under Republic Act 11310, also known as the 4Ps Act, the cash grant amount is determined by the number of children monitored in education, a maximum of three, and their corresponding grade level. Consequently, households with more children enrolled in higher education levels tend to receive larger cash grants, potentially increasing their overall household income, yet in this study, the household beneficiaries with more monitored children do not take the greater cash grants as significant than those of its counterpart group in evaluating the effect of the CCT program on their economic condition.

Furthermore, the result revealed no significant difference in the extent of the CCT program's effects on the household beneficiaries' economic condition when grouped according to the years availed of ($t = 0.72$; $p = .877$). Therefore, the null hypothesis stating that there is no significant difference in the extent of the CCT program's effects on the household beneficiaries' economic condition when grouped according to the number of years availed of is not rejected. The independent t-test result suggests that the number of years a household has been in the CCT program (within or beyond the 7-year program period) does not significantly affect the household beneficiaries' economic condition. This could suggest that economic gains from the CCT program plateau over time or its effect decreases regardless of how long a household stays in it. These results imply that longer program duration does not translate into more substantial economic gains.

As the findings of the study suggest, the effect of the CCT program on the economic condition of the household beneficiaries, though beneficial, does not significantly differ regardless of the number of years availed, and while the program is not necessarily for the purpose of improving the present economic condition of the households, it is recommended that beneficiaries make use of the program within the allotted 7-year period. The 4Ps mainly enhance the health, nutrition, and education of children aged 0-18 (DSWD, 2025), implying that the program is not designed to address the family's immediate financial needs directly. However, it aims to break the intergenerational cycle of poverty, which the program is eyeing for growth in the socio-economic condition of the beneficiaries in the long run. Section 4 of the Republic Act 11310 highlights the duration of the program's availability to the beneficiaries.

In Table 11, the result revealed no significant difference in the extent of the CCT program's effects on the household beneficiaries' economic condition when grouped according to location (x^2 = 3.55; p = .305). Therefore, the null hypothesis stating that there is no significant difference in the extent of the CCT program's effects on the economic condition of the household beneficiaries when grouped according to location is not rejected.

Table 11. *Difference in Economic Condition according to Location*

Variables	x^2	p
Location	3.55	.305

The Kruskal-Wallis' result suggests the CCT program's effect on economic conditions is similar across locations because the economic conditions of the household beneficiaries in the lowland and upland barangays have improved to comparable degrees. The results conclude that program effectiveness in terms of economic condition is not significantly influenced by location. Since the findings indicate that the program's effect is constant across various geographic locations, this could help formulate and implement policies across barangays without requiring major adjustments for geographic differences. The findings fail to align with Capulong and Cuevas (2024), indicating that in urban areas, the CCT program has improved the household beneficiaries' saving behavior and the quality of food consumed by household beneficiaries, which suggests that location has significance in the effect of the program on economic condition in terms of household consumption and savings. Physical access to services and employment opportunities is essential for economic growth and development (Cattaneo et al., 2022). Reinforced by Litsardopoulos et al. (2020), urban areas provide better access to goods and services and offer a wider range of jobs and higher earning potential. The study's findings exclude the potential advantage of those beneficiaries living near the city, undermining the idea that it could also be an advantage of the program in influencing those households economically.

3.5 Location as Predictor of Economic Condition

Table 12 determines whether the location variable acts as a predictor of the extent of the effects of the CCT program on the economic condition of the household beneficiaries. The data analysis revealed that the location variable (p = .001) was a predictor of the extent of the CCT program's effects on the household beneficiaries' economic condition. The study's finding indicates that the economic condition of household beneficiaries of the CCT program can be predicted by their location or the place where the households live, whether near or far from the city proper, with some location groups experiencing more significant difficulties than others. The results show how important it is to consider location-specific factors when developing and implementing poverty alleviation programs like CCTs, even though location only accounts for a small percentage of the variation in economic outcomes. The results also suggest that location has a statistically significant effect on the economic condition of CCT beneficiaries, with an adverse effect observed for households in specific locations.

Table 12. Influence of *Location as a Predictor on the Economic Condition of the Household Beneficiaries*

Variable	R	R^2	Unstandardized Coefficient		Standardized Coefficient	t	p
			B	Std. Error	Beta		
Location	0.175a	0.03	-0.21	0.06	-0.17	-3.47	.001

The findings are consistent with Capulong (2022), which implies that the CCT program is more effective in rural areas, particularly in increasing education expenditure and fostering human capital investment, and less effective in urban areas in terms of per capita total expenditures in urban areas, driven by an increase in per capita savings. The prevalence of children living in poverty is higher in rural areas, according to the Philippine Statistics Authority (2025), which suggests that poverty alleviation efforts should be concentrated in those areas to reduce the poverty incidence rate.

4.0 Conclusion

The study's findings indicate that the Conditional Cash Transfer (CCT) program has profound positive effects on the social conditions of household beneficiaries, especially in areas such as education, health, nutrition, and women's empowerment. This effect remains significant when analyzing the beneficiaries according to household size, location, and duration of program participation. Additionally, the economic conditions of the beneficiaries also improved in terms of household consumption, income, investment, and savings. However, the impact was

slightly less pronounced compared to social conditions. The study highlights that while location plays a critical role in influencing the effects of the CCT program on economic conditions, the variations in impact based on household size and duration of participation were not significant. This suggests that demographic factors alone may not be sufficient to explain differences in program effectiveness, pointing to the importance of contextual factors related to location. Several recommendations are given to help enhance the socio-economic effects of the CCT program. First, improving the program's features is essential by integrating additional support services that promote education, health, nutrition, and women's empowerment. Tailoring interventions to account for household size, location, and the duration of program participation will further increase relevance and effectiveness, as specific needs vary significantly across different groups.

Moreover, strengthening economic empowerment through initiatives to increase household income, encourage investment, and foster savings is crucial; this could involve offering skills training, access to microloans, and financial literacy programs. Community engagement is another key recommendation, as involving local communities in implementing and evaluating the program can ensure it remains responsive to their needs. In terms of future research directions, conducting longitudinal studies to explore the long-term impacts of the CCT program on beneficiaries will provide insights into its lasting effects. Comparative studies between beneficiaries from different locations can help identify how local context influences program effectiveness. Examining the spillover effects of the CCT program on non-beneficiaries within the same communities can offer a broader perspective on its impacts. Evaluating specific components of the CCT program to determine which elements are most effective would also be beneficial.

5.0 Contributions of Authors

The first author conceptualized the research topic. The second author collaborated on data design and analysis, while the first author reviewed the manuscript.

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7.0 Conflict of Interests

The authors declare that they have no conflict of interest.

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Factors Affecting the Performance of Students in the National Achievement Test

Rhoda G. Reyno*, Rodel B. Guzman
Isabela State University, Echague, Isabela, Philippines
Department of Education, Rizal Region National High School, Alicia, Isabela, Philippines

*Corresponding Author Email: reynorhoda@gmail.com

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Abstract. Achievement tests are essential in assessing educational outcomes and student performance in various subjects. Previous literature has revealed that demographic and administrative factors often affect their results. This study aims to determine the influence of socio-demographic characteristics, teaching effectiveness, and management practices on National Achievement Test (NAT) outcomes among Grade 10 students in the Schools Division of Isabela to provide a basis for an enhancement program. Quantitative research under descriptive-correlational research design was used to collect data from 12 schools and analyze their performance in English, Filipino, Mathematics, and Araling Panlipunan. Results revealed that disparities in performance across subjects, with students struggling the most in Mathematics (M=37.74, low proficient) and critical thinking components. Additionally, socio-demographic factors such as parental education (τb = 0.099, p = .015), economic status (τb = 0.127, p=.001), and school size (τb = -0.126, p =.002) significantly impacted test outcomes, highlighting the need for targeted support. Teaching effectiveness, specifically preparation for instruction and management practices, was also a vital determinant of performance. These findings highlighted the necessity of systemic reforms that center on equitable resource allocation, consistent professional development, and leadership development in schools. This paper suggests that to improve the NAT performance, there is a need for a change of paradigm in the curricula towards a more responsive and evidence-based policy making.

Keywords: Education reform; Management practices; National Achievement Test; Socio-demographic factors; Teaching effectiveness.

1.0 Introduction

The role of achievement tests is to evaluate and assess the educational progress and competency of students in different subjects. However, test results are affected by a combination of demographic and administrative factors. For educators, policymakers, and researchers to interpret test results effectively and implement effective pedagogical strategies, they must know these impacts. Under DepEd Memo 55, series of 2016, the National Achievement Test for Grade 10 (NAT G10) is an integral part of student exit assessments designed to ascertain whether graduating learners are meeting the standards in the Junior High School curriculum (Department of Education, 2023). The test covers the 21st-century skills: problem solving, information literacy, and critical thinking. Its scope includes the learning areas in English, Science, Mathematics, Filipino, and Araling Panlipunan as content. The test's design is progressive, with varying difficulty levels in a multiple-choice format using English and the Filipino language. Despite its importance, many schools have yet to attain appreciable scores in English at the junior high school level, leading to average NAT performance. Prior research has identified that different variables influence students' performance on standardized tests. Students' academic achievement is subject to

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economic status, parental education, and cultural background, as stated by Shahjahan et al. (2021). The effectiveness of teaching, including teacher qualifications and instructional practices, is undoubtedly a vital factor in influencing student outcomes (Blömeke et al., 2016). There is also a great deal of evidence that management practices within schools - how resources are allocated, for example, or leadership styles - influence the learning environment and student performance (Leithwood, 2021).

Behiga (2022) mapped the results of NAT for Grade 6 from 2016-2018 and Grade 12 learners in 2018-2019. His analyses revealed an alarming result: the NAT in 2011-2012 had an almost 50% decline in 2016-2017. The same group of students was tested four years apart, leading to Behiga's conclusion that implementing the K-12 program did not yield the desired effect on the learners' proficiency levels. This observation was verbalized by then Education Secretary Leonor Briones, who stated that the NAT results "gravitate towards the low proficiency levels," especially in Science, Math, and English (Malipot, 2019).

Socio-demographic factors encompass many student characteristics, including sex, economic status, parental education levels, cultural background, family size, and school size. These elements collectively shape students' educational environment and experiences, significantly impacting their test performance (El Refae et al., 2021). Munir et al. (2023) argued that a person's socioeconomic background is a vast time indicator of academic performance. Wealthy children often have more educational resources, like after-school classes, personalized teacher attention, and books, which is reflected in their academic achievement. By contrast, lower-socioeconomic children may experience obstacles with limited financial resources for school-related costs, lack of educational resources, and insufficient parental involvement, impacting school performance. Briones et al. (2021) found that the way parents behaved, the ages of the children, the degree of their proficiency in the use of the internet, and other factors, including lack of motivation and the socio-economic status of the family, all affected their academic performance (Bulut & Aslantepe, 2022).

It is important to note what might account for the disparities in National Achievement Test (NAT) attainment to improve the schools (Revilla & Estudillo, 2021). Taking the time to understand where these disparities come from and how to explain them equips leaders to allocate resources in ways that ensure equitable opportunities to success for every student. Policymakers can choose programs, resource allocation, and financial investments in schools based on data, not state test results. This skill provides the ability to recognize optimal practices and successful strategies that can be employed in diverse educational contexts, creating an atmosphere that allows all students to flourish.

Management practices, such as regulations, operational procedures, and organizational structure (Bilbao, 2019), affect how well students do in assessments. The areas to be included are its distribution of money, educator quality, curriculum, and testing. Submission of needs of schools, teaching skills, administration skills, and cooperation have to be carried out through an effective administration of the educational institutions. Better-performing schools, in turn, lead to higher learning outputs and increased test performance for students (Mburu et al., 2019). In contrast, they found that a poor-performing school had not done what it was supposed to teach, and as a result, students from these schools performed poorly on their tests.
Nevertheless, there are gaps within the present literature. Much research looks at single factors in isolation, not their combined effects. In addition, few detail-specific analyses and writings on junior high school learners have been conducted primarily in relation to the Philippine setting. Moreover, no systematic review has identified potential factors associated with influential factors and offered interventions based on the empirical findings.

This directly ties to SDG 4, Quality Education, which challenges everything related to fostering a quality and equitable education that will lead to lifelong learning opportunities for all types of access. This study aimed to identify these factors and markers of student success to understand disparities in NAT performance and identify barriers to ensuring all medically underserved Filipino communities receive quality education. The findings will be used to direct intervention programs uniquely designed to improve educational results and life changes in schools, particularly for disadvantaged/ marginalized students. Interventions to improve NAT performance will improve results in this national exam, achieving SDG 4 by ensuring all students receive quality education and guaranteeing them the knowledge and skills necessary for personal and professional development. This research will help provide information for educators, administrators, and policymakers that is crucial in making well-founded decisions, and contribute to raising the quality level of the educational system around the Philippines.

2.0 Methodology

2.1 Research Design

To attain the study's objectives, the researcher employed quantitative research under a descriptive-correlational research design to examine relationships between the Grade 10 students' NAT performance and other relevant factors such as socio-demographic factors, teaching effectiveness, and management practices. Understanding these relationships helps pinpoint which factors are most strongly associated with higher or lower NAT scores, guiding where interventions may be most effective.

2.2 Research Locale

The study encompassed the entire Schools Division of Isabela as a research locale. The Division is composed of 183 schools divided into six legislative districts. Twelve schools will be included in the study: three mega secondary schools, three large secondary schools, three medium secondary schools, and three small secondary schools.

2.3 Research Participants

The study's respondents are 377 Grade 10 Junior High School students within the Schools Division Office of Isabela who are enrolled in the SY 2023-2024. These respondents were identified through convenience sampling. They are utilized to generate information on the perceived factors affecting the performance of Junior High School learners in the National Achievement Test.

2.4 Research Instrument

The researcher used a combination of adopted and self-designed survey questionnaires to determine the management practices of school heads in the Division of Isabela. The first part of the questionnaire identifies the respondents' demographic profile. The second part is an adopted Evaluation Instrument for Teaching Effectiveness from Isabela State University. The third part is a self-developed 4-point Likert scale anchored on the Competency Framework for Southeast Asian School Heads (2014) by SEAMEO INNOTECH on measuring the management practices of the school heads. This instrument has five subscales informed by the domains in the said competency framework. The researcher will validate this part of the questionnaire with field experts and pilot-test it to ensure its reliability. To confirm the reliability of the items within each subscale, Cronbach's alpha will be used for reliability testing. A Cronbach's alpha value above 0.70 ($\alpha > .70$) will indicate that the instrument is reliable and suitable for use in the study. The researcher employed a documentary analysis to determine the NAT mean percentage score for each institution. The data was requested from the concerned department in the Schools Division Office.

2.5 Data Gathering Procedure

The data collection for this research model started with conceptualizing and finalizing the research proposal and instrument. In the beginning phase, the researcher designed the questionnaire to measure the management practices of the heads of schools as precisely as possible, according to the study's objectives. A panel of experts reviewed and validated the questionnaire, and appropriate revisions were made based on their inputs. After the revision, the researcher appealed to the Dean of the Graduate School to permit the study through a permit form. The researcher also secured written permission from the Schools Division Office and the heads of selected schools in Isabela.

After obtaining the required permissions, validated questionnaires were distributed to the selected school's student respondents. At the same time, the researcher requested the required documents to ascertain the National Achievement Test (NAT) mean percentage score per institution. The information needed was requested from the Schools Division Office. Once the data is collected, it is tallied, collated, and encoded into an Excel spreadsheet and sent to a statistician for appropriate statistical analysis. After receiving the analyzed data, the researcher interpreted and synthesized the results presented to the panel for review and validation. The researcher ensured that it followed all the ethical principles and standards to protect and respect the rights, dignity, and well-being of the respondent throughout the study.

2.6 Ethical Considerations

The researchers upheld strict ethical standards in the study to protect all participants. Participants were fully

informed about the purpose of the study, their voluntary involvement, and their right to withdraw at any time without consequence. Confidentiality and anonymity were maintained using coded data; no identifying information was disclosed in the results. The researchers took great care to avoid causing harm or discomfort, particularly when addressing sensitive socio-demographic information. The study was guided by respect, integrity, and academic honesty, ensuring that all data were collected and reported truthfully. Furthermore, findings from this research aim to benefit the educational community by providing a basis for meaningful intervention and policy development, thereby contributing to improved student outcomes and equitable education practices.

3.0 Results and Discussion

3.1 National Achievement Test Performance

Table 1 presents the National Achievement Test (NAT) performance of schools in Isabela across various subject areas, categorizing performance into problem-solving, information literacy, and critical thinking components. These three components represent essential cognitive skills necessary for academic success. Problem-solving refers to the ability to apply knowledge and strategies to find solutions. Information literacy pertains to the ability to locate, evaluate, and use information effectively, while critical thinking involves analyzing, interpreting, and making reasoned judgments. However, the way these skills manifest varies across subjects.

Table 1. *National Achievement Test of Grade 10 Students in Isabela in 2023*

Subject	Area	Mean	Proficiency Level
English	Problem Solving	54.77	Nearly Proficient
	Information Literacy	47.21	Low Proficient
	Critical Thinking	45.35	Low Proficient
	Sub mean	**49.11**	**Low Proficient**
Filipino	Problem Solving	52.13	Nearly Proficient
	Information Literacy	55.17	Nearly Proficient
	Critical Thinking	54.17	Nearly Proficient
	Sub mean	**53.82**	**Nearly Proficient**
Mathematics	Problem Solving	38.18	Low Proficient
	Information Literacy	37.18	Low Proficient
	Critical Thinking	37.86	Low Proficient
	Sub mean	**37.74**	**Low Proficient**
Araling Panlipunan	Problem Solving	54.74	Nearly Proficient
	Information Literacy	55.68	Nearly Proficient
	Critical Thinking	47.27	Low Proficient
	Sub mean	**52.56**	**Nearly Proficient**

Legend: 90 – 100 Highly Proficient, 75 - 89 Proficient, 50 - 74 Nearly Proficient, 25 - 49 Low Proficient, 0 - 24 Not Proficient.

In the English subject, the total mean scores across all schools indicate the highest performance in the Problem-solving component (M=54.77), but only at the "Nearly Proficient" level at best. The lowest is the Critical Thinking component (M=45.35), categorized at the "Low Proficient" level. This suggests that students, on average, demonstrated strong competencies in applying problem-solving strategies and lower critical thinking skills in the English subject. The students need improvement to be considered proficient. In Filipino subject, the total mean scores reveal the highest performance in Information Literacy (M=55.17) and the lowest in Filipino-Problem Solving (M=52.13). However, all three areas are categorized as "Nearly Proficient". Thus, the difference between the highest and lowest areas is negligible. The sub mean for Filipino is 53.82, indicating an overall "Nearly Proficient" rating. Nonetheless, it still shows that the schools are more literate in information literacy than problem solving when involving the Filipino subject. Unlike in English, problem-solving in Filipino pertains more to language-based reasoning, such as understanding nuances, cultural contexts, and idiomatic expressions. Information literacy focuses on reading comprehension in Filipino texts, while critical thinking emphasizes making logical interpretations based on historical and literary contexts.

Among all the content areas, the highest performance in Mathematics was observed in the Critical Thinking (M=37.86) area, while the lowest was in Information Literacy (M=37.18). This subject has more consistent results than the other subjects since the areas with the highest and lowest performance are more or less similar. However, this also means that all areas of mathematics were rated at "Low Proficient" levels. Problem-solving in Mathematics requires students to apply formulas and logical reasoning to quantitative problems. Information literacy pertains to interpreting numerical data, graphs, and mathematical texts, while critical thinking is

demonstrated through analyzing patterns, constructing proofs, and justifying solutions. Mathematics performance is notably low, and students need substantial improvement in understanding and applying mathematical concepts. The sub mean for Mathematics is 37.74, categorized as "Low Proficient."

In Araling Panlipunan, both Problem Solving (M=54.74) and Information Literacy (M=55.68) were classified as Nearly Proficient, while Critical Thinking (M=47.27) fell into the Low Proficient level. The students appear to have stronger competency in recalling and interpreting information rather than critical thinking, where results are more varied and concerning. Like Filipinos, Araling Panlipunan shows stronger problem-solving and information literacy outcomes. In Araling Panlipunan, problem-solving refers to applying historical and societal knowledge to real-world situations, such as decision-making in governance and economics. Information literacy involves evaluating sources, understanding historical narratives, and recognizing bias, while critical thinking requires students to assess events, form evidence-based arguments, and predict socio-political outcomes. The sub-mean for Araling Panlipunan is 52.56, also classified as "Nearly Proficient."

Across all subjects, the data revealed a concerning trend in critical thinking, where students consistently performed at lower proficiency levels. This suggests that while students can recall and apply learned knowledge in familiar contexts, they find it hard to analyze, evaluate, and synthesize information independently. Abysmal performance was seen in mathematics across all three domains, indicating an urgent need for pedagogical approaches that support problem solving and conceptual understanding. According to Shanta and Wells (2022), students' difficulties in critical thinking are often linked to traditional instructional approaches that prioritize memorization over active problem-solving. Additionally, the disparity between English and Filipino results may reflect differences in language proficiency and comprehension strategies, as Shadiev et al. (2022) noted, who emphasized that language familiarity significantly influences students' ability to process and analyze information in academic settings. These findings highlight the importance of integrating higher-order thinking skills across all learning areas and ensuring that instruction goes beyond rote memorization to promote deeper understanding and analytical reasoning.

3.2 Relationship between Sociodemographic Profile and NAT Performance

The succeeding tables present the correlation matrix between the National Achievement Test (NAT) performance across various subject areas and socio-demographic factors. Kendall's tau b was employed to determine the relationships between the NAT scores and socio-demographic profiles. This non-parametric test was used to assess the strength and direction of the association between the subject-specific scores and the demographic variables.

Table 2. *Correlation Matrix between Sociodemographic Profile and NAT Performance in English*

Socio-demographic Profile	Problem Solving	Information Literacy	Critical Thinking
	Coefficient (τb)	Coefficient (τb)	Coefficient (τb)
Sex	.01	.00	.01
Economic Status	-.06	-.04	-.02
Parental Education (Father)	.09*	.08*	.07
Parental Education (Mother)	.06	.03	.02
Cultural BG	.05	.04	.02
School Size	.07	-.00	-.03
No. of Siblings	.04	.05	.03

*Legend: * = significant*

In the English subject, as presented in Table 2, a significant positive relationship was observed between paternal education and English-Problem Solving (τb = 0.099, p = .015) and even English-Information Literacy (τb = 0.086, p = .034). Perhaps more literate fathers have a wider variety of reading resources, encourage a higher level of discourse in the home, and set higher academic goals for their children, leading to improved performance. On the other hand, it also may suggest that students whose fathers are less educated are disadvantaged when developing skills related to their evaluation of English, perhaps owing to a lack of access to literacy-rich environments. Meanwhile, no significant relationships were found for English-Critical Thinking and the profile variables.

Such a positive correlation between paternal education and English performance supports the findings of Kapengut and Noble (2020), which highlighted the role of parents' education in language-related competencies, especially regarding reading comprehension and analytical capabilities. On a broader level, as discussed by Davis-Kean et al. (2021), parental education typically results in more access to educational resources and a bigger focus

on language development at home, which might explain better performance in English problem-solving and information literacy tasks. Parents' education level is also known to significantly impact their students' language and critical thinking skills, particularly as Bañales et al. (2020) found that students with highly educated parents tend to grow up in homes rich with language exposure. The lack of a significant relationship between English and critical thinking could imply that instructional strategies and curriculum design have a greater impact on critical thinking skills in language than socio-demographic factors.

Table 3. *Correlation Matrix between Sociodemographic Profile and NAT Performance in Filipino*

Socio-demographic Profile	Problem Solving	Information Literacy	Critical Thinking
	Coefficient (τb)	Coefficient (τb)	Coefficient (τb)
Sex	.06	-.04	-.03
Economic Status	-.04	.06	.12*
Parental Education (Father)	.03	.07	.00*
Parental Education (Mother)	.01	.07	.04*
Cultural BG	-.00	-.01	-.12
School Size	-.11*	.00	-.16
No. of Siblings	-.02	.01	-.01

*Legend: * = significant*

In Filipino subject, significant positive correlations were found between Filipino-Critical Thinking with economic status (τb = 0.127, p = .001) and paternal education (τb = 0.007, p = .864) and maternal education (τb = 0.040, p = .328). This suggests that students from higher economic backgrounds tend to develop better critical thinking skills in Filipino, implying that these students have greater access to supplementary learning materials, enrichment programs, and language exposure at home. The study of Pishghadam et al. (2011) showed that the variables of primary interest, i.e., social capital, cultural capital, and parents' educational levels, have significant and important influences on achievement.

These findings also imply that educational disparities rooted in economic and educational backgrounds can perpetuate cycles of advantage and disadvantage. While some students from lower socio-economic backgrounds demonstrate resilience and achieve high levels of critical thinking, the overall trend underscores the need for policies and interventions that address inequities in access to quality education and parental support. This is consistent with other findings showing that children do better academically when their parents have higher levels of education. Liu et al. (2020) examined the relationships between five factors (i.e., parental education, parental involvement, school strategies, cultural background, and economic status) with students' academic achievement across seven subjects, including mathematics, languages, science, and social science. Likewise, Kwarteng et al. (2022) reported that children from parents with relatively high levels of education are more likely to develop critical thinking skills due to enriched home environments that encourage inquiry and discussion. These studies indicate that the parental educational background may come with a conducive atmosphere, enabling critical thinking development within students.

Furthermore, a significant negative relationship was also observed between school size and performance in Filipino-Problem Solving (τb = -0.111, p = .007). This potentially means that students from larger schools tend to have lower scores in this area. This result might be due to the greater student-to-teacher ratio in bigger schools. They may also face challenges that negatively impact students' problem-solving skills, such as less individualized attention, reduced teacher-student interaction, and possible difficulties in classroom management. As a result, it leads to less individualized instruction and limited teacher-student interaction. In the Philippines, large class sizes significantly negatively affect both teachers and students, impacting classroom management, academic performance, and teacher well-being. Smaller classes are more conducive to learning and can lead to higher student achievement, particularly for students from disadvantaged backgrounds. According to Maringe & Sing (2014, students in large classes do not have the same opportunities to interact with the teacher as students in small classes. To offer large classes without sacrificing the quality of education, educators must understand how and why class sizes influence student engagement behaviors and educational outcomes. However, it may also indicate that smaller schools provide more targeted learning experiences, where students receive better guidance in problem-solving tasks in Filipino. Meanwhile, no significant relationships were found for Filipino Information Literacy and the profile variables.

Table 4. *Correlation Matrix between Sociodemographic Profile and NAT Performance in Math*

Socio-demographic Profile	Problem Solving	Information Literacy	Critical Thinking
	Coefficient (τb)	Coefficient (τb)	Coefficient (τb)
Sex	.09*	.05	.00
Economic Status	-.02	.02	.05
Parental Education (Father)	-.02	-.00	.04
Parental Education (Mother)	-.11*	-.07	.00
Cultural BG	-.09*	-.06	.00
School Size	-.21*	-.19*	-.09*
No. of Siblings	.03	-.00	-.01

*Legend: * = significant*

In the Mathematics subject, significant positive correlations were found between sex and Mathematics-Problem Solving (τb = 0.099, p = .024). These results imply that male students might have a slight advantage in problem-solving tasks in Mathematics. The result was consistent with the result of the study of Meelissen and Luften (2008), stating that gender-related to mathematical learning outcomes, such as the results of research presented by that mathematical achievement, including mathematical problem-solving achievement of the male student was better than that of the female student. Based on these results, mathematics teachers must create a learning process that enables all students to practice improving their mathematical connection ability. Hence, they can succeed in solving mathematical problems.

Also, a significant negative correlation was found between Math-problem Solving and maternal education (τb =-.118), cultural background (τb = -.097), and school size (τb =-.214). The negative correlation to maternal education suggests that higher maternal education is associated with lower math problem-solving scores among students. This contradicts most current research, often revealing a positive or neutral link between children's math achievement and their mothers' education. It might indicate contextual elements that unintentionally impair or hinder student achievement, like disparities in parental participation, expectations, or possibly pressures related to higher maternal education. The negative correlation to cultural background suggests that students from these backgrounds may face barriers, such as language differences, educational values, or systemic biases, that impact their performance.
In contrast, the negative correlation to school size indicates that students in larger schools tend to perform worse in math problem-solving tasks. Students from larger schools and those whose mothers have lower educational attainment tend to struggle more. A potential explanation is that larger school environments are too crowded and provide fewer personalized learning opportunities in math, and maternal education influences how students develop numerical literacy at home. Burns P. M. conducted a study in 2020 that discussed the connections between children's math abilities and their educational ambitions, family environment, and maternal education. Numerous studies have found that more educated women tend to devote more time to pursuits that improve the literacy and numeracy of their children.

Mathematics-Information Literacy also showed a significant negative relationship with school size (τb = -0.197, p = .000), and Mathematics-Critical Thinking was also negatively correlated with school size (τb = -0.099, p = .017). These findings indicate that students in larger schools are less likely to perform well in both information literacy and critical thinking in math. This could mean that large class sizes limit the opportunity for in-depth discussions, hands-on activities, and personalized guidance in mathematical reasoning. On the other hand, smaller schools may provide a more structured learning environment that fosters analytical thinking and a deeper understanding of mathematical concepts.

The association between school size and poorer mathematics performance is consistent with the research by Guryan et al. (2023) on large educational settings, which tend to decrease individualized instruction and lead to lower student engagement and performance. Koussihouèdé (2020) also believed that larger schools dilute attention and worsen mathematics achievement. The suggested association between sex and mathematics performance may arise from gender differences in mathematics success (Fischer & Thierry, 2022), particularly the minor and stable differences in favor of boys on math performance in specific contexts. On the other hand, the negative association between paternal education and problem vocabulary performance is likely to be context-specific because previous studies (Kapengut & Noble, 2020; Bañales et al., 2020; Davis-Kean et al., 2021) have typically reported positive relationships between parental education and the child's academic achievement. These

results highlight the importance of context in interpreting the impact of some socio-demographic variables on mathematics performance. These findings emphasize the role of socio-demographic factors in shaping student performance across different subjects. Surprising findings include the relative impact of parental education, economic status, and the size of the school attended by the child, which always indicate that educational outcomes of children are at least as much a product of social and economic forces beyond the school as they are of the instruction received in the school. Recognizing these disparities is crucial in designing policies that ensure equitable access to quality education, particularly for students from disadvantaged backgrounds.

Table 5. *Correlation Matrix between Sociodemographic Profile and NAT Performance in Araling Panlipunan*

Socio-demographic Profile	Problem Solving	Information Literacy	Critical Thinking
	Coefficient (τb)	Coefficient (τb)	Coefficient (τb)
Sex	-.04	.01	-.05
Economic Status	.06	.01	.15*
Parental Education (Father)	.05	.03	.01
Parental Education (Mother)	.08*	.02	.05
Cultural BG	-.02	-.03	-.09*
School Size	-.10*	-.13*	-.12*
No. of Siblings	-.01	-.02	-.06

*Legend: * = significant*

For the Araling Panlipunan subject, a significant positive relationship was found between maternal education and performance in Araling Panlipunan-Problem Solving (τb = 0.081, p = .045). It means that students whose mothers have higher educational attainment tend to perform better in problem-solving tasks related to social studies. A possibility is that this is due to greater exposure to discussions on historical and civic issues at home, with engaging conversations with their mothers. This implies that mothers with higher education levels are more likely to provide an enriching home environment, offer academic support, and foster positive attitudes toward learning, which translates to better problem-solving skills and higher achievement in Araling Panlipunan. Educated mothers are also more involved in their children's schooling, participate in school activities, and set higher educational expectations, all of which contribute to improved student outcomes. According to Seden et al. (2020), mothers' education level has been linked to children's cognitive ability as early as three months old. Numerous studies have found that more educated women tend to devote more time to pursuits that improve the literacy and numeracy of their children. These findings demonstrate the value of empowering women via education since their involvement and expertise can improve their children's cognitive growth and academic achievement in important areas. Educational institutions and policymakers may consider initiatives encouraging parental involvement and education to improve students' performance in problem-solving and other academic domains.

A positive significant relationship was also found between economic status and Araling Panlipunan- Critical Thinking (τb = 0.150, p = .000). Students with more affluent economic backgrounds tend to excel in critical thinking due to better access to learning resources. This suggests that students from higher-income families would have easier access to materials that improve their critical thinking skills in history, economics, and governance, including books, educational aids, and technology. Furthermore, more financially stable families are more likely to offer enriched learning contexts, such as discussions about current affairs or involvement in extracurricular activities that foster critical thinking. The results also underscore systemic inequities, as students from lower socioeconomic backgrounds may lack similar opportunities, potentially widening achievement gaps in critical thinking skills. Schools might prioritize community partnerships that offer mentorship or resources to marginalized children, teacher training in varied instruction, and equitable access to high-quality instructional materials as ways to address the issue. To guarantee that all students in Araling Panlipunan acquire the critical thinking skills required for active citizenship and academic success, policymakers may want to integrate socioeconomic support programs with curriculum initiatives.

This finding is consistent with Idris et al.'s (2020) findings that children with more educated parents perform better academically. A meta-analysis conducted by Wilder (2023) showed that parental involvement positively affects students' academic achievement across subjects. The results also imply that both mothers' education and providing a supportive environment develop problem-solving and critical-thinking skills among students, highlighting the importance of family engagement and support in educational outcomes. Furthermore, the relationship between economic position and critical thinking is consistent with other studies demonstrating how socioeconomic factors affect educational attainment and cognitive development.

Additionally, school size showed a significant negative relationship with both Araling Panlipunan-Problem Solving (τb = -0.107, p = .009), Araling Panlipunan-Information Literacy (τb = -0.130, p = .002), and Critical Thinking (τb = -.126). From this, larger schools possibly offer less attention to instruction and fewer interactive discussions, which are known to hinder student performance in these areas. A study by Chen (2024) also found that larger class sizes can hinder customized instruction and decrease academic performance. Similarly, Hanushek (2020) noted that when class and school sizes become too large, a student's average attention drops, impairing individualized instruction, which can hurt academic performance. These studies have favored the smaller schools as a friendlier place to learn critical thinking skills.

Araling Panlipunan-Critical Thinking was also found to have a significant negative relationship to cultural background (τb = -0.098, p = .018). This could be due to cultural differences in learning styles, values, or perspectives that affect how students engage with the content, which heavily involves Philippine history, culture, and civic concepts. For example, some cultural contexts may emphasize rote memorization or respect for authority over questioning and analytical thinking, essential for Araling Panlipunan's critical thinking. Additionally, the curriculum's focus on national history and cultural identity might not fully resonate with or be accessible to students from diverse cultural backgrounds, limiting their ability to analyze and reflect on the material critically. A negative correlation with cultural background suggests that specific cultural influences may shape how students engage with analytical and evaluative tasks in social studies. This situation also highlights the need for culturally responsive teaching approaches that acknowledge and integrate students' cultural contexts to foster critical thinking skills better.

3.3 Relationship between NAT Performance, Teaching Effectiveness, and Management Practices

Table 6. *Correlation Analysis of NAT Performance and Teaching Effectiveness*

Domain	Mean	SD	Coefficient(τb)	p
Commitment	3.30	0.40	-.03*	.400
Preparation for Instruction	3.33	0.40	.03*	.440
Classroom Management and Teaching for Independent Learning	3.38	0.41	-.05*	.190
Knowledge of the Subject Matter	3.35	0.42	-.02	.670
Instructional Skills and Management of Learning	3.29	0.39	.03	.460

*Legend: *=significant*

Analysis reveals a significant positive relationship between preparation for instruction and the NAT performance (τb = 0.03, p = 0.44). Preparation for Instruction refers to the planning and organization of materials, activities, and strategies by educators to effectively engage students in learning. It includes setting goals, considering students' current academic levels, and creating a systematic plan to guide students towards those objectives through a cycle of planning, teaching, assessing, and adjusting instruction based on evaluation results. This preparation is essential for maximizing student engagement, optimizing learning outcomes, and ensuring effective classroom management. This implies that the more thoroughly teachers prepare for their lessons, the better their students tend to perform on standardized assessments. This underscores the critical role of teacher proficiency and instructional planning in fostering student achievement, such as showing enthusiasm in teaching the topic, preparing appropriate instructional materials, giving lesson guides/topics with a time frame and references, and the teacher should be well-groomed and well-poised. When a teacher shows genuine enthusiasm for the topic, it creates a positive and engaging learning environment that motivates students to participate actively and develop a deeper interest in the subject matter. Lessons are made clear, relevant, and accessible by creating appropriate instructional materials for the students' needs. This promotes improved comprehension and retention of concepts. In addition to keeping the teacher and students organized, a well-structured lesson plan or subjects with a defined time frame and references help maintain a fluid instructional flow and guarantee that learning objectives are fulfilled within the allocated time.

It follows that to improve teachers' content understanding and instructional practices and guarantee alignment with NAT standards, educational institutions should invest in specific training programs, continuous professional development, and support mechanisms. By doing this, schools can close performance gaps and improve overall academic results while acknowledging that other elements—like student involvement, instructional strategies, and institutional support—also play a role in success and should be considered in an all-encompassing approach to educational development. The result that preparation for instruction correlates positively with their

performance on the NAT complements the work of Abramczyk and Jurkowski (2022), who studied the relationship between the way lessons are planned and designed with their students' performance. On the other hand, the lack of significant results in subject matter knowledge and instructional skills points to the complex interrelationships affecting student performance, which other factors might influence in addition to teacher levels of competencies.

On the other hand, a significant negative relationship was found between teachers' "commitment" and the overall NAT performance (τb = -0.03, p = 0.40), and the same is true for "classroom management and teaching for independent learning" (τb = -0.05, p = 0.19). Commitment of teachers refers to the dedication, passion, and responsibility that educators demonstrate towards their profession and students. It encompasses the effort, time, and energy teachers invest in planning lessons, delivering instruction, assessing student progress, providing support, and fostering a positive learning environment. This commitment involves going above and beyond to ensure students' success, personal growth, and academic development. At the same time, Classroom Management refers to the strategies and techniques teachers employ to create a positive and productive learning environment within the classroom. It involves establishing routines, setting expectations, maintaining discipline, and fostering a safe and inclusive space for all students to engage in learning. Effective classroom management encompasses various aspects such as behavior management, student engagement, time management, and organization, all aimed at promoting a conducive atmosphere for teaching and learning.

This finding implies that higher levels of teacher commitment such as showing extra concern to students by referring their problems to the proper authorities if needed, attending class regularly, starts and dismisses class on time, accomplishes assigned tasks as scheduled, demonstrates sensitivity to student's learning ability, evaluating student performance objectively and records the same accurately and efforts to manage classrooms or foster independent learning such as paying attention to classroom atmosphere, involves students in the formulation of classroom policies in relation to the attainment of the course objectives, making students attentive, interests and responsive, adopts teaching strategies that encourage students to learn and apply concepts taught, allows students to think and make their own decisions independently, enhances student's self-concept/self-esteem through proper recognition of their attributes and differences of opinion during discussion, may not always translate into better student outcomes on standardized national assessments. Instead, it might suggest that some management or commitment styles might unintentionally emphasize teaching elements that are not in line with the knowledge or abilities assessed by the NAT, or it might even foster circumstances in which students are less prepared to meet the test's particular requirements. Qadach et al. (2020) also found similar results, noting that. In contrast, high commitment is critical; it does not automatically result in higher test performance levels unless well-delivered instruction has taken place.
No significant relationships were found between the domains of knowledge of the subject matter, instructional skills, and learning management. These results suggest that preparation for instruction positively affects student performance, but an overemphasis on commitment and classroom management most likely does not translate to higher academic performance.

Table 7. *Correlation Analysis of NAT Performance and Management Practices*

Domain	Mean	SD	Coefficient(τb)	p
Strategic Thinking and Management	3.72	0.42	-.04*	.390
Instructional leadership	3.71	0.42	-.03*	.430
Personal Excellence	3.73	0.42	-.01	.850
Stakeholder Engagement	3.79	0.48	-.02	.620
Managerial Leadership	3.76	0.39	-.01	.840

*Legend: *=significant*

Table 7 presents the correlation between overall NAT performance and various management practices. The analysis revealed a significant negative relationship between strategic thinking and management (τb = -0.04, p = 0.39), instructional leadership, and overall NAT performance (τb = -0.03, p = 0.43). Strategic Thinking and Management involves the ability to plan, envision, and execute long-term goals and initiatives to drive the overall success and development of the school. School leaders with strategic thinking skills can analyze data, identify strengths and weaknesses, anticipate challenges, and formulate effective strategies to enhance the school's performance, reputation, and educational outcomes. Furthermore, effective management by school heads involves overseeing daily operations, coordinating resources, fostering a positive school culture, and supporting

teachers and staff to create an environment conducive to teaching and learning whereas, Instructional Leadership entails guiding and supporting teachers in enhancing instructional practices, curriculum development, and student learning outcomes within the school. School leaders with strong instructional leadership skills work closely with educators to set academic goals, provide professional development opportunities, and implement effective teaching strategies. They play a crucial role in creating a culture of continuous improvement, fostering collaboration among teachers, and promoting excellence in teaching and learning.

This finding suggests that, in this context, increased emphasis on these leadership practices may not translate into higher student achievement on standardized assessments. The methods used to apply instructional leadership, strategic thinking, and innovation do not adequately match the current instructional needs or the knowledge and abilities evaluated by the NAT. It suggests that overemphasizing leadership projects or more general management techniques may take resources and attention away from focused exam preparation and in-class instruction, which are more strongly associated with better test results. Such results indicate that these managerial qualities, which include strategic thought and instructional leadership, are necessary to work with instruction but aren't the sole predictors of the overall outcomes from national assessments. This supports Bellibaş et al. (2021), who argued that schools' leadership strategies should be equally emphasized as direct support for the learners (such as instruction). This could mean leadership acts are more effective when supported by these hands-on instructional and teacher modeling strategies.

No significant relationships were found for the other domains of personal excellence, stakeholder engagement, and managerial leadership. Sure enough, the non-significant relationships with personal excellence, stakeholder engagement, and managerial leadership follow the results of Yu (2022), who explained that no management practice will lead to higher academic achievement if better quality curricula and greater student motivation do not accompany it. That might suggest that leadership balances instructional support and teacher mentoring more effectively. This result is a reminder that student performance will be limited at best without aligning leadership strategies with instructional priorities.

4.0 Conclusion

Based on the study's findings, the performance disparity among schools across all subjects highlights critical differences in student proficiency. Schools that scored above the mean, exceptionally high in English, Problem Solving, and Information Literacy, had much better pragmatic application and information handling skills. The reliably weak performing Critical Thinking scale points to a systemic challenge to increase higher-order cognitive skills, indicating the need for curriculum reviews and focused teaching strategies to address such gaps. The socio-demographic factors, especially parental educational attainment, financial background, and school magnitude, were important in NAT results for various subjects. However, the strength and nature of the relationship vary. The role of parents' educational attainment in fostering linguistic skills and access to learning resources is highlighted, confirming that parental attributes can provide an environment conducive to skill acquisition and application. On the other hand, the non-significant correlation with certain areas implies that ulterior variables associated with learners, such as the quality of instruction or unique pedagogical approaches, can potentially facilitate the acquisition of higher-order cognitive abilities at a much greater rate than socio-demographic influences alone.

In line with that, the negative relationship between school size and problem-solving is attributable to possible drawbacks of a high student-to-teacher ratio. Increased school size leads to reduced personalized instruction and limited interactive learning events. The consistent positive correlation between economic status and Critical Thinking reinforces the importance of socioeconomic capital, as it is likely better access to the benefits of learning aids, extracurricular activities, and enriched environments that promote mechanisms of good learning. The study's findings also point towards systemic issues of gender advantages, cultural expectations, variations in parenting roles, and priorities in Mathematics. A negative correlation matches gender differences in Problem-Solving performance with maternal education and cultural background. The repeated finding in various subjects correlating parents' educational and economic status with performance speaks to their fundamental role in academic achievement.

To address the variations in student performance linked to socio-demographic factors and parental education, teachers should adopt differentiated instructional strategies that accommodate diverse student needs. Teachers are also encouraged to employ culturally relevant pedagogy and provide equitable avenues for learning to

narrow gaps associated with economic and gender inequalities. Also, formative assessment should be regularly conducted to identify gaps and adequately address them through suitable interventions. The Project ASCEND (Achieving Success through Comprehensive Engagement and Data-driven Strategies) initiative can also be implemented to support students in critical thinking and problem-solving development. This seeks to complement NAT readiness by stimulating instructional preparedness, fortifying deficient learners through remedial classes, assimilation of critical thinking activities, and community mobilization. With a combination of peer tutoring, Saturday off-hours enhancement programs, PISA-like assessments, and teacher development workshops guided by evidence-based best practices, this program is designed to improve academic performance comprehensively.

School administrators should prioritize resource allocation to reduce the challenges associated with larger school sizes, such as student-to-teacher ratios. Consider investing more money in professional development, hiring more teachers, and providing more programs to students (especially for subjects like Mathematics, where students currently perform below the expected level). At the risk of reiterating policies that may already be in place, administrators must emphasize encouraging parents to engage in educational activities that benefit their children. Administrators must also emphasize parent engagement in educational activities. Additionally, addressing inequities in access to learning aids through programs supporting economically disadvantaged students, such as scholarship initiatives or resource provisioning, can go a long way in filling the gap of educational assistance received by students.

5.0 Contributions of Authors

AA – Conceived and designed the analysis, collected the data, performed the analysis, wrote the paper, encoded, edited, and conducted data analysis and methodology.
BA – Supervised, monitored, and checked the findings of this work.

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7.0 Conflict of Interests

All authors declare that they have no conflicts of interest.

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Lived Experiences of Physical Education Teachers Handling Students with Special Needs

Jesel Mae K. Montecino*, Carlou G. Bernaldez
Foundation University, Dumaguete City, Negros Oriental, Philippines

*Corresponding Author Email: jemmontecino@gmail.com

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Abstract. This study explored the lived experiences of Physical Education (PE) teachers handling students with Special Needs. It utilized Colaizzi's phenomenological approach and a purposive sampling technique in identifying the seven (7) PE teachers from public and private schools. It also used a face-to-face interview with the participants in their respective schools to collect data. The study revealed four emergent themes: confronting training shortages, transformative commitment to inclusive and equitable education, relational support, and disparity in access to diagnostic and medical services. Teachers often cited communication challenges with LSENs, lack of appropriate inclusive resources and facilities, and insufficient training and expertise. Despite these challenges, teachers' adaptability through implementing individualized strategies demonstrates their commitment to inclusive education. Furthermore, the study's findings highlighted the need for teacher training, resource allocation, and policy implementation to address inclusive education disparities.

Keywords: Inclusive education; Physical education teachers; Students with special needs.

1.0 Introduction

The role of physical education (PE) teachers is crucial in fostering the overall development of students, impacting their cognitive abilities, physical growth, and social skills through PE programs. Inclusive Physical Education and physical activity initiatives in schools are designed to provide equal opportunities for all students, including those with disabilities (McNamara & Pan, 2021; Pocock & Miyahara, 2017). Inclusive school environments cultivate attitudes, values, and skills necessary for diverse societal integration (Leijen et al., 2021). Teachers contribute to inclusive education by designing adaptive educational strategies, encouraging collaboration, and utilizing available resources (Triviño-Amigo et al., 2023). These collaborative efforts, such as the positive attitudes of PE teachers towards inclusion (Alhumaid et al., 2022) and the inclusive education program emphasizing the need for improved physical education facilities for all students (Nuñez, 2021; UNESCO, 2005), play a vital role in educational systems.

The adapted PE program in the Philippines has moderately met its objective, particularly in promoting teacher competencies and addressing various learning domains (Estrella, 2020). However, working with students who have disabilities has been reported to cause tension and anxiety in many PE teachers (Von Haaren-Mack et al., 2019). Teachers reportedly fear inadvertently causing harm to students during physical activities or of being unprepared to accommodate diverse students, which often leads to emotional distress (Catellani et al., 2018). While Filipino teachers encounter numerous challenges, many are adopting an

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inclusive curriculum, and teachers have broadened their understanding and enhanced their teaching abilities (Byrd & Alexander, 2020). Additionally, teachers use various methods to measure student progress in an inclusive setting. Adjusting teaching methods and materials enables students with disabilities to succeed and develop the physical strength, stamina, and skills needed to maintain lifelong activity (Estrella, 2020). These methods include regular assessments, observational techniques, and feedback from students and parents.

Nevertheless, despite the growing focus on inclusive education to enhance the development of students with special educational needs, there is still a significant lack of research, specifically in Physical Inclusive Education. Most existing studies have primarily focused on the preparatory stages of inclusive education (Jimenez, 2025; Triviño-Amigo et al., 2023; Zwane & Malale, 2018), while the practical challenges encountered by PE teachers during actual implementation have remained less explored. This oversight might directly affect the success of inclusive education implementation, particularly in Physical Education due to its emphasis on physical activities and social interaction.

The researcher of the current study has observed that LSENs are becoming more prevalent across both private and public schools in the Philippines. However, she has also noticed that only a few teachers truly understand the importance of accommodating these students in PE contexts. Given the societal responsibility to celebrate diversity, she perceives this situation as a critical concern. She also acknowledges that schools are key in delivering quality, inclusive education for all students, regardless of their unique learning needs and differences. Therefore, this study sought to fill the gap by examining teachers' lived experiences working with learners with special needs (LSENs) in Physical Inclusive Education. By capturing their firsthand insights, this study provided practical and context-specific recommendations to improve the integration of inclusive practices in physical education settings.

2.0 Methodology

2.1 Research Design

The phenomenological method used in this study was popularized by Edmund Husserl (1859–1938) (Creswell, 2007). Exploring and comprehending people's experiences in daily life are done through phenomenology. In this study, the researcher particularly utilized Colaizzi's approach to data interpretation. She examined a phenomenon from a pre-reflective perspective, regardless of whether it is real or imagined, objectively measurable or subjective. Therefore, to perform phenomenology, the researcher must have in-depth discussions with their subjects to enter their world and access their experiences. Investigating subjective phenomena is made possible by phenomenology, which is based on the idea that people's lived experiences serve as the foundation for essential reality truths. According to Praveena and Sasikumar (2021), phenomenology is a research method intended to explore people's experiences as they move through different phases of life. It is exploratory and descriptive, and the focus of analysis, as emphasized by Ravindran (2019), is to uncover the tacit meanings that people attach to their actions and responses related to the phenomenon.

2.2 Research Locale

The study participants were chosen purposively based on the inclusion criteria and the phenomenon being studied. Purposive or judgmental sampling is a type of non-probability sampling based on the belief that the researcher's knowledge about the population can hand-pick sample members (Polit & Beck, 2013). In the current study, the researcher selected the teachers she believes have substantial knowledge, experience, and expertise in inclusive education. Among the criteria used to choose the sample is the requirement that each participant has experienced the phenomenon and must be able to describe the experience in words. PE teachers who work with LSENs in various private and public schools in Dumaguete City are the participants of this investigation. All participants were interviewed until data saturation was attained.

2.3 Research Instrument

A semi-structured interview was utilized as the sole instrument for gathering data. Open-ended questions, worded in English, were used to elicit significant statements from the interviewees. These inquiries are intended to clarify the topic under investigation. The interviews were audio-recorded using a mobile phone. Additionally,

the researcher maintained a journal to record observations and comments during the process.

2.4 Data Gathering Procedure

The data was gathered between April and May 2023. Before the interview, a letter of request to conduct the study was sent to the Dean of the Graduate School of Foundation University. Afterward, the signed and approved request was submitted to the division superintendent of Dumaguete City. Once the superintendent approves, the request is presented to the principals of the schools where the selected PE teachers teach. In private schools, a letter to the administrators or the principal was sent before it was presented to the teachers. After securing the letters, the researcher did a mock interview and bracketing. Afterward, the researcher identified the teachers based on the inclusion criteria. The researcher then talked to the teacher personally and arranged an interview appointment with each participant based on the latter's preferred day and time so they could express themself without inhibitions. The participants were guaranteed complete secrecy and received a detailed explanation of the nature and goal of the study.

Each participant also signed the informed consent form. They also emphasized that the information exchange was captured on a cellphone recorder and that they could end the interview if they felt uncomfortable. The researcher's primary responsibility during the interview was to listen intently to everything the participant said and intervene only to clarify. In addition, the researcher guided the participants regarding specific themes that surfaced throughout the interview. The study's researcher also took notes or kept records of verbal and non-verbal cues shown by the participants during the interview. The notes, along with the participants' demographic information (i.e., age, sex), were kept in a journal. Usually, the duration of each interview depends on the participant's extent of engagement. In this study, the interviews lasted between a minimum of 20 minutes and a maximum of an hour. Lastly, the recorded and transcribed materials underwent validity checks to ensure the accuracy of the transcribed data.

2.5 Ethical Considerations

The researcher implemented all the necessary ethical considerations throughout the study. The researcher ensured that the participants' identities and the confidentiality of their statements were maintained. Above all, there was ample opportunity for the participants to share their stories without needless interruptions from the researcher. Scheef and Buyserie (2020) revealed in their study that participant identity remained unknown to the researchers as the stripping of personal information allowed for anonymity. For confidentiality and anonymity, a code was assigned to each participant. The hard copies of the data gathered from the participants were kept in locked file cabinets, while the soft copies were stored in password-protected computers.

3.0 Results and Discussion

After thoroughly analyzing the transcripts, the researcher extracted several emergent themes that encapsulated the participants' lived experiences.

3.1 Overcoming Educational Hurdles

The first theme captures the difficulties participants faced in teaching inclusive Physical Education. Some participants shared their struggles, patiently explaining concepts to LSENs and determining the most effective instructional approaches. After their in-depth interviews, the participants typically expressed similar opinions regarding their issues. Most of the participants admitted they lacked the necessary training. They also mentioned the difficulty of giving instructions because of the lack of preparation and references appropriate for LSENs.

Under this first emergent theme are four sub-themes, namely: a) Confronting Training Shortages; b) Approaches to Inclusivity; c) Surmounting Communication Obstacles; d) Pedagogical Pathways; and e) Access to Educational Resources.

Confronting Training Shortages

This theme illustrates the inadequate training of PE teachers. Lack of training leads to inconsistent implementation of inclusive practices. Most of the participants expressed their doubts about whether the LSENs understood the instructions given to them. They often feel less prepared to meet the needs of these students. Participants described the challenges they encountered.

"It is not easy for me because I do not have any background in teaching students with special needs, but I do not have a choice but to cater to them because they are included in my class, so it is a challenge." (P1)

"*Teaching students with special needs is very challenging, ma'am. It takes much patience, yes, because you need to make them involved or let them engage in your activities, and of course, they have special needs, so you must cater to them."* (P4).

The participants' responses underscore the importance of training and equipping teachers with the necessary skills to effectively handle and support students with special needs. This finding aligns with the study by Masongsong et al. (2023), which emphasizes that the successful implementation of inclusive education depends mainly on the preparedness of educators. For inclusion to be realized, teachers must be empowered change agents, equipped with the essential values, skills, and attitudes that enable every student to succeed (Baguisa & Ang-Manaig, 2021).

Approaches to Inclusivity

One of the significant challenges reported by the participants was the difficulty in implementing learning strategies that catered to the diverse needs of all students. Appropriate strategies should be considered in the context of inclusive education. However, the findings of this study revealed that participants possessed limited knowledge of inclusivity. Consequently, some teachers faced difficulties effectively delivering lessons to accommodate students with special educational needs.

"I am sorry, but another thing that I would do is let them open their notes, except for those without disabilities. Still, it is the same; even if they open their notes, they still have difficulty." (P1)

"*For example, some students have low comprehension. So, we should give them more time. Others also need to have instructional aids with larger letters for them to be able to read. They all have differences that must be catered to."* (P3)

To ensure the successful implementation of inclusive education, teachers must feel prepared to incorporate inclusive practices into their classroom teachings (Krischler et al., 2019). Consistent with (Sánchez et al., 2021), teachers in this study also identified physical barriers, curriculum limitations, and insufficient teacher training as key challenges hindering significant inclusive instruction, particularly in the context of Physical Education, where demands for physical activities and social interaction increase the complexity of inclusion.

Surmounting Communication Obstacles

The participants described their challenges in teaching LSENs due to lacking background or formal training in inclusive education. A recurring issue was the struggles in communicating directly with students with hearing impairments or other disabilities, as the teachers lack knowledge of sign language or other specialized communication methods. Participant 1 described her experience communicating with her student with hearing impairments in the interview.

"One of the basic challenges is that I cannot communicate with them directly because I do not know sign language, which could have been a great help." (P1)

"First of all, handling these kinds of students is very tasky and hard to deal with because they have different things that we need to cater to. Just for example, one of our students here is autistic, so we are having a hard time communicating and giving instructions about the things that we let him do." (P7)

Based on the participants' responses, it is evident that communication with students, particularly those with special education needs, poses a significant challenge in Physical Education contexts. These findings are supported by Goldfeld et al. (2021), who emphasized that intensive teacher training on communication strategies has repeatedly been shown to improve teachers' knowledge and overall instructional competence. Similarly, Wasik and Hindman (2020) and Egert et al. (2020) found that adequate training enhances the quality of teacher-child interactions and the ability to provide meaningful instructional support. In the Philippine context, Cubillo (2024) further highlighted that many educators lack training in effective communication strategies for students with disabilities, which often leads to misunderstandings and ineffective teaching

practices.

Pedagogical Pathways

The participants shared that their experiences concerning the curriculum implementation and classroom activities involved specific modifications to accommodate students with special educational needs. They reported adapting their teaching methods and strategies better to support the learning of students with diverse needs.

"For example, some students have low comprehension. So, we should give them more time. Others also need to have instructional aids with larger letters for them to be able to read. They all have differences that must be catered to." (P3)

"It is not easy because books are not even available to them. We keep practicing Inclusive Education, but books, materials, and tools for students are unavailable. We have trainings and seminars, although we learn from them, yet how about teaching physical education? How are we supposed to cater to them?" (P5)

The findings of this study emphasized the crucial role of accessible, flexible, and responsive educational resources for the effectiveness of inclusive practices, regardless of students' abilities or disabilities. The participants frequently cited the lack of appropriate and specialized learning materials as a significant barrier to inclusion, particularly in Physical Education. This observation supports Miller's (2020) assertion that Physical Education teachers' role within inclusive education is to create lessons for students with differing abilities and learning styles to ensure understanding and participation.

Access to Educational Resources

This theme discusses the lack of equipment and facilities to cater to students with special needs. The participants' statements implied that the availability of various equipment and adaptable facilities is crucial for creating an inclusive learning environment in physical education. They argued that the lack of appropriate equipment and facilities can present a significant challenge to the effective implementation of inclusive physical education.

"The challenge is that we lack experience and facilities.It would be better if there were facilities available for these particular students so that they can receive proper care and training." (P2)

"This is what it is now, from what I have seen here, the ramp. Maybe next year, an elevator will be specifically for students with special needs. That would benefit them, especially those in wheelchairs, so they will not struggle anymore, especially when going to the field." (P5)

The study revealed that most schools do not have adapted equipment necessary to support LSENs in Physical Education. Participants asserted the importance of safety among students with a disability or those with visual impairments while using this adapted equipment. They believed that the lack of adapted equipment has led to the exclusion of LSENs from practical PE lessons and other sporting activities, primarily due to safety concerns and the risk of injury. Parallel to these findings, Akinyi et al. (2015) also found that the lack of teaching and learning materials such as textbooks, talking calculators, braille machines, large prints, compact discs, and other sports equipment undermines the success of inclusive education. This study affirmed that the absence of appropriate resources prevents schools from offering equitable learning opportunities for LSENs, particularly in Physical Education.

3.2 Transformative Commitment to Inclusive and Equitable Education

In this theme, teachers aim to cultivate inclusive mindsets and practices to meet the unique needs of students with disabilities. This ensures that all students, regardless of their physical or intellectual abilities, have access to physical education that develops their physical, mental, and social well-being. Three themes encompass this emergent theme. These are: a) Unwavering Dedication to Inclusive Practices; b) Vital Importance of Ensuring Education for All; c) Approaching Challenges as Opportunities for Growth; and d) Inspiration for Professional Advancement.

Unwavering Dedication to Inclusive Practices

Participants in this theme stressed the significance of inclusive education, emphasizing that one size does

not fit all and that each student requires tailored support. Inclusive education ensures that all students, including those with disabilities and special needs, have equal access to physical education.
"There is only one curriculum; no curriculum fits them perfectly, so we must modify it for our students with special needs as teachers because one size does not fit all. You must tailor it to suit each child." (P3)

The participant's statement could be linked with Kushartanti's (2018) findings that inclusive physical education and various modifications in the learning process must be conducted to achieve the established goals. The adaptive physical education learning model is preferably arranged to adjust to students' disabilities. Access to physical education, physical activity, or sports programs is essential for students with special needs to grow and develop, especially in developing all their potential to be ready to have an independent life.

Vital Importance of Ensuring Education for All
The participants showed commitment to inclusive education and ensured the successful implementation of inclusive practices. They expressed their approach to addressing the needs of every student and emphasized the importance of equal opportunity for all.

"Yes, I make sure that there is no special treatment. They are treated equally, and they feel that they are the same as the other students." (P1)

"I have experienced special education, at least, and I am constantly challenged to be more prepared than usual because I have these students who need it. My teaching is more challenging than the other classes, so I must be more prepared." (P3)

The participants in this expressed their clear intention to treat LSENs equitably, regardless of their background, ensuring they all feel included in the classroom. One participant further reflected on the additional effort required to meet the needs of LSENs. These findings align with Fernandez et al. (2021), who emphasized that teachers are responsible for achieving inclusive education, as they must organize the educational response, design and develop personalized educational practices, motivate students, work collaboratively, and use different resources and technologies. Similarly, Pocock and Miyahara (2017) asserted that no matter a student's background, ability, or identity, teachers play a crucial part in embracing and instructing them.

Approaching Challenges as Opportunities for Growth
Despite the challenges faced by the PE teachers, they continue to support and accommodate the needs of every student. Participants devoted their efforts to their strategies to deliver lessons effectively. Most of them applied techniques that they think suit the students' capacities. These strategies or techniques stem from their observation of the students' behavior. Participant 3 added:

"Handling Special Education is wonderful. It is challenging and inspiring. You can make a difference if you have an open heart and an open mind. You must embrace it." (P3)

"Ahhh, my experience here is very challenging at first since I am just a regular teacher teaching regular students. I am not really into teaching students with special needs, but once you get to know them, you will love them." (P4)

The participants' narratives revealed that while most teachers began with limited exposure to inclusive education, this does not deter them from striving to fulfill their role. These findings are supported by Azubuike et al. (2023); educators need to know how to adapt physical education to meet the specific needs of individuals with disabilities. This service involves modifying physical education to ensure safety and address the unique developmental needs of each child with impairments.

Inspiration for Professional Growth
This theme emphasizes the significant factor of having trained teachers in Inclusive Education. PE teachers' lack of training in inclusive education highlights this as a substantial barrier to implementing inclusive practices in PE classes. The participants revealed that training solves their challenges while handling diverse students, including those with disabilities, in a mainstream classroom. They believed teachers must be equipped with skills and teaching strategies appropriate for these learners.

"It would be much better if incoming teachers, particularly MAPEH teachers, are trained by the institution, especially public schools under DepEd, so that whenever there are students with special needs, they know how to cater to them and treat them differently as much as possible." (P2)

"It would be better if all teachers were trained. Ideally, all teachers should be trained, regardless of the subject." (P2)

The responses from the participants suggested the urgent need for action to address the lack of training among physical education teachers. Similarly, Azubuike et al. (2023) revealed that PE teachers possess limited knowledge and are inadequately prepared to teach students with disabilities. As a result, some teachers felt that they were not professionally prepared to deal with LSENs, demotivating them to modify lessons and activities to meet the needs of students with disabilities. This implied that the absence of specialized training for teachers, particularly in Physical Education, affected teachers' confidence and limited teaching inclusivity.

3.3 Relational Support

The third theme discusses how the participants recognized the need to collaborate with parents and specialists to support special needs students better. The participants consulted the parents' practices at home, which could also be applied in school. Under this, two themes emerged: a) Unified Efforts of Teachers and Parents; and b) Peer Support.

Unified Efforts of Teachers and Parents

The participants emphasized that collaboration between parents and schools is essential for creating an inclusive environment that supports the diverse needs of all students. They also highlighted the importance of parental involvement in the success of Inclusive Education.

"Involved in a gym activity with his parents' permission." Involve them in the activities with his and his parents' permission." (P2)

"They are aware of their child's condition, so during that time, the mother told me, "Ma'am, I need to, I need your help. If possible, Ma'am, we need you to extend your patience with my child because I know, Ma'am, that she is a slow learner. When you give her instructions, she still gets confused and will ask, 'What was that, Ma'am? How do I do that, Ma'am?" (P5)

Participants recognized the importance of collaboration between parents and teachers as a fundamental principle to implement inclusive education. Parents and teachers are the primary stakeholders with whom children with learning difficulties interact daily (Grace & Carlo, 2023). On the other hand, Zezulková and Janků (2020) maintained that collaboration between schools and parents is a significant predictor of the successful inclusion of pupils in mainstream primary education. In this context, it is necessary to adjust communication with pupils' parents.

Peer Support

The involvement of classmates in assisting students with disabilities fosters a sense of belonging and enhances participation and engagement during activities.

"They are just given an assistant, and I also guide them through peer support to help and watch them because I cannot always be there to supervise." (P7)

"If there are performance tasks, since all of them are expected to perform in Physical Education classes, I always assign one student with an impairment to a particular group. I make sure that their classmates encourage them to participate. So even if they have difficulty with the task, it becomes easier because most of their group mates ensure that they also take part." (P1)

The findings of this study align with the existing studies emphasizing that students without disabilities provide academic and social support to peers with severe disabilities through peer support arrangements (Brock & Huber, 2017). Furthermore, the teachers' use of adapted tasks and patience reflects their growing awareness of

inclusivity. These practices resonate with the findings of Lindsey and McGuire (2021), who stressed the importance of adapting tasks and providing extended time to accommodate diverse learners. Additionally, the socialization and educational progress of students with special needs are positively influenced by their peers (Syla, 2023), a study that shows inclusive peer dynamics contribute to the overall outcomes for all learners.

3.4 Disparity in Access to Diagnostic and Medical Services

This theme highlights that students with special needs have different educational experiences in public and private schools due to differences in medical and diagnostic services. Many LSENs in public schools do not have official diagnoses, making it difficult for teachers to provide individualized educational help. This contrasts sharply with private institutions, where pupils usually have access to professional support and medical diagnoses, enabling more individualized and successful solutions. Under this, two themes emerged: a) Diagnostic Availability; and b) Socio-Economic factors.

Diagnosis Availability

Based on the participants' responses, it can be inferred that most public-school students with special needs have no doctor's diagnosis, making it challenging for teachers to craft an intervention. Although teachers know something is wrong with the students, they do not have the proper diagnosis.

"I have one student, I think he has ADHD, but I do not have any problem handling him. His voice gets suddenly loud sometimes, but I do not mind. I wonder what his impairment is because he looks normal." (P1)

"Because he suddenly raises his voice, he dislikes being disturbed. He mumbles to himself in his place but does not bother anyone and is not very disturbing. He has different needs. So, when I asked the adviser, that was the explanation." (P1)

These statements from the participants emphasized that most public-school students with special needs often lack formal diagnoses from medical professionals. This absence of medical diagnoses complicates teachers' ability to craft effective interventions. Existing studies, such as McLaughlin and Nolet (2020) and Hepburn (2019), noted that the lack of diagnosis creates significant barriers to accessing necessary support services, leading to inequities between public and private schools. Teachers frequently feel unprepared to handle students with unidentified needs, resulting in a reliance on generic strategies rather than targeted interventions (Avramidis & Norwich, 2019).

Socio-Economic Factors

Families earning more are more likely to afford private schooling and related medical treatments; hence, socioeconomic variables are essential. Although private school teachers gain from extra support and organized plans based on medical advice, public school teachers could find it challenging to meet the varied needs of pupils who are not yet diagnosed due to a lack of resources and training.

"We usually recommend to this student and parents that they should go to a special education school, like West City Central School, rather than here. However, some come here because of poverty, financial reasons, and the distance from home. That is why they do not go." (P2)

"One of the parents here, a parent of our learner, provided us with a specialist from Manila. Then we just had an online seminar where we were given different scenarios related to this disability." (P5)

The participants' accounts highlighted the disparity in the accessibility of educational and medical resources between public and private schools, primarily influenced by socioeconomic factors. Families with greater financial means are more likely to afford necessary medical evaluations and support, enabling teachers with structured and formal guidance. In contrast, public school teachers often struggle to meet the diverse needs of students who remain undiagnosed due to limited resources and inadequate training. For instance, Brew et al. (2021) found that other factors influencing students' academic performance include income, educational backgrounds, access to libraries and textbooks, availability of meals, and the quality of teachers, all of which significantly impact their academic outcomes. Similarly, Dangol and Lamichhane, B. (2024), reported that parents with children attending private schools perceived the quality of education more positively than parents of children in public schools. This situation underscores the urgent need for systemic changes to ensure that all

students, regardless of financial status, have equal access to essential medical and diagnostic resources that promote their learning and development.

4.0 Conclusion

Considering the findings of this inquiry, the researcher concludes that Physical Education teachers in private and public schools face significant challenges in accommodating students' diverse needs. These teachers emphasize the importance of using visual aids and modifying their activities and assessments to cater to their learners' needs. They also recognize the value of maintaining flexibility, adaptability, and a patient, empathetic approach to teaching. Additionally, the crucial support of parents, peers, adequate finances, and professional interventionists has been instrumental in helping every student with special needs succeed in their personal interests and academic endeavors. Thus, it is recommended that schools provide specialized resources, targeted teacher training, and family involvement coupled with community support to effectively create a responsive, inclusive educational environment where every learner can thrive.

5.0 Contributions of Authors

The authors attest to their equal involvement in all aspects of this research. All authors reviewed and approved the final version of this paper.

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7.0 Conflict of Interests

This study has no conflict of interest of any sort.

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Exploring Behavior-Oriented Decision Optimization among Logistics Service Supply Chain Managers in China: A Phenomenological Inquiry

Liu Chunbin, Gynnyn G. Gumban*
Central Philippine University, Iloilo City, Philippines

*Corresponding Author Email: ggumban@cpu.edu.ph

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Abstract. This study addresses the limited understanding of behavior-oriented decision optimization (BODO) among logistics service supply chain managers in China, despite its critical role in navigating the complexities of modern logistics. The research aimed to explore managers' lived experiences and decision-making behaviors employing BODO strategies. Using a Husserlian descriptive phenomenological design, the study was conducted from June 2024 to January 2025 with seven purposively selected logistics managers from Jiangxi Province, China. Data were gathered through semi-structured interviews and analyzed using Colaizzi's method to extract significant statements and thematic clusters. Findings revealed seven key themes: (1) Navigating the dynamic logistics environment, emphasizing technology, collaboration, and sustainability; (2) The role of behavioral traits, such as visionary leadership and team synergy, in decision-making; (3) Behavioral excellence enhancing operational, organizational, and interpersonal dynamics; (4) Strengthening decision-making capacity through behavioral optimization; (5) Challenges in implementing BODO, including cultural and resource constraints; (6) Self-awareness as a foundational trait in refining decisions and communication; and (7) Strategic dynamics involving the integration of behavioral insights at multiple organizational levels. The results underscore that BODO is a multifaceted process shaped by personal, organizational, and contextual factors. Managers who effectively apply behavioral insights enhance decision quality, foster collaboration, improve customer experiences, and contribute to organizational adaptability and innovation. The study contributes to the literature by highlighting behavior as a critical dimension of decision optimization, offering practical insights for leadership development and strategic operations in logistics.

Keywords: Behavior-oriented decision optimization; Logistics service; Strategic leadership; Decision-making behavior; China.

1.0 Introduction

China's logistics service supply chain (LSSC) sector has undergone substantial transformation over the past decade, primarily fueled by the country's rapid economic expansion, accelerated urbanization, and escalating demand for high-performance logistics solutions (Li et al., 2023). As global integration and digital technologies continue to reshape the competitive terrain, logistics managers must make high-stakes decisions that simultaneously address cost efficiency, service quality, and sustainability imperatives (Havale et al., 2024). These decisions, often undertaken under conditions of uncertainty and complexity, necessitate a dual emphasis on technical proficiency and behavioral competence. In this context, Monjur and Akon (2023) assert that the strategic

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success of supply chain operations is contingent upon the ability to make informed and adaptive decisions that facilitate the seamless flow of goods, services, and information.

Extant literature in the field of supply chain management has predominantly focused on digitalization, structural optimization, and operational efficiency (Fu et al., 2022; Stroumpoulis & Kopanaki, 2022; Jaboob et al., 2024; Yang et al., 2021). Although these studies provide foundational insights into performance enhancement, they often overlook the behavioral underpinnings of managerial decision-making. A growing body of research now emphasizes the critical influence of human factors, including leadership behavior, emotional intelligence, communication styles, and team dynamics, on organizational outcomes (Holloway, 2024; Fantozzi et al., 2024; Toufighi et al., 2024). Farinha et al. (2024) further argue that effective logistics management is fundamentally embedded in social and cultural contexts, highlighting the necessity for behavior-oriented approaches. This study centers on behavior-oriented decision-making (BODM), which is conceptualized as integrating behavioral attributes such as self-awareness, empathy, collaboration, emotional regulation, and resilience into the managerial decision-making process. Contrary to traditional rationalist paradigms that emphasize logic and efficiency, BODM recognizes the inherently human, emotionally responsive, and socially embedded nature of decision-making in logistics environments. It reflects a shift from purely mechanistic frameworks to those that incorporate psychological and interpersonal dimensions.

The study's theoretical foundation is anchored in Behavioral Decision Theory (Simon, 1955; Kahneman & Tversky, 1979), which posits that decision-makers operate within the bounds of cognitive and emotional limitations. Complementing this are Emotional Intelligence Theory (Cherniss, 2000), Social Cognitive Theory (Bandura, 1986), and Transformational Leadership Theory, all of which collectively assert that behavioral competencies significantly shape managerial efficacy. These perspectives suggest that decision optimization is a multifaceted process encompassing analytical, emotional, and relational domains.

This study adopts a qualitative phenomenological methodology to explore the nuances of behavior-oriented decision-making, specifically following the Husserlian descriptive tradition. This approach is appropriate for uncovering the lived experiences of logistics service supply chain managers, providing rich, context-sensitive insights into their behavioral and strategic decision practices. While quantitative studies dominate current discourse, they often fail to account for the subjective, experiential, and interpersonal realities that inform decision-making in high-pressure environments. This methodological gap underscores the relevance of qualitative inquiry to surface tacit knowledge, behavioral patterns, and emotional insights that are otherwise obscured in positivist models.

The research was conducted in Jiangxi Province, China, a region characterized by rapid industrial development and a growing demand for advanced logistics services. By examining how logistics managers in this context employ behavior-oriented decision strategies, the study seeks to illuminate the intersection between individual behavior and organizational outcomes. The findings contribute to a more holistic framework for understanding logistics leadership and provide actionable insights for enhancing agility, innovation, and human-centered decision-making within complex supply chain ecosystems.

2.0 Methodology

2.1 Research Design

This study employed a Husserlian descriptive phenomenological design to investigate the lived experiences of logistics service supply chain managers in applying behavior-oriented decision optimization (BODO). Rooted in the philosophical tradition of Edmund Husserl, this approach emphasizes *epoché* or bracketing, which involves the intentional suspension of the researcher's presuppositions to apprehend the phenomenon as experienced by the participants themselves. Phenomenology was selected for its capacity to elicit in-depth, first-person accounts and uncover the underlying structures of experience, particularly suited for examining managerial decision-making's affective, cognitive, and behavioral dimensions.

2.2 Research Locale

The study was conducted in Jiangxi Province, China, an emerging industrial and logistics hub characterized by expanding infrastructure and increasing participation in domestic and international trade networks. This locale provided a relevant and dynamic context in which managers confront decision-making challenges in real-time,

under conditions shaped by rapid technological adoption and shifting market demands.

2.3 Research Participants

A total of seven (7) logistics service supply chain managers were purposively selected based on the following inclusion criteria: (1) current managerial role in logistics or supply chain operations; (2) minimum of five years of relevant professional experience; (3) age of 30 years or older; (4) direct involvement in strategic and operational decision-making; and (5) willingness to participate in a one-on-one, in-depth interview. These criteria ensured experiential adequacy and relevance to the study objectives. The sample size reflects qualitative methodological standards emphasizing data richness over statistical generalizability. Guest et al. (2020) suggest that thematic saturation in phenomenological studies is typically reached within six to twelve interviews. In the present study, data saturation was attained by the sixth participant, as no new categories or themes emerged thereafter, affirming the sufficiency of the sample (Braun & Clarke, 2021).

2.4 Research Instrument

In alignment with phenomenological methodology, the primary research instrument was the researcher. A semi-structured interview guide, informed by literature and expert validation, was utilized to probe participants' behavioral tendencies, decision-making strategies, and leadership experiences related to BODO. The guide incorporated open-ended questions to facilitate narrative elaboration and was piloted to ensure clarity. Interviews were conducted in Mandarin, audio-recorded with consent, transcribed verbatim, and subsequently translated into English. Field notes and reflective memos were maintained to document contextual nuances and enhance interpretative depth.

2.5 Data Gathering Procedure

Data were collected between June 2024 and January 2025 through scheduled interviews, arranged via formal invitations and professional referrals. Interviews were conducted in private office settings or through secure digital platforms (e.g., Tencent Meeting, Zoom), depending on participant availability. Each session lasted approximately 45 to 60 minutes. The interviews followed a semi-structured format with flexibility for probing emergent issues. Data collection continued until data saturation was achieved, confirmed through the recurrence of patterns and the absence of novel insights in successive interviews.

2.6 Data Analysis

Thematic analysis was followed (Morrow et al., 2015) utilizing Colaizzi's seven-step method, ensuring systematic and rigorous interpretation of qualitative data. The steps involved: (1) thorough reading of all transcripts for comprehensive understanding; (2) extraction of significant statements; (3) formulation of meanings from these statements; (4) clustering of meanings into thematic units; (5) development of an exhaustive description of the phenomenon; (6) identification of the fundamental structure of the experience; and (7) Validation of findings through member checking with participants. Several validation strategies were employed to ensure analytical credibility and methodological integrity. Data sources, including interview transcripts, field notes, and memos, were triangulated to corroborate interpretations. Member checking was conducted to confirm the authenticity and resonance of findings with participants' intended meanings. An audit trail was maintained to ensure transparency of analytic decisions, and reflexivity was practiced managing researcher bias throughout the analysis. These strategies collectively supported the trustworthiness criteria of credibility, transferability, dependability, and confirmability (Carcary, 2020).

2.7 Ethical Considerations

Ethical clearance was granted by the Research Ethics Review Board (RERB) of Central Philippine University (Protocol No. CPU-RERB-2024-063). Participants received comprehensive information regarding the study's aims, procedures, and ethical safeguards. Written informed consent was obtained before participation. Confidentiality was maintained through pseudonyms, and all data were stored in encrypted digital formats accessible only to the research team. The study adhered strictly to the ethical principles outlined in the Declaration of Helsinki and the institutional research ethics guidelines.

3.0 Results and Discussion

This section presents the essential experiences of logistics service supply chain managers in Jiangxi Province, China, regarding behavior-oriented decision optimization (BODO). Through Colaizzi's method, five overarching

themes emerged, capturing decision-making's behavioral, operational, emotional, and organizational dimensions. The findings not only reflect Jiangxi's unique industrial dynamics but also offer broader insights into the evolving nature of managerial leadership and decision behavior in Asia's logistics sector.

3.1 Navigating Behavioral and Operational Challenges

Logistics managers consistently identified behavioral resistance, technological disruptions, and emotional inertia as key barriers to optimized decision-making. While advanced digital tools such as ERP and CRM systems were available, human-centered challenges such as resistance to change and fear of failure frequently undermined their effective implementation.

As Manager 2 stated, *"We had the system, but our people were not ready for the change. They doubted it until they saw results."* These challenges echo Liu and Wang (2021), who emphasized the importance of psychological safety and emotional readiness in adopting innovative practices. These findings underscore a critical tension between technological advancement and human adaptability in the context of China's accelerated digitalization agenda. Similar behavioral barriers are observable in other rapidly industrializing Asian nations, where workforce modernization is outpacing leadership development and organizational culture reform (Zhou et al., 2023). Therefore, addressing emotional friction, communication gaps, and cognitive biases is essential to achieving truly optimized logistics systems across Asia.

3.2 Behavior-Oriented Decision Processes in Practice

Behavior-oriented decision-making was reflected in practices emphasizing empathetic leadership, real-time behavioral insights, and collaborative adjustments. Rather than purely quantitative metrics, managers described how subtle human cues, such as staff morale, client behavior, and team dynamics, often informed decisions.

A vivid example came from Manager 3, who traced the issue to customer behavior patterns upon detecting a spike in weekend delivery complaints and adjusted staffing accordingly. This reduced complaints by 40%, underscoring how behavioral attentiveness leads to practical operational gains. These examples highlight how BODO supports the growing need for human-centered logistics management in China and Asia, where urbanization, consumer expectations, and e-commerce proliferation demand greater responsiveness. In Southeast Asia, similar strategies are being adopted to localize services in culturally diverse and behaviorally nuanced markets (Sanmee, 2024). As such, China's advancements in behavior-based logistics could serve as a model for neighboring economies aiming to blend technology with human-centric innovation.

3.3 Leadership Traits and Self-Awareness as Behavioral Catalysts

Emotional intelligence, empathy, and self-awareness were identified as foundational leadership traits enabling behavior-oriented decision optimization. Leaders who actively practiced reflection, transparency, and emotional regulation were perceived as more credible, trustworthy, and effective.

Manager 5 implemented a *"fail-forward"* initiative to normalize experimentation and mitigate fear of failure, while Manager 7 stated, "The more self-aware I became, the more my team trusted my decisions." These behaviors align with Goleman's emotional intelligence framework and are further supported by Zhang et al. (2021), who stress that behavioral maturity enhances leadership legitimacy. In China, where traditional hierarchical management styles often dominate, these findings signal a paradigm shift toward relational leadership, a model increasingly relevant across Asia's logistics sector, particularly in cross-cultural teams and fast-paced decision environments (Mehra, 2025). This shift can be instrumental in bridging generational gaps in leadership and empowering mid-level managers across the Asian region to lead adaptively.

3.4 Organizational Dynamics and Empowerment through BODO

Integrating behavior-oriented strategies fosters participatory decision-making, flattens hierarchies, and creates emotionally intelligent workplace cultures. Managers reported that BODO facilitated more transparent communication, stronger interpersonal bonds, and deeper employee engagement.

Manager 4's facilitation of a joint workshop to resolve interdepartmental conflict demonstrated how behavioral awareness, rather than procedural enforcement, led to long-term solutions. As Manager 2 noted, *"It is not just about making better decisions, it is about making people feel part of the process."* These findings support Pougajendy et al. (2024), who emphasize that inclusive, behavior-focused cultures drive innovation and resilience. In the broader

Asian context, where collectivist values often shape workplace norms, behavior-oriented leadership aligns well with cultural expectations around harmony, group cohesion, and mutual respect (Hofstede Insights, 2022). This suggests that BODO is viable in China and scalable across Asian economies where people-centered decision-making is culturally resonant.

3.5 The Holistic Value of Behavior-Oriented Decision Optimization

The final theme underscores BODO as an integrative framework that links behavioral insight with strategic foresight. Managers described BODO as a mindset that balances data with empathy, driving performance metrics, emotional investment, and organizational resilience.

Manager 6 observed, "*Behavioral optimization is not just smart, it is human. It respects people while improving outcomes.*" This holistic perspective aligns with Marta (2021) and Li et al. (2021), who argue that strategic planning must incorporate psychological and social dimensions to remain effective in complex systems.

This study explored the lived experiences of logistics service supply chain (LSSC) managers in Jiangxi Province, China, concerning behavior-oriented decision optimization (BODO). The findings advance a multidimensional understanding of how behavioral, emotional, and cognitive traits influence managerial decision-making under operational pressure. Crucially, the study provides empirical evidence that human-centered approaches in decision-making are not merely complementary to digital strategies but are foundational to sustainable logistics performance in the Chinese and broader Asian context.

The consistent identification of behavioral barriers such as resistance to change and fear of failure reinforces earlier assertions by Liu and Wang (2021) that psychological readiness is critical to the adoption of technological solutions in logistics. However, while previous studies have primarily emphasized structural enablers, this research highlights the pivotal role of emotional intelligence and behavioral leadership in bridging the readiness gap. These findings add nuance to Zhou and Zhou (2023), who documented the challenges of workforce transformation amid China's digital push, by demonstrating that emotional agility and interpersonal trust can catalyze technological adoption in second-tier cities like Jiangxi.

In contrast to the prevailing rationalist paradigm in logistics literature, which privileges metrics and systems optimization (e.g., Yang et al., 2021), this study reveals that real-time behavioral insights, such as recognizing shifts in employee morale or customer sentiment, enable more responsive and tailored decision-making. This supports the work of Fontoura and Coelho (2022), who argue for integrating behavioral inputs into operational models. Moreover, the empirical accounts in this study demonstrate that leaders who embed behavioral feedback into routine practices, such as dynamic staffing or conflict resolution, achieve measurable outcomes, including reduced customer complaints and improved team cohesion.

Identifying self-awareness and emotional regulation as key leadership traits aligns with Goleman's emotional intelligence framework. It corroborates findings by Alqarni et al. (2022), who emphasized that behaviorally mature leaders are likelier to foster innovation and engagement. Notably, this study advances the discussion by contextualizing such traits within China's traditionally hierarchical management culture. While Pye (2024) highlighted the challenges of leadership transformation in East Asian firms, this research illustrates a subtle but significant shift toward relational leadership in logistics, driven not by external mandates but by the intrinsic value placed on trust, empathy, and collaboration in high-stakes decision-making.

Furthermore, the study's emphasis on participatory decision-making and behavioral empowerment supports the theoretical assertions of Yousaf et al. (2024). It provides empirical backing to the view that emotionally intelligent cultures are more resilient and innovation-oriented. In the Asian context, where collectivism and interdependence are deeply embedded in workplace norms (Insights, 2022), behavior-oriented leadership is viable and culturally congruent. This finding challenges the assumption that Western-derived behavioral models require significant adaptation in Asian settings. Instead, this study suggests that BODO is intrinsically aligned with Asian managerial values, particularly in economies undergoing socio-technical transitions such as Vietnam, Indonesia, and the Philippines. The notion of BODO as a holistic framework integrating empathy, strategy, and data resonates with recent calls by Marta (2021) and Li et al. (2021) for decision models that go beyond linear optimization. While Zhang et al. (2021) stress the importance of predictive analytics, this study contends that human insight must complement such tools to be truly effective. This is relevant in Asia, where logistics networks increasingly rely on

hybrid decision environments blending algorithmic intelligence with human judgment. The implication is that leadership development in this sector should prioritize technical proficiency and psychological competencies.

Nonetheless, some limitations must be acknowledged. The study was conducted in a single province and reflects the experiences of a small, purposively selected sample. While data saturation was achieved, the cultural, organizational, or technological contexts in other regions of China or other Asian economies may yield different patterns. Additionally, while participant narratives provided rich detail, the subjective nature of phenomenological inquiry limits generalizability. Further research employing mixed-method approaches or larger comparative case studies could validate and expand on these findings. Theoretically, this study contributes to behavioral operations management by providing grounded insights into how emotional intelligence, leadership behavior, and cultural norms coalesce in shaping managerial decision quality. It also invites interdisciplinary dialogue with psychology and organizational behavior, particularly in developing leadership training programs that embed behavioral diagnostics into logistics strategy.

Integrating behavioral data with digital decision support systems presents a promising avenue for future research. Investigating how behavioral cues, such as emotional tone in communication or patterns of interaction, can be embedded into predictive tools may lead to more adaptive and responsive logistics platforms. Longitudinal studies could also examine how emotional intelligence evolves with managerial tenure or in response to organizational interventions. Finally, cross-cultural studies may reveal the extent to which BODO is universally applicable or shaped by national culture, thus informing the development of globally relevant yet locally grounded decision-making frameworks in logistics management. This study positions behavior-oriented decision optimization not as an ancillary leadership skill but as a core strategic competence for managing complexity, ambiguity, and transformation in the logistics service supply chain sector, particularly in China and Asia's dynamic and culturally rich contexts.

4.0 Conclusion

This phenomenological inquiry examined the lived experiences of logistics service supply chain (LSSC) managers to elucidate the complex dynamics underlying behavior-oriented decision optimization. The emergent themes and subthemes reveal the multidimensional interplay between operational efficiency, emotional intelligence, and strategic alignment in logistics decision-making. Notable contributions of the study include the identification of behavioral self-awareness, feedback-driven adaptation, and the ability to balance organizational agility with operational consistency as core enablers of effective decision outcomes. The findings affirm that behavioral excellence is not ancillary but integral to sustaining competitive performance. Managers who demonstrate empathy, foster collaborative cultures, and implement structured feedback mechanisms are better positioned to lead adaptive, resilient, and innovation-driven teams. Furthermore, emotional agility and self-reflective capacity equip decision-makers to manage uncertainty, build stakeholder alignment, and sustain engagement across complex logistics ecosystems.

The study also highlights several impediments to behavior-oriented decision optimization, including organizational inertia, communication deficiencies, and interpretive bias in data utilization. Addressing these barriers necessitates both strategic foresight and human-centric leadership practices. Cultivating a learning-oriented culture characterized by psychological safety, continuous feedback, and shared accountability is thus imperative for enhancing organizational adaptability and long-term success. This research extends the discourse in behavioral operations management by providing an empirically grounded, experience-based perspective on decision-making within the LSSC context. The theoretical and practical implications offer actionable insights for managers aiming to embed behavioral competencies into performance optimization, innovation strategies, and workforce engagement.

Future research may investigate integrating behavioral data with digital decision support systems to develop predictive frameworks that enhance real-time decision accuracy. Longitudinal studies could further examine the evolving influence of emotional intelligence within increasingly automated and data-intensive supply chains. Additionally, cross-cultural extensions of this research may uncover regional variations in behavioral decision-making, thereby informing the development of more inclusive, context-sensitive models for global logistics management.

5.0 Contributions of Authors

Liu Chun Bin– editing, writing, analysis, and coding. Gynnyn G. Gumban- Advising, Supervising, Final Editing.

6.0 Funding

No funding is received from this research.

7.0 Conflict of Interests

The authors declare no conflict of interest.

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School Culture, Quality of Work Life, and Interpersonal Support: A Structural Equation Model on Organizational Citizenship Behavior of Secondary School Teachers in Region XII

Rhumer S. Lañojan[1]*, Rinante L. Genuba[2]
[1,2]University of Mindanao, Davao City, Philippines
[1]Mindanao State University - General Santos, Philippines

*Corresponding Author Email: r.lanojan.487129@umindanao.edu.ph

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Abstract. This study examined the best-fit model of organizational citizenship behavior (OCB) among teachers, focusing on how school culture, quality of work life, and interpersonal support influence it. Using a non-experimental quantitative design, the researchers gathered data from 400 secondary school teachers in Region XII, Philippines, through stratified random sampling. Standardized questionnaires measured OCB and the three influencing factors. Data were analyzed using descriptive statistics, correlation, multiple linear regression, and structural equation modeling (SEM). Results showed that teachers had a very high level of OCB, while school culture, quality of work life, and interpersonal support were rated high. Strong positive relationships were found between each of the three factors and OCB. Among them, the quality of work life and interpersonal support significantly and positively predicted teachers' OCB. The final model (Model 3) was identified as the best-fit model based on SEM criteria, confirming that these two factors are key influences on OCB. The study suggests that improving work-life quality and fostering supportive school relationships can enhance positive teacher behaviors beyond formal roles.

Keywords: Educational management; Interpersonal support; Organizational citizenship behavior; Quality of work life; School culture; Structural equation model; Philippines.

1.0 Introduction

Teachers play an essential role in shaping students' futures, but their influence goes beyond simply teaching lessons. Many educators show extra effort through Organizational Citizenship Behavior (OCB), which includes helping colleagues, attending school events, and supporting students outside class time (Cropanzano & Byrne, 2020). These behaviors are not part of formal job duties but are essential in creating a favorable school climate and improving student outcomes. However, even the most dedicated teachers face challenges that limit their ability to go the extra mile. Problems like heavy workloads, large class sizes, limited teaching materials, and a lack of support from school leaders contribute to stress and burnout (Manlongat et al., 2021). When teachers feel overwhelmed and unappreciated, they may stop doing extra tasks that help the school. Other problems, such as poor school culture, low salaries, and limited chances for professional growth, also reduce teachers' motivation to engage in OCB (Liu et al., 2020; Nyangarika, 2020; Teacher Task Force, 2021; Blad, 2024; Braid, 2024).

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Research shows that OCB has many educational benefits. Teachers who engage in OCB not only help students perform better but also experience less stress and greater job satisfaction (Liu, Wang, & Li, 2020; Hanus & Hokanson, 2022). A positive school environment encourages OCB and reduces problems like absenteeism and teacher turnover (De Geus et al., 2020). Factors such as job satisfaction, organizational justice, and support systems are linked to higher levels of OCB. However, not all these relationships are fully understood in the context of schools. Moreover, the impact of these factors on teachers' OCB has produced mixed findings. Some studies suggest that such unfavorable working conditions demotivate teachers and reduce their likelihood to engage in extra-role behaviors. For instance, teachers in schools with toxic cultures and limited support systems often report low morale and diminished OCB (Somech & Ron, 2007). Similarly, inadequate compensation has been linked to reduced job satisfaction, negatively affecting teachers' willingness to go beyond formal job duties (Nguni, Sleegers, & Denessen, 2006). In contrast, other studies argue that intrinsic motivation and professional commitment can sustain or enhance OCB despite external limitations. For example, Bogler and Somech (2004) found that teachers with high professional identity and internal motivation still demonstrated strong OCB even in low pay and restricted growth opportunities. This suggests that individual values and sense of vocation can buffer the adverse effects of poor institutional support. These inconsistencies in the findings further highlight the need for this study.

Most previous studies on OCB come from fields like business and psychology, and fewer focus on the education sector, especially in secondary schools (Gnanarajan et al., 2020). Studies that do explore OCB in education often focus on only one or two influencing factors without looking at how these elements interact in real school settings (Taseer et al., 2020; Tagliabue et al., 2020; Hanson, 2022). Understanding teacher OCB is also important for achieving Sustainable Development Goal 4 (SDG 4), which promotes quality and inclusive education. Teachers who go beyond their roles help create supportive and inspiring environments that improve student learning (UNESCO, 2024). This study aims to fill these gaps by examining how school culture, quality of work life, and interpersonal support affect OCB among secondary school teachers. By taking a holistic approach, this research seeks to better understand how these factors influence teacher behavior. The results will help schools create conditions where teachers feel valued, supported, and motivated to do more than their jobs require—ultimately improving student learning and school success.

2.0 Methodology

2.1 Research Design

This study utilized a quantitative, non-experimental research method with a descriptive-correlational design. The descriptive component was used to present the levels of school culture, quality of work life, interpersonal support, and organizational citizenship behavior (OCB) among junior high school teachers. The correlational aspect explored the relationships among these variables. This design was appropriate for the study as it allowed the researcher to examine associations between multiple variables without manipulating any conditions. Furthermore, path analysis and Structural Equation Modeling (SEM) provided a deeper understanding of the influence of the exogenous variables—school culture, quality of work life, and interpersonal support—on the endogenous variable, organizational citizenship behavior.

2.2 Research Participants

The study focused on 12,326 junior high school teachers from eight congressional districts in Region XII, Mindanao, Philippines, during the school year 2023–2024. Using Slovin's Formula with a 5% margin of error, a sample size of 400 teachers was selected through a stratified random sampling technique. This approach ensured proportional representation across the region's eight school divisions: Kidapawan City (18), General Santos City (54), Koronadal City (18), Tacurong City (8), Cotabato Province (113), South Cotabato (69), Sultan Kudarat (56), and Sarangani Province (64). Stratified sampling allowed the researcher to ensure that each division was fairly represented in the study. Only junior high school teachers teaching in the same school for at least five years were included, as they were more likely to have stable work experiences that reflect consistent organizational behaviors. Teachers with less than five years of tenure were excluded not only to avoid data influenced by the early stages of workplace adjustment but also to ensure that respondents had sufficient time to fully integrate and adapt into the school culture, nurture a stable professional and interpersonal relationship among colleagues, and exhibit consistent organizational behaviors. This criterion aimed to provide a more accurate and mature understanding of OCB within a well-established school context."

2.3 Research Instruments

The primary data collection tool was a structured questionnaire with four significant sections measuring a specific

variable. The first section measured school culture using the instrument adapted from Wagner (2006), with indicators including professional collaboration, affiliative collegiality, and self-determination/efficacy. Items including: in our school, teachers and staff discuss instructional strategies and curriculum issues, and a true "sense" of community is reflected, are some of the observed constructs to measure the level of school culture among teachers. The second part, adopted from Swamy et al. (2015), assessed the quality of work life using nine indicators: work environment, organizational culture and climate, relationships and cooperation, training and development, compensation and rewards, facilities, job satisfaction and security, autonomy, and adequacy of resources. Items including: in our school, the work environment is good and highly motivating, and I feel I am given adequate and fair compensation for my work, are some of the observed constructs to measure the quality of work life among teachers. The third part, adapted from Cohen and Hoberman (1983), evaluated interpersonal support, including tangible, belonging, self-esteem, and appraisal support. Items including: several people I trust to help solve my problems, and someone who takes pride in my accomplishments, are some of the observed constructs to measure the level of interpersonal support among teachers. The final section, adopted from Rubiato (2022), measured organizational citizenship behavior with five indicators: altruism, conscientiousness, sportsmanship, courtesy, and civic virtue. Items including: I voluntarily help other teachers with work-related problems, and I accept criticism objectively, whether from my subordinates, peers, or superiors, are some of the observed constructs to measure the level of OCB among teachers.

The instrument used a five-point Likert scale (1=Strongly Disagree to Agree 5=Strongly) to assess the frequency or agreement with each construct with the following interpretations: 4.20–5.00 (very high), 3.40–4.19 (high), 2.60–3.39 (moderate), 1.80–2.59 (low), and 1.00–1.79 (very low). The questionnaire underwent expert validation by six professionals, who gave it an average rating of 4.62, indicating strong content validity. The reliability of each section was confirmed through a pilot test using Cronbach's alpha, yielding the following results: school culture ($\alpha = 0.94$), quality of work life ($\alpha = 0.96$), interpersonal support ($\alpha = 0.97$), and OCB ($\alpha = 0.95$). These values indicated excellent internal consistency.

2.4 Data Gathering Procedure

The researcher first secured approval from the University of Mindanao Ethics Review Center (UMERC), protocol number UMERC-2022-038. A pilot test was conducted to ensure the validity and reliability of the instrument. Upon receiving the necessary certifications, a permission letter signed by the research adviser and university dean was submitted to the Department of Education (DepEd) Regional Director of Region XII. Once approved, the researcher visited each of the eight DepEd Division Offices to seek formal approval from the division superintendents. After receiving all necessary endorsements, the researcher visited selected schools and distributed the survey questionnaires to the teacher-respondents. The researcher was available during distribution and collection for teachers who required assistance or clarification. All raw data were collected, organized into spreadsheets, and submitted to a statistics expert for analysis.

2.5 Data Analysis

The data analysis involved both descriptive and inferential statistics. Descriptive statistics assessed school culture levels, work-life quality, interpersonal support, and OCB, including frequency, mean, and standard deviation. Pearson's Product-Moment Correlation was applied to identify the strength and direction of relationships among the variables. Multiple regression and factor analysis were used to determine which exogenous variables had the most significant impact on OCB. Structural Equation Modeling (SEM) was then used to test the hypothesized model and identify the best-fit model. Specific SEM fit indices were followed to assess how well the proposed model represents the observed data. These included Chi-square, p-value, CMIN/df, Normative Fit Index (NFI), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and P-close. Standard benchmarks (e.g., CFI, GFI, and TLI > 0.95; RMSEA < 0.05). Combining these indices provides a more comprehensive and reliable evaluation of model fitness.

2.6 Ethical Considerations

This study strictly followed ethical research standards. Participants were informed of the study's purpose, benefits, and possible risks before they agreed to participate. Written informed consent was obtained from all participants. Confidentiality and anonymity were ensured throughout the study, and participation was voluntary, with respondents allowed to withdraw at any time without consequences. The researcher took careful measures to avoid ethical issues such as plagiarism, falsification, fabrication, or misconduct. Data were stored in a password-protected device, accessible only to the researcher, and all files will be deleted one year after the completion of the

study to protect participants' privacy. Additionally, findings from the research will be shared with participants as part of ethical transparency and appreciation for their participation.

3.0 Results and Discussion

3.1 School Culture, Quality of Work Life, and Interpersonal Support of Secondary School Teachers

Presented in Table 1 is the level of school culture of secondary school teachers in terms of professional collaboration, affiliative collegiality, and self-determination/efficacy. An overall mean of 4.09 and an SD of 0.60 were obtained, which is described as high. This means that the level of school culture is often manifested. Analyzing the result in the computation of all indicators of school culture, professional collaboration has the highest mean of 4.18 and SD of 0.64, which is described as high. In contrast, affiliative collegiality has the lowest mean of 4.02 with a standard deviation of 0.69, which is described as high.

Table 1. *Level of School Culture in Secondary Schools*

Indicators	SD	Mean	Descriptive Level
Professional Collaboration	0.64	4.18	High
Self-determination/Efficacy	0.67	4.07	High
Affiliative Collegiality	0.69	4.02	High
Overall	**0.60**	**4.09**	**High**

The high descriptive levels on every indicator of school culture of secondary school teachers are due to the very high rating on teachers and staff discussing instructional strategies and curriculum issues, the high rating on teachers and staff telling stories of celebrations that support the school's values, and personnel seek alternatives to problems/issues rather than repeating what has been done. The results imply a positive and collaborative environment for secondary teachers within the school, where they are engaged in meaningful conversations that lead to improving teaching practices and student outcomes. Moreover, the results suggest a culture of innovation and continuous improvement, which can enhance overall school effectiveness and adaptability.

This result is aligned with the findings of De Guzman (2024), who explored the preferred school culture of secondary school teachers and found that teachers highly preferred a hierarchical school culture, suggesting a desire for clear roles, expectations, and decision-making processes. Such a positive culture, characterized by strong leadership, collaborative teamwork, open communication, and a shared vision, can foster a work environment that empowers teachers and enhances student learning. Additionally, this result is consistent with the findings of Ismail et al. (2022), who investigated the impact of school culture on school effectiveness in government schools and revealed that schools with a positive school culture display higher school effectiveness compared to schools with less positive school culture. Similarly, the study of Kamaroellah and Mubarak (2019) and Bhatt (2023) supported the result, which found that a strong and positive school culture enhances teachers' job performance, professional commitment, and well-being. When educators feel valued, supported, and empowered, they are more motivated and engaged, leading to improved teaching practices and better student outcomes.

Disclosed in Table 2 is the level of quality of work life of secondary school teachers in terms of work environment, organization culture and climate, relation and cooperation, training and development, compensation and rewards, facilities, job satisfaction and security, autonomy of work, and adequacy of resources. The obtained overall mean of 4.06 signifies a high level. This indicates that the quality of

Table 2. *Level of Quality of Work Life in Secondary Schools*

Indicators	SD	Mean	Descriptive Level
Job Satisfaction and Security	0.65	4.20	Very High
Relation and Cooperation	0.69	4.14	High
Autonomy of Work	0.66	4.11	High
Organization Culture and Climate	0.68	4.10	High
Training and Development	0.77	4.10	High
Adequacy of Resources	0.76	4.01	High
Compensation and Rewards	0.74	4.00	High
Facilities	0.74	3.97	High
Work Environment	0.73	3.94	High
Overall	**0.62**	**4.06**	**High**

Secondary school teachers' work lives are often manifested. A per-indicator analysis found that job satisfaction and security indicators have the highest mean of 4.20, which is described as very high, with a standard deviation

of 0.65. In contrast, the indicator work environment has the lowest mean of 3.94, which is described as high, with a standard deviation of 0.73.

The high level of implementation of the indicators in quality of work life manifested among secondary school teachers in terms of work environment, organization culture and climate, relation and cooperation, training and development, compensation and development, facilities, job satisfaction and security, autonomy of work, and adequacy of resources imply that the school institutions established their quality of work life. The high result is due to the high ratings of the respondents on the working conditions are good; I am proud to be working for it, I get good support from my subordinates, and training programs help teachers achieve the required skills for performing the job effectively, I feel I am given adequate and fair compensation for the work I do, safety measures adopted are reasonable, I feel pretty secure about my job, my job allows me to be as productive as I can be, my job lets me use my skills and abilities, and communication and information flow between the departments is satisfactory. Due to these, secondary teachers experience a significant change in their well-being; the school enhances its outcomes, giving good vibes along the teaching-learning process and ultimately supporting the retention of teachers and even a leap in innovation.

The high level of quality of work life of secondary school teachers is aligned with the findings of Malimban et al. (2023), who reported a high level of QWL of teachers, particularly in terms of job happiness and working conditions, emphasizing that positive perceptions of QWL can contribute to increased job satisfaction and overall teacher well-being. Similarly, it aligned with the findings of Balunganon (2024), which revealed a high level of quality of work life of teachers that is frequently evident across various dimensions, including working conditions, social integration, growth opportunities, recreational spaces, compensation, and job security, underscoring the importance of these factors in shaping the quality of work life for teachers.

Displayed in Table 3 is the level of interpersonal support of secondary school teachers in terms of tangible support, belonging support, self-esteem support, and appraisal support. The level of interpersonal support of secondary school teachers attained an overall mean of 3.94, which is described as high. This means that the level of interpersonal support of secondary school teachers is often manifested. All indicators of interpersonal support recorded high mean scores. Based on the indicator analysis, belonging support has the highest mean of 4.08, which is described as high, with a standard deviation of 0.66. Meanwhile, the indicator of self-esteem support has the lowest mean score of 3.60, which is interpreted as high and has a standard deviation of 0.71.

Table 3. *Level of Interpersonal Support in Secondary Schools*

Indicators	SD	Mean	Descriptive Level
Appraisal Support	0.69	4.17	High
Belonging Support	0.66	4.08	High
Tangible Support	0.70	3.90	High
Self-esteem Support	0.71	3.60	High
Overall	**0.58**	**3.94**	**High**

The high interpersonal support among secondary school teachers regarding tangible, belonging, self-esteem, and appraisal support shows that they receive significant interpersonal support from their peers and superiors in Region XII. The high results are attributed to the high ratings of the respondents on there is at least one person I know whose advice I trust; if I were sick and needed someone (friend, family member, or acquaintance) to take me to the doctor, I would have no trouble finding someone, I have an easy time keeping pace with my friends, and there are several different people I enjoy spending time with. This suggests that teachers have a strong sense of social support and connection within their social networks and the presence of reliable relationships that can provide guidance and reassurance. Moreover, this also reflects a robust support system, contributing to emotional well-being and resilience and fulfilling social life, which can enhance overall happiness and reduce feelings of isolation.

The high-level interpersonal support of secondary school teachers is parallel to the findings of Riggio and Richard (2019), which emphasized that strong interpersonal support from colleagues, administrators, and families positively impacts teacher well-being and job satisfaction. This support can mitigate stress, burnout, and turnover intentions. Also, it is aligned with the findings of Gregory and Chapman (2019), which underscored that a positive school culture characterized by strong relationships among staff members can significantly impact teacher well-being and job satisfaction. Supportive school leaders and collaborative cultures can enhance interpersonal support. Additionally, the result is also consonant with the findings of Skaalvik and Skaalvik (2019), which accentuated that supportive

relationships with colleagues can enhance teachers' emotional well-being, fundamentally influencing their teaching effectiveness.

As seen in Table 4, the level of organizational citizenship behavior among secondary school teachers is presented in terms of altruism, conscientiousness, sportsmanship, courtesy, and civic virtue. It obtained an overall mean of 4.29, indicating that teachers' organizational citizenship behavior always manifests an overall standard deviation of 0.51. The indicator with the highest mean is courtesy at 4.46, which is described as very high with a standard deviation of 0.53. On the other hand, altruism obtained the lowest mean at 4.12, which is described as high, with a standard deviation of 0.66.

Table 4. *Level of Organizational Citizenship Behavior in Secondary Schools*

Indicators	SD	Mean	Descriptive Level
Courtesy	0.53	4.46	Very High
Conscientiousness	0.56	4.36	Very High
Civic Virtue	0.54	4.31	Very High
Sportsmanship	0.59	4.21	Very High
Altruism	0.66	4.12	High
Overall	**0.51**	**4.29**	**Very High**

The very high descriptive levels on the indicators of organizational citizenship behavior of secondary school teachers are due to the very high rating on I voluntarily help other teachers with work-related problems; I display maturity and enthusiasm in aiming for higher organizational goals, I deal positively with the situation that does not go as planned, I demonstrate professional image: being polite and trustworthy, and I observe proper decorum in relating with superiors and peers. The results suggest a strong culture of collaboration and professionalism within the school environment and reflect a supportive atmosphere that fosters teamwork and enhances overall school functionality. Moreover, this indicates a commitment to continuous improvement and resilience and reinforces a respectful and conducive working environment, which can contribute to higher job satisfaction and improved student outcomes.

This result is consistent with Al-Ahmadi and Mahran's (2021) and Somech and Bogler's (2023) findings, which revealed that teachers demonstrated a high level of OCB, including extra effort, innovation, and student support. However, this result is contradicted by Gnanarajan et al.'s study, which revealed a decline in the teachers' propensity to perform OCB on students, school, and their colleagues. Factors such as work-family conflict, perceived organizational support, teacher values, teachers' self-efficacy, student behavior patterns, and pupil control ideologies significantly contribute to these low levels of teachers' OCB. These factors can erode teachers' motivation and capacity to engage in discretionary behaviors. The contrasting results highlight the complexity of OCB as a construct influenced not only by school culture but also by individual perceptions and external pressures. It also highlights the need for a nuanced approach in interpreting OCB, recognizing that favorable outcomes in some settings may not be easily replicated in others due to differing internal and external stressors.

3.2 Relationship Between School Culture and Organizational Citizenship Behaviors

Table 5 shows the results of the significant relationship between school culture and organizational citizenship behaviors of secondary school teachers. As displayed in the hypothesis, the relationship was tested at the 0.05 significance level. The total r value of 0.590 with a p-value less than 0.05 indicates a strong positive and significant relationship between school culture and organizational citizenship behaviors of secondary school teachers. The positive correlation coefficient r signifies a direct relationship between the two variables; that is, as the school culture improves, there is a corresponding increase in the organizational citizenship behavior among teachers.

Furthermore, the results reveal that all indices of school culture have a significant relationship with organizational citizenship behaviors, as all p-values are less than 0.05. This finding leads to the rejection of the study's first null hypothesis, positing that there is no significant relationship between school culture and the organizational citizenship behaviors of secondary school teachers. This suggests that improving the teacher's school culture regarding professional collaboration, affiliative collegiality, and self-determination/efficacy can enhance their organizational citizenship behavior. This is aligned with the study of Choong and Ng (2024), who found that trust and professional collaboration among colleagues promote shared responsibilities and teamwork, encouraging teachers to contribute beyond their formal roles and enhancing their overall commitment to organizational goals. When teachers collaborate effectively, share expertise, and support one another, they are more likely to exhibit

OCB, such as helping colleagues, volunteering for extra duties, and mentoring new teachers. This relationship is further strengthened by collective efficacy, underscoring the importance of a supportive and trusting school culture.

Table 5. *Relationship between Sub-Variables under School Culture and Organizational Citizenship Behaviors*

School Culture	Organizational Citizenship Behaviors					
	Altruism	**Conscientiousness**	**Sportsmanship**	**Courtesy**	**Civic Virtue**	**Overall**
Professional Collaboration	.419**	.475**	.476**	.455**	.459**	.518**
	.000	.000	.000	.000	.000	.000
Affiliative Collegiality	.457**	.449**	.457**	.452**	.430**	.511**
	.000	.000	.000	.000	.000	.000
Self-determination or Efficacy	.459**	.518**	.540**	.505**	.482**	.568**
	.000	.000	.000	.000	.000	.000
Overall	**.494****	**.532****	**.543****	**.521****	**.506****	**.590****
	.000	**.000**	**.000**	**.000**	**.000**	**.000**

Similarly, this is parallel to the study of Alias et al. (2023), which pointed out that affiliative collegiality, which emphasizes strong interpersonal relationships and mutual support among colleagues, strengthens trust and encourages behaviors such as helping peers and participating in extracurricular activities that benefit the school community. Moreover, this is consistent with the findings of Guhao and Sioting (2023), which accentuated that self-determination and efficacy empower teachers by enhancing their confidence and motivation, which are critical for driving proactive and constructive behaviors that align with organizational goals. When teachers feel empowered to make decisions and take initiative, they are more likely to engage in OCB, as they perceive their work as meaningful and impactful. Furthermore, the result is consonant with the study of Praharti et al. (2023), which revealed that school culture has a positive and significant effect on the teacher's Organizational Citizenship Behavior (OCB). This suggests that school culture enhances teachers' Organizational Citizenship Behavior (OCB).

These findings are generally consistent with Homans's Social Exchange Theory (1958). This theory posited that a positive school culture that fosters supportive relationships and collaboration can enhance teachers' perceptions of the rewards associated with engaging in OCB, such as recognition, respect, and a sense of belonging. When teachers feel their contributions are valued and reciprocated by their peers and the administration, they are more likely to engage in discretionary behaviors that benefit the school community.

3.3 Relationship between Quality of Work Life and Organizational Citizenship Behavior

Disclosed in Table 6 is the relationship between the quality of work life and organizational citizenship behaviors of secondary school teachers. As displayed in the hypothesis, the relationship was tested at a 0.05 significance level. The overall R value of 0.700 with a p-value less than 0.05 indicates a strong positive and significant relationship between the quality of work life and the organizational citizenship behaviors of secondary school teachers. The positive correlation coefficient r signifies a direct relationship between the two variables; as the quality of work life rises, there is a corresponding increase in organizational citizenship behavior among teachers. Individually, all indicators of quality of work life correlate positively with organizational citizenship behaviors, having p-values less than 0.05. This finding leads to the rejection of the study's second null hypothesis, positing that there is no significant relationship between quality of work life and the organizational citizenship behaviors of secondary school teachers.

This result is aligned with the study of Helvaci and Eker (2019), which demonstrated that teachers' quality of work life significantly affects their OCB, indicating that a harmonious integration of professional and personal life encourages teachers to contribute voluntarily to organizational goals. It also emphasized that a positive and significant relationship between teachers' quality of work life (QWL) and their organizational citizenship behavior (OCB) underscores the critical role of a supportive work environment in promoting behaviors that extend beyond formal job requirements. A high QWL, characterized by factors such as work environment, job satisfaction and security, relation and cooperation, and adequacy of resources, fosters a sense of well-being among teachers, enhancing their willingness to engage in discretionary behaviors that benefit the organization. For instance, teachers who experience a favorable work-life balance are more likely to exhibit altruistic behaviors towards colleagues and students, contributing to a collaborative and productive school culture.

Table 6. *Relationship between Sub-Variables under Quality of Work Life and Organizational Citizenship Behaviors*

Quality of Work Life	Organizational Citizenship Behaviors					
	Altruism	**Conscientiousness**	**Sportsmanship**	**Courtesy**	**Civic Virtue**	**Overall**
Work Environment	.482**	.450**	.504**	.422**	.463**	.529**
	.000	.000	.000	.000	.000	.000
Organization Culture and Climate	.576**	.568**	.616**	.557**	.568**	.656**
	.000	.000	.000	.000	.000	.000
Relation and Cooperation	.503**	.502**	.548**	.530**	.541**	.596**
	.000	.000	.000	.000	.000	.000
Training and Development	.475**	.496**	.523**	.471**	.478**	.555**
	.000	.000	.000	.000	.000	.000
Compensation and Rewards	.534**	.560**	.534**	.531**	.496**	.604**
	.000	.000	.000	.000	.000	.000
Facilities	.515**	.491**	.514**	.463**	.460**	.557**
	.000	.000	.000	.000	.000	.000
Job Satisfaction and Security	.578**	.657**	.617**	.620**	.584**	.693**
	.000	.000	.000	.000	.000	.000
Autonomy of Work	.580**	.636**	.619**	.583**	.570**	.679**
	.000	.000	.000	.000	.000	.000
Adequacy of Resources	.521**	.521**	.573**	.490**	.510**	.595**
	.000	.000	.000	.000	.000	.000
Overall	**.610****	**.624****	**.647****	**.597****	**.598****	**.700****
	.000	**.000**	**.000**	**.000**	**.000**	**.000**

Similarly, this is supported by the findings of Singh (2019), who pointed out that positive QWL can increase job satisfaction and organizational commitment, further motivating teachers to go above and beyond their prescribed duties. Educational institutions aiming to enhance OCB among teachers should prioritize improving the quality of work life, as this benefits the teachers and contributes to the organization's overall effectiveness and success. Moreover, this finding is consistent with the study of Sumarsi and Rizal (2022), who revealed that higher QWL positively influences OCB among teachers, suggesting that when educators experience a balanced and fulfilling work life, they are more inclined to engage in behaviors that go beyond their formal job responsibilities. Furthermore, these findings are aligned with the Job Demands-Resources (JD-R) Theory formulated by Bakker and Demerouti in 2014. This theory provides a framework for understanding the relationship between the quality of work life and Organizational Citizenship Behavior (OCB) among teachers, which posits that job demands like workloads can lead to strain. However, job resources like support can mitigate this effect and promote well-being. High QWL facilitated but sufficient resources lead to positive emotions like job satisfaction, further motivating teachers to engage in OCB (Bakker et al., 2014; Mazzetti et al., 2023).

3.4 Relationship between Interpersonal Support and Organizational Citizenship Behavior

Table 7 shows the results of the relationship between interpersonal support and organizational citizenship behavior of secondary school teachers. As displayed in the hypothesis, the relationship was tested at a 0.05 significance level. The overall R value of 0.649 with a p-value less than 0.05 indicates a strong positive and significant relationship between interpersonal support and the organizational citizenship behaviors of secondary school teachers. The positive correlation coefficient r signifies a direct relationship between the two variables. As the interpersonal support increases, there is also a corresponding increase in teachers' organizational citizenship behavior. Individually, all indicators of interpersonal support correlate positively with organizational citizenship behaviors, having a p-value less than 0.05. This finding rejects the study's third null hypothesis, which stated that there is no significant relationship between interpersonal support and the organizational citizenship behaviors of secondary school teachers.

These findings emphasize the significant role of a supportive work environment in fostering discretionary behaviors that benefit educational institutions. This suggests that when teachers have strong interpersonal support from their peers and the school, they are likelier to go the extra mile for their students and the school community. Moreover, a supportive environment contributes to a sense of belonging and organizational commitment, motivating teachers to exhibit OCB. Hence, fostering interpersonal support within schools is essential for encouraging OCB among teachers, leading to improved collaboration, enhanced school performance,

and better student outcomes.

Table 7. *Relationship between Sub-variables under Interpersonal Support and Organizational Citizenship Behaviors*

Interpersonal Support	Organizational Citizenship Behaviors					
	Altruism	**Conscientiousness**	**Sportsmanship**	**Courtesy**	**Civic Virtue**	**Overall**
Appraisal Support	.500**	.494**	.462**	.507**	.463**	.551**
	.000	.000	.000	.000	.000	.000
Tangible Support	.484**	.399**	.434**	.404**	.431**	.492**
	.000	.000	.000	.000	.000	.000
Self-esteem Support	.539**	.381**	.459**	.281**	.386**	.472**
	.000	.000	.000	.000	.000	.000
Belonging Support	.642**	.526**	.517**	.482**	.530**	.617**
	.000	.000	.000	.000	.000	.000
Overall	**.658****	**.547****	**.570****	**.510****	**.551****	**.649****
	.000	**.000**	**.000**	**.000**	**.000**	**.000**

This result parallels the study of Choong and Ng (2024), who found that trust among colleagues enhances teachers' self-efficacy, promoting OCB. This dynamic suggests that when teachers feel supported by their peers, they are more likely to engage in behaviors beyond their formal job requirements, such as assisting colleagues and participating in school activities. Similarly, it is aligned with the study of Hsieh et al. (2022), which highlighted that perceived organizational support at both the school and teacher levels positively influences teachers' job engagement and OCB. These findings underscore the critical role of interpersonal support in enhancing teachers' commitment and proactive engagement within schools, highlighting the need for educational institutions to cultivate environments that support teachers' well-being to promote organizational success. Furthermore, these results are consistent with the Social Support Theory of Cohen and Wills (1985), which states that the presence of supportive relationships can buffer against stress and promote desirable outcomes, such as increased well-being and resilience. These lead to enhanced job satisfaction, reduced burnout, and the promotion of a collaborative work environment where OCB is valued and reinforced.

3.5 Influence of School Culture, Quality of Work Life, and Interpersonal Support on Organizational Citizenship Behavior

Table 8 establishes the influence of school culture, quality of work life, and interpersonal support on the organizational citizenship behaviors of secondary school teachers. The analysis yielded a significant F-value of 164.994 with a corresponding p-value of 0.000, indicating that the regression model is statistically significant. This result rejects the fourth null hypothesis that the examined variables (Quality of Work Life and Interpersonal Support) can predict teachers' organizational citizenship behavior. In addition, the R^2 of 0.556 signifies that 55.6 percent of the variation in organizational citizenship behaviors of secondary school teachers is explained by the predictor variables, school culture, quality of work life, and interpersonal support. This means that 44.4 percent of the variation could be attributed to other factors besides these three variables. The data further revealed that the standard coefficient of quality of work life has the highest beta of 0.428. This indicates that the quality of work life has the most significant influence on the organizational citizenship behaviors of secondary school teachers, compared to interpersonal support, which has 0.340, and school culture, which has 0.060, respectively.

Table 8. *Influence of School Culture, Quality of Work Life, and Interpersonal Support on the Organizational Citizenship Behavior*

	Organizational Citizenship Behavior			
(Variables)	**B**	**β**	**t**	**Sig.**
Constant	1.49		11.1	.000
School Culture	.051	.060	.978	.329
Quality of Work Life	.350	.428	6.12	.000
Interpersonal Support	.297	.340	7.66	.000
R	.745			
R^2	.556			
ΔR	.552			
F	164			
ρ	.000			
R	.745			

Numerous studies have investigated the positive influence of Quality of Work Life (QWL) on Organizational Citizenship Behavior (OCB) among teachers, emphasizing the critical role of QWL in fostering behaviors that benefit educational institutions. A high QWL, which encompasses job satisfaction, work-life balance, supportive leadership, and adequate compensation, creates a sense of belonging and commitment among teachers. This

commitment motivates them to engage in OCBs, including helping colleagues, volunteering for additional tasks, and going beyond their formal job responsibilities.

This is aligned with the findings of Koyuncu and Demirhan (2021), who examined the levels of QWL, organizational commitment, and OCB among teaching staff in higher education institutions. The study revealed a strong positive correlation between QWL and organizational commitment and a moderate positive correlation between QWL and OCB. Similarly, this parallels the study by Surya and Jacob (2023), which demonstrated that higher QWL is associated with increased OCB, indicating that teachers who experience better working conditions are more likely to engage in voluntary, pro-social behaviors beyond their job requirements. Additionally, it aligns with the findings of Lie et al. (2022), which emphasized that supportive leadership and strong organizational commitment have been shown to amplify the positive effects of QWL on OCB, and that of Afzal et al. (2022), which pointed out that specific dimensions of QWL, such as a safe and healthy work environment, opportunities for professional development, and adequate compensation, have been found to influence the promotion of OCBs among educators significantly.

3.6 Generated Structural Models of Organizational Citizenship Behavior

Table 9 discloses the summary of goodness of fit measures for the three generated models. Several indices were used to evaluate each model, and the optimal model was identified based on the best fit across these indices. Moreover, the table highlights the results of the goodness of fit measures of Model 3. As shown in the results, the Model 3 values have successfully met the criteria set by each index: CMIN/DF < 2, GFI, CFI, NFI, TLI > 0.95, and RMSEA < 0.05 with a P-Close> 0.05. The result aligns with the criteria set by Sahoo (2019), emphasizing that the CMIN/DF should be less than 2. The Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Normed Fit Index (NFI), and Goodness of Fit Index (GFI) should be more than 0.95. Moreover, the RMEA and PCLOSE values are supported by Sathyanarayana & Thangamuthu (2024), indicating 0.01, 0.05, and 0.08 as excellent, good, and mediocre fit, respectively, with a P-Close that is greater than 0.05.

Table 9. Summary of Goodness of Fit Measures of the Three Generated Models

Model	P-value (>0.05)	CMIN / DF (0<value<2)	GFI (>0.95)	CFI (>0.95)	NFI (>0.95)	TLI (>0.95)	RMSEA (<0.05)	P-close (>0.05)
1	.000	8.294	.750	.827	.808	.805	.135	.000
2	.000	5.087	.809	.904	.884	.891	.101	.000
3	.062	1.457	.982	.996	.987	.993	.034	.877

Legend: P-value -> 0.05- value must be greater than 0.05
CMIN/DF – Chi-Square/Degrees of Freedom - (0 < value < 2) – values must be greater than zero but less than 2
GFI – Goodness of Fit Index -> 0.95- value must be greater than 0.95
CFI – Comparative Fit Index -> 0.95- value must be greater than 0.95
NFI – Normed Fit Index -> 0.95- value must be greater than 0.95
TLI – Tucker-Lewis Index -> 0.95- value must be greater than 0.95
RMSEA – Root Mean Square of Error Approximation - < 0.05- value must be less than 0.05
P-close -> 0.05- value must be greater than 0.05

The generated Model 1 is presented in Figure 1, which obtained a p-value of 0.000, CMIN/DF of 8.294, goodness of fit index of .750, comparative fit index of .827, normed fit index of .808, Tucker-Lewis's index of .805, RMSEA of .135, and a p-close of .000. All of these values failed to satisfy the best-model indices. Meanwhile, Model 2, as presented in Figure 2, obtained a p-value of 0.000, CMIN/DF of 5.087, goodness of fit index of .809, comparative fit index of .904, normed fit index of .884, Tucker-Lewis's index of .891, RMSEA of .101, and a p-close of .000. All these values failed to satisfy the best-model indices. Specifically, the generated Model 3, as presented in Figure 3, the best-fit model of OCB of teachers, obtained a p-value of 0.062, CMIN/DF of 1.457, a goodness of fit index of .982, comparative fit index of .996, normed fit index of .987, Tucker-Lewis's index of .993, RMSEA of .034, and finally p-close of .877. All exogenous variables are fitted to be part of the best-fit model for organizational citizenship behaviors of secondary school teachers in Region XII.

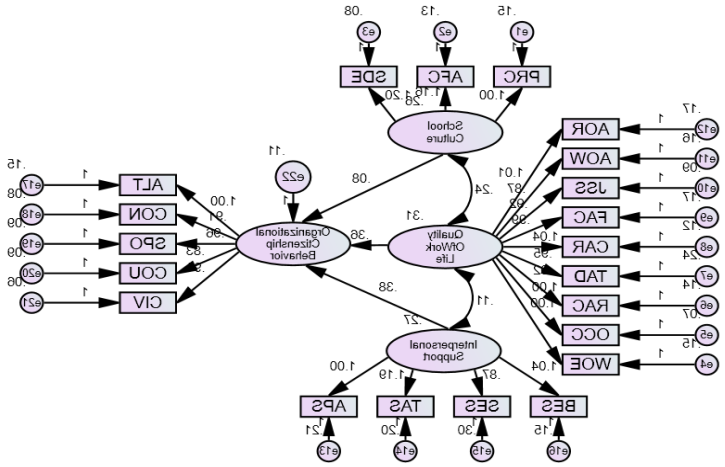

Figure 1. *Generated Model 1 of Organizational Citizenship Behavior*

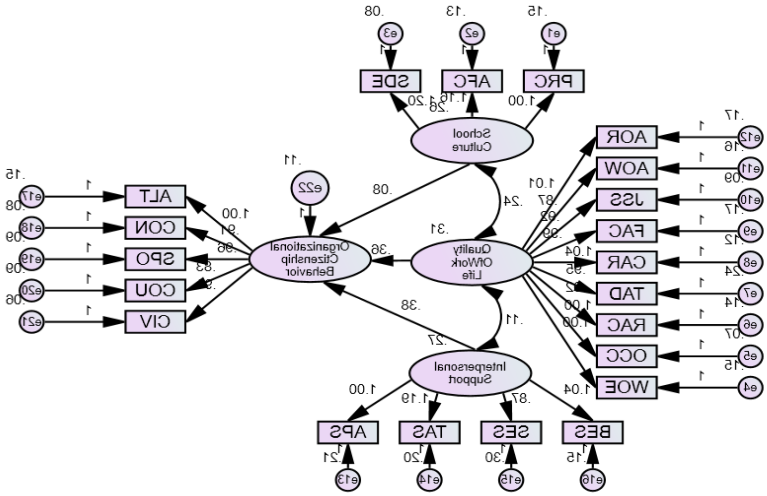

Figure 2. *Generated Model 2 of Organizational Citizenship Behavior*

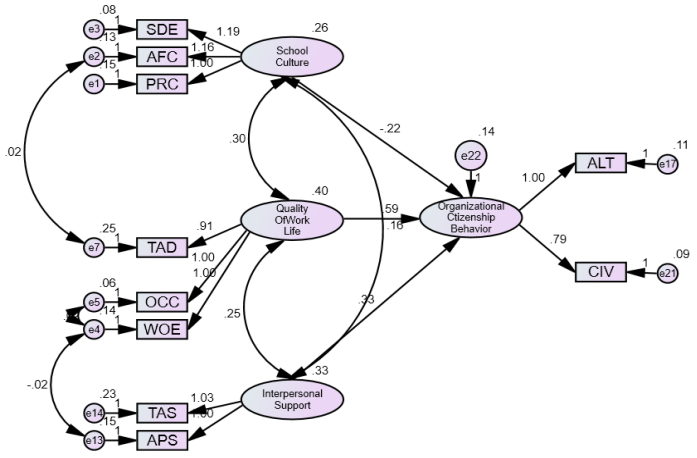

Figure 3. *Best-Fit Model of Organizational Citizenship Behavior*

Moreover, Figure 3 comprehensively illustrates the interconnected factors contributing to secondary teachers' positive organizational citizenship behavior. As shown in Table 10, quality of work life is strongly represented by its factors, with the highest beta value of .593 indicating a substantial positive influence—teachers who experience a supportive and fulfilling work environment are significantly more likely to engage in OCB; followed by interpersonal support (beta = .331) suggesting that collegial relationships and emotional support among peers and leaders contribute to teachers' willingness to go beyond their formal duties. Interestingly, school culture had a negative beta value (beta = -.218), indicating an inverse relationship with teachers' OCB. This result may suggest that certain cultural norms or organizational practices within the schools studied could be misaligned with the values or motivations that promote OCB, or that authoritarian school culture may suppress discretionary behaviors. These findings highlight the importance of fostering individual and relational support structures and critically examining school-wide cultural dynamics that may unintentionally hinder positive organizational citizenship behaviors.

Also, the goodness of fit results revealed that all these values satisfy the best-model indices criteria as shown by CMIN/DF 0 < 1.457 < 2, GFI, CFI, NFI, TLI > 0.95, and RMSEA < 0.05 with a P- Close > 0.05. This indicates that the currently structured model adequately explains the relationships between these variables and organizational citizenship behaviors. This model, which demonstrated the best fit among those tested, highlights the crucial role of school culture, quality of work life, and interpersonal support in fostering organizational citizenship behavior among teachers. Significantly, the model goes beyond identifying these individual influences to illustrate their interconnectedness. It reveals a causal chain where a positive school culture fosters a higher quality of work life, promoting stronger interpersonal support among colleagues. These positive relationships then loop back to reinforce a positive school culture, creating a virtuous cycle. By visualizing these complex interactions, Model 3 provides valuable insights for school leaders seeking to cultivate a thriving, supportive work environment where teachers and students can flourish.

Table 10. *Regression Weights of the 3 Generated Models*

	Exogenous Variables to Endogenous Variable		
Model	**School Culture**	**Quality of Work Life**	**Interpersonal Support**
1	.057^{NS}	.406***	.383***
2	.081^{NS}	.359**	.378***
3	-.218^{NS}	.593^{NS}	.331**

* p<0.05, ** p<0.01, *** p=0.000, *NS= not significant*

Moreover, all three indicators of school culture (EXO1) identified as professional collaboration, affiliative collegiality, and self-determination/efficacy remained significant predictors of organizational citizenship behavior of secondary teachers. Likewise, three out of nine indicators of quality of work life (EXO2), namely training and development, organization culture and climate, and work environment, were found to influence the organizational citizenship behavior of secondary teachers. Furthermore, two out of four indicators of interpersonal support (EXO3), identified as tangible and appraisal support, were predictors of organizational citizenship behavior. Meanwhile, the model retained two out of five indicators of organizational citizenship behavior (ENDO), namely altruism and civic virtue, and further showed a direct causal link between exogenous and endogenous variables.

4.0 Conclusion

This study highlights the significant role of school culture, quality of work life, and interpersonal support in shaping secondary school teachers' organizational citizenship behavior (OCB). While teachers generally exhibited high levels of OCB, areas such as affiliative collegiality, work environment, self-esteem support, and altruism were identified as needing improvement. These findings underscore the importance of fostering a supportive, collaborative, and empowering school environment through mentorship programs, team-building activities, and peer support initiatives. Anchored in the Social Exchange Theory, Job Demands-Resources Model, and Social Support Theory, the study affirms that positive relationships, adequate resources, and strong social networks enhance teacher motivation and willingness to go beyond formal roles. Future research may validate the adapted model and questionnaire in diverse educational contexts such as elementary schools, private institutions, or schools in rural areas, to further strengthen its application, generalizability, and practical relevance. This validation is important to determine whether the model accurately captures the dynamics of organizational citizenship behavior (OCB) across varying cultural, institutional, and demographic settings.

Additionally, examining the model's sensitivity to factors such as leadership style, resource availability, and community engagement can help refine its constructs and enhance its applicability in guiding policy and practice. Moreover, school administrators and policymakers may implement targeted interventions such as structured mentorship programs, regular team-building activities, annual onboarding sessions, and peer coaching systems to strengthen areas of weakness identified in the study. These practical strategies can help strengthen collegial relationships, boost teachers' self-worth, and foster a positive work environment—thereby sustaining high levels of OCB and promoting a more engaged and collaborative school community.

5.0 Contributions of Authors

The authors contributed equally to all aspects of this research, including the conceptualization, methodology, data analysis, writing, and manuscript revision. Each author shares equal responsibility for the content and integrity of the work.

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7.0 Conflict of Interests

There is no conflict of interest in the publication of this paper, as declared by the authors

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Stakeholders' Awareness and Attitude Towards Inclusive Education in Philippine Elementary Schools

Ronielen P. Capillo*[1], Nathaniel D. Naanep[2]
[1]Sultan Kudarat State University – Access Campus, Sultan Kudarat, Philippines
[2]Sultan Kudarat State University, Sultan Kudarat, Philippines

*Corresponding Author Email: ronielencapillo@sksu.edu.ph

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Abstract. This study focuses on the relationship between stakeholders' level of awareness and attitude towards IE in mainstream classrooms in the selected five (5) elementary schools in West Isulan District, Division of Sultan Kudarat, Philippines. The study used a comparative and descriptive-correlational research design, which involved a total enumeration of 611 respondents. Through a researcher-made and validated survey questionnaire, the study found that stakeholders were highly aware of the significance, difficulties, and policies, and expressed very positive attitudes regarding mindset, beliefs, and actions towards IE, which further indicates that there is a positive attitude towards those with impairments if there is awareness regarding IE. Meanwhile, using the LSD test, there is a notable distinction in the level of understanding and the level of attitude among the different stakeholders, with principals having the highest mean. However, although teachers have a very positive attitude towards IE, they still obtained the lowest mean because they only have a basic understanding of how to teach and understand children with needs, not in addressing students with emotional and behavioral difficulties. A significant correlation was found between awareness and attitude, underscoring the need for targeted professional development, especially for teachers to enhance understanding and better practice implementing IE.

Keywords: Inclusive education; Mainstream classroom; Elementary school.

1.0 Introduction

Inclusive education ensures that all learners have equal access to education regardless of their abilities or backgrounds. This study aims to examine stakeholders' awareness and attitudes, specifically regarding their understanding of the concept, importance, challenges, and relevant policies of inclusive education. By doing so, it seeks to contribute to the ongoing discourse on how inclusive education can be more effectively implemented in mainstream classrooms, particularly in underserved areas. Understanding stakeholders' mental states, beliefs, and behavioral dispositions is essential for crafting interventions and policies that promote inclusivity in education.

Taking every learner with different capabilities into one classroom and providing quality education despite their differences are the goals of inclusive education. Children have diverse characteristics, each with strengths and weaknesses (Peters, 2004). Each one is eligible for education (EFA, 1990; Peters, 2004), and teachers must advocate for equity education by supporting them through teaching and learning processes (MDG, 2015). If those children were continually excluded from a mainstream classroom, their health, livelihood, and social participation would

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be affected (Jodl et al., 2023). Likewise, this success relies on the awareness and attitude of various stakeholders within the educational system. Catolico and Cabanlit (2023) highlight the broader societal benefits, upholding students' rights and facilitating and lowering prejudice in an inclusive society. If there is awareness regarding IE, an increase in positive attitudes is associated with increased social interactions, high academic performance, and improved well-being and self-worth in students with impairments (Jincy & Anu, 2024; Jardinez & Natividad, 2024).

However, several challenges persist. These include limited government support for teachers, insufficient training in crafting Individualized Education Plans (IEPs), and inadequate classroom resources (Muega, 2019; Ecoben, 2019). Collaboration among parents, teachers, and local education committees is essential for promoting inclusive practices (Lapeña et al., 2023; Baguisa et al., 2019). Moreover, many educators question whether their understanding aligns with the international definitions and requirements (Muega, 2016). In connection, Byrne (2020) also notes that nations have difficulties in declarations, treaties, general comments, and guidelines due to the varying set of international policies and standards on inclusion in an educational context. Despite these issues, the Philippines continues to push for inclusive education through various initiatives such as DepEd Order No. 21, s. 2019 and the "MATATAG" agenda outlined in DepEd Order No. 14, s. 2023 (Catolico, 2023; Llego, 2022). Meanwhile, inclusive education is not accessible in some places in the Philippines, especially in these underserved areas. Although there was no special education available in these schools, especially the elementary schools in West Isulan District, Division of Sultan Kudarat, Philippines, there were still parents who chose to enroll their children due to the very far distance from the city schools, which have IE teachers (SPED) and classrooms.

Given these conditions, this study is timely and significant. It provides an in-depth analysis of stakeholders' awareness and attitudes toward inclusive education, which is crucial for developing informed, effective, and context-sensitive educational policies and projects for more effective and equitable implementation of inclusive education.

2.0 Methodology

2.1 Research Design

The study employed a quantitative method and a descriptive correlational research design, which is comparative and correlational. Descriptive correlational research design involves gathering data to determine the strength and direction of relationships between variables (Creswell, 2014). It measures the trends and relationships within a sample without manipulating the variables (McCombes, 2023). It involves comparison, for it establishes significant differences between groups of subjects based on the criteria. Thus, it allows us to describe a population and look for the relationship between the stakeholders' awareness and prevailing factors of stakeholders' attitudes towards inclusive education.

2.2 Research Locale

The study was conducted in selected elementary schools in the West Isulan District, Division of Sultan Kudarat, Philippines. Five (5) different stakeholders were utilized as respondents, including teachers, school heads, PTA Officers, parents, and pupils. West Isulan District is situated in the western part of the municipality of Isulan. This area is an urbanizing rural area rich in agricultural land, forestland, and pasture/grassland. Its road distance from the municipality is 10km to 15 km from the city.

2.3 Research Respondents

The total population of stakeholders in the selected five schools in West Isulan District, elementary teaching personnel, is seventy (70) teachers, five (5) school heads, forty-two (42) PTA Officers, 233 Grade six parents, and 275 Grade six pupils, with 611 respondents in all. The study employed a total enumeration sample at a 5% margin of error and a 5% confidence interval. All teachers, school heads, PTA Officers, Grade six (6) parents, and pupils were taken from the population. Respondents were chosen regardless of gender, age, ethnicity, color, abilities, or disabilities.

2.4 Research Instrument

This study used a researcher-made and validated survey questionnaire to measure stakeholders' awareness and attitude towards IE. The study followed ethical guidelines, and the respondents' participation was voluntary. To ensure the integrity of the results, education and research enthusiasts reviewed the researcher-made

questionnaires to meet the objectives of this study. A pilot test with a small sample of stakeholders as respondents identified ambiguities and assessed the test questions' flow and relevance to the study's objectives.

2.5 Data Gathering Procedure

The study has undergone methodical processes to collect data. First, approval must be obtained from the graduate school dean to carry out the study, and then permission must be sought from the school division superintendent and coordinated with the school heads. Second, the researcher explained the study's rationale and distributed the questionnaire to the five stakeholders who would fill it out. Third, the researcher personally collected the questionnaire once the respondents completed it. Lastly, the researcher assured the respondents that all their responses would remain confidential and that the study's findings would only be used for academic and educational purposes.

2.6 Data Analysis

The gathered data were initially analyzed using descriptive statistics. Mean and standard deviations were used to determine the stakeholders' awareness levels and attitudes. Meanwhile, to assess whether there is a significant difference in the level of awareness and attitude of the different stakeholders towards IE, one-way ANOVA and Least Significant Difference (LSD) test were used. Moreover, the Pearson r product-moment correlation coefficient was employed to examine the correlation between the two variables. The correlation coefficient is used to measure the frequency and relationships among variables. Its value can range from ± 0.00 to 0.29 (Curtis, 2016). All tests were done at a 0.05 level of significance. Calculations were carried out using Statistical Package for the Social Sciences (SPSS) version 2016.

2.6 Ethical Considerations

This research adhered to ethical standards. Participation was entirely voluntary, with respondents having the option to withdraw at any time if they felt uncomfortable. Every effort was made to minimize potential physical, social, or psychological harm. The dignity and well-being of the participating teachers, school heads, PTA officers, Grade six parents, and pupils were consistently safeguarded. All research data were kept confidential, and the rights of the respondents were protected to maintain scientific and academic integrity. Additionally, results were communicated ethically and adequately to prevent plagiarism or research misconduct.

3.0 Results and Discussion

Table 1 shows the level of stakeholders' awareness across various dimensions. Stakeholders demonstrate a high level of awareness in inclusive education regarding teachers' concept (M=4.41; SD=0.88) and implementation importance (M=4.33; SD=0.91). The results indicate that stakeholders are highly aware of the concept and importance of implementing inclusive education. Further, the results show that these indicators generated the highest mean of awareness among the rest. The level of awareness was also explored on different samples using the same scale, showing the same high level of awareness among stakeholders towards IE (Toong, 2019; Jincy & Anu, 2024; Sharma & Giri, 2020). Interestingly, increasing awareness of IE could help students become more accepting and see the importance of each one, encouraging collaboration, reducing conflict, and enhancing the caliber of learning (Foster, 2020; Dewi, 2024).

Table 1. *Level of Awareness towards IE among the Different Stakeholders*

Indicators	Mean	SD	Interpretation
Teachers' Concept of IE	4.41	0.88	Highly Aware
Importance of Implementing IE	4.33	0.91	Highly Aware
National and International Policies and Projects of IE	4.18	0.96	Aware
Issues in Implementing IE	4.19	1.00	Aware
Total Measure	**4.28**	**0.94**	**Highly Aware**

On the other hand, as shown in the table, stakeholders got a mean score of 4.19 (SD=1.00) on the issues in implementing IE and 4.18 (SD=0.96) on the national and international policies and projects regarding IE. It can be noted that these indicators got the lowest mean scores among the rest of the indicators, showing the stakeholders' understanding of inclusive education. This is also observable in the studies conducted on different groups using the same scale (Young, 2024; Papadakaki et al., 2022; Chary & Perumal, 2022). It could be inferred that some respondents were deprived of the information, which results in minimal awareness of the issues, policies, and projects of inclusive education (Boyle & Allen, 2023).

Table 2 presents the results of stakeholders' attitudes towards inclusive education. The result revealed that stakeholders' have a consistently very positive attitude when it comes to their value of belief or feeling (M=4.35; SD=0.92), mental state conscious or unconscious (M=4.34; SD=0.89), and predisposition to a behavior or action (M=4.33; SD=0.89) with an overall total measure of 4.34 (0.90). This suggests that stakeholders have very positive attitudes towards inclusive education. The positive attitudes were also explored using the same scale, showing the same positive attitudes towards inclusive education (Deeba, 2023; Islam & Ahsan, 2022; Singh, 2025). Additionally, explicit/conscious attitudes can draw a positive and constructivist perspective on inclusion, and there is no concrete evidence that people are ignorant of their indirect attitudes (Bornert-Ringleb et al., 2020; Gawronski et al., 2006). Further, someone's belief can contribute to their attitude toward handling inclusive classrooms (Dignath et al., 2022).

Table 2. *Level of Attitude towards IE among Different Stakeholders*

Indicators	Mean	SD	Interpretation
Mental State Conscious or Unconscious	4.34	0.89	Very Positive
A Value of Belief or Feeling	4.35	0.92	Very Positive
A Predisposition to a Behavior or Action	4.33	0.89	Very Positive
Total Measure	**4.34**	**0.90**	**Very Positive**

Result reveals that the mean values for awareness range from 4.25 to 4.64. Using One-Way Analysis of Variance, there is a notable distinction among the awareness of the different stakeholders in West Isulan District at the 1% level of significance since the computed F value of 5.045 is greater than the F tabular value of 4.89 at df error of 15. Furthermore, using the Least Significant Difference (LSD) test, principals obtained the highest mean of 4.64, comparable to PTA officers (4.47). Meanwhile, pupils received the lowest mean of 4.25, comparable to the parents (4.26). Despite that, all stakeholders obtained an overall mean for their awareness interpreted as highly aware; however, a stricter procedure using statistics obtained a significant difference among stakeholders due to the different standards used. Further, this implies that principals and the PTA officers have a higher level of awareness towards IE than the rest of the three stakeholders, as perceived by the respondents, which can shed light on promoting building bridges and relationships between schools and communities (Khaleel et al., 2021; Mbua, 2023).

Table 3. *Test of Difference on Stakeholders' Awareness of IE*

Stakeholders	Mean*
Pupils	**4.25**^{b}
Parents	**4.26**^{b}
Teachers	**4.34**^{b}
PTA Officers	**4.47**^{ab}
Principal	**4.64**^{a}

CV= 3.38%, LSD value @ 1% = 0.30

**Means having similar superscripts are not significantly different using the LSD test

Using One-Way Analysis of Variance, the results revealed that there is a difference in the level of attitude across dimensions among the different stakeholders at a 1% level of significance since the computed F value of 8.40 is greater than the F tabular value of 5.99 at df error of 10. Further analysis using the LSD test showed that principals obtained the highest mean of 4.64, followed by a comparable mean of 4.59 by the PTA officers, and pupils with a mean of 4.37 (see Table 4). Consequently, teachers received the lowest mean of 4.16, comparable to parents, who received a mean of 4.28. This indicates that the principals, PTA officers, and the pupils have similar perceptions of the level of attitude toward IE. On the other hand, despite having a very positive attitude, teachers still obtained the lowest mean (4.16) among the rest of the stakeholders. This suggests that principals possessed the highest attitude towards inclusive education, which results in enhanced social interaction and harmonious teaching and learning processes (Rendon et al., 2023).

Table 4. *Test of Difference on Stakeholders' Attitude towards IE*

Stakeholders	Mean*
Pupils	**4.37**^{abc}
Parents	**4.28**^{bc}
Teachers	**4.16**^{c}
PTA Officers	**4.59**^{ab}
Principal	**4.64**^{a}

CV = 2.78% , LSD value @ 1% = 0.317

**Means having similar superscripts are not significantly different using the LSD test

The correlation coefficient reported in the table is 0.64. It indicates a moderate positive correlation, which means there is a dependable relationship between stakeholders' level of awareness towards IE and the level of attitude. The t-computed value of 19.77 is greater than the t-critical at 1.96, which indicates that the correlation observed is statistically significant and not due to chance. This indicates a dependable relationship between the stakeholders' awareness of IE and the attitude level. Moreover, the R^2, which is the coefficient of determination of 0.41, indicates that the awareness towards IE contributed 41% to the attitude, while the rest (59%) was attributed to other variables. The findings suggest that the more knowledgeable someone is about the principles and benefits of inclusive practices, the more likely they are to have a positive attitude to inclusion in educational settings. School administrators and educational institutions in the West Isulan District may advocate for more significant emphasis on inclusive education within the curriculum and teacher preparation program. Unlike previous studies (Papadakaki, 2022; Kumar & Rajitha, 2022; Masbaño, 2023), this paper found a significant correlation between the level of awareness and attitude towards inclusive education.

Table 5. *Pearson r Correlation between the Level of Stakeholders' Awareness and Attitude towards Inclusive Education*

Predictor	n	df	Pearson r	t_{comp}	t_{crit}	Interpretation	Remarks
Awareness Attitude $R^2 = 0.41$	611	609	0.64	19.77	1.96	Moderate positive correlation	significant

Note: significant at 0.5 level

4.0 Conclusion

The findings of this study highlight a positive correlation between the level of awareness and attitude toward inclusive education. Individuals with a higher understanding of inclusive education's concept, importance, national and international policies and projects, and issues are likely to exhibit a more positive attitude toward its implementation. As stakeholders such as teachers, school heads, students, PTA officers, and parents work towards creating a more inclusive environment, increasing awareness through awareness drives, training, and workshops may be conducted to sustain effectively the implementation of inclusivity among schools and the community.

Considering the overall research findings, the researchers believe this paper offers a valuable assessment of stakeholders' awareness and attitude towards inclusive education in a specific sample and context. This paper confirms the high psychometric qualities of measuring the awareness and attitude of IE in a large sample, including the LGUs and government officials supporting inclusive education systems. Although the findings of this study provide valuable data, some limitations can be noted. Given the study's focus on a particular sample, it is recommended to investigate teachers' readiness towards IE about classroom resources that can be noted based on the characteristics of the population, particularly the mainstream classrooms in rural areas. At this stage, scale development studies should incorporate additional reliability and validity assessment using other statistical methods. Finally, to better understand the awareness and attitude of stakeholders towards inclusive education, further scholarly research is needed to explore its associations with additional factors and variables.

5.0 Contributions of Authors

The authors contributed equally to each section and reviewed and approved the final version of the work.

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7.0 Conflict of Interest

The authors affirm having no conflict of interest with the publication of this paper.

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Evaluating the Impact of Student Internships on Hospitality Management Education

Serdan M. Devero, Jr.
Negros Oriental State University, Bais City, Negros Oriental, Philippines

Author Email: deveroserdan@gmail.com

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Abstract. This study addresses the gap in evaluating the effectiveness of the Student Internship Program (SIP), a structured industry-based training initiative designed to bridge academic learning and real-world practice in Hospitality Management. Aiming to assess the program's impact, the study utilized a descriptive survey design and gathered data from 41 third-year Hospitality Management students who completed a three-month internship during the academic year 2023–2024. Effectiveness was measured using a structured questionnaire with a 5-point Likert scale, focusing on three key domains: personal development, environmental adaptation, and decision-making skills. Results indicate that the SIP enhances students' professional growth, boosts confidence, and provides industry-relevant experience. The findings underscore the vital role of internships in workforce preparation and suggest the need for continuous program improvement to align with evolving industry demands and support student success.

Keywords: Career readiness; Experiential learning; Hospitality management education; Program effectiveness; Student internship program.

1.0 Introduction

In today's competitive and skills-driven labor market, the value of a college degree increasingly depends on a graduate's ability to translate theoretical knowledge into practical, real-world competencies. This is especially true in Hospitality Management, where employers seek not only technical know-how but also adaptability, critical thinking, and strong interpersonal skills. One key strategy to bridge the gap between academic instruction and industry demands is the student internship program. In the Philippine context, the Commission on Higher Education (CHED) underscores the importance of internships through Memorandum Order No. 104, Series of 2017, which mandates the integration of academic learning with hands-on training in recognized Host Training Establishments (HTEs)—companies or institutions authorized to provide workplace immersion. These programs aim to equip students with relevant skills, values, and professional experiences that transcend traditional classroom learning.

Globally and locally, research supports internships' role in enhancing hard and soft skills. For example, Dikti (2020) and Hadiyanto et al. (2020) highlighted that internship programs are most effective when deliberately structured within the academic curriculum and aligned with course objectives. Similarly, Careerlabs (2023) emphasized that successful internships promote self-reflection, teamwork, and critical self-evaluation, contributing significantly to a student's preparedness for future employment.

Despite the well-established benefits of internships, there remains a gap in evaluating how effectively specific

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local internship programs meet these expectations, particularly within public higher education institutions in the Philippines. While studies have examined internship models in other countries or private institutions, less is known about the real-world outcomes of internship programs offered by state universities, especially in regions such as Negros Oriental.

This study addresses that gap by investigating the effectiveness of the Student Internship Program (SIP) in Hospitality Management at a state university in Central Visayas, focusing on how well it prepares students for the demands of the hospitality industry. Specifically, the study examines skills development, professional readiness, alignment with academic content, and student satisfaction. Using a descriptive research design, data were collected from third-year students who completed a three-month internship during the academic year 2023–2024, alongside evaluations from employers and faculty coordinators. This study's purpose is to provide a comprehensive assessment of the SIP's strengths and areas for improvement. Its significance lies in identifying whether the internship program meets industry standards and offering evidence-based recommendations for enhancing curriculum design. Ultimately, this research seeks to bridge the gap between academic training and professional readiness, ensuring that graduates of the Hospitality Management program are competent, confident, and prepared to succeed in their chosen careers.

2.0 Methodology

2.1 Research Design

This study employed a descriptive, survey-based, cross-sectional research design to assess the effectiveness of the Student Internship Program (SIP) in Hospitality Management as a basis for curriculum enhancement. It aimed to describe the experiences and perceptions of third-year students who completed a three-month internship during the academic year 2023–2024. A structured questionnaire was used to gather data from 41 selected students through purposive sampling. The questionnaire focused on three key areas: personal development, environmental adaptation, and decision-making. The collected data were analyzed using descriptive statistics—frequency, percentage, and mean. Frequency and percentage were used to summarize participant responses and identify dominant trends, while the mean scores helped determine the overall perceived effectiveness of each dimension of the internship program.

2.2 Research Locale

The study was conducted in a state university in Central Visayas, Philippines, specifically within the Bachelor of Science in Hospitality Management program. The university offers internship opportunities through its Student Internship Program (SIP), which aims to provide students with practical training in various hospitality-related establishments. The research focused on third-year Hospitality Management students who completed their internships during the academic year 2023–2024. The university's name is not disclosed for confidentiality and data privacy purposes.

2.3 Research Participants

The participants of the study were 41 third-year Bachelor of Science in Hospitality Management (BSHM) students from a state university in Negros Oriental who completed their Student Internship Program (SIP) during the academic year 2023–2024. The study utilized purposive sampling, a non-probability technique where participants are selected based on specific criteria relevant to the study. In this case, participants were chosen because of their direct involvement in the internship program and ability to provide informed insights into its effectiveness (Palinkas et al., 2015). The sample size of 41 was determined based on the total number of eligible students who completed the internship during the academic year and voluntarily agreed to participate in the study.

2.4 Research Instrument

The primary instrument used in this study was a structured questionnaire developed by the researcher and anchored in David Kolb's Experiential Learning Theory, which emphasizes learning through concrete experience, reflective observation, abstract conceptualization, and active experimentation. The questionnaire assessed the effectiveness of the Student Internship Program (SIP) across three dimensions: personal development, environmental adaptation, and decision-making. A 4-point Likert scale was used to measure responses: 4 – Very Effective, 3 – Effective, 2 – Less Effective, and 1 – Not Effective. To ensure content validity, the instrument was evaluated by a panel of three experts in education and hospitality. Their feedback guided the revision and refinement of questionnaire items. A pilot test was also conducted with 10 students (not part of the final sample) to check for the instrument's clarity, reliability, and coherence.

2.5 Data Gathering Procedure

Data collection occurred during the second semester of the academic year 2023–2024. The researcher distributed the structured questionnaire in person during class sessions to ensure accessibility and high response rates. Before distribution, participants were informed about the study's purpose and procedures, and informed consent was obtained. To encourage honest and unbiased responses, participants were assured of the anonymity of their answers, and questionnaires were submitted anonymously. Completing the questionnaire took approximately 15–20 minutes, after which responses were collected immediately and coded for analysis.

2.6 Ethical Considerations

This study followed ethical guidelines to ensure the protection of participants. Informed consent was obtained, participation was voluntary, and confidentiality was maintained. Data were anonymized, securely stored, and will be deleted after one year. The researcher ensured transparency and upheld ethical standards throughout the research process, including proper citations.

3.0 Results and Discussion

3.1 Effectiveness of the Student Internship Program Based on Personal Factors

The findings presented in Table 1 suggest that the Student Internship Program (SIP) in Hospitality Management has been highly effective in influencing personal factors related to student engagement, learning, and development. The overall mean score of 3.42 indicates that students generally found the SIP to be very effective in enhancing their professional competencies and fostering personal growth, which aligns with research highlighting the value of internships in bridging the gap between academic theory and industry practice (Kolb, 1984; Hernandez et al., 2018).

Table 1. *Effectiveness of the Student Internship Program (SIP) in Hospitality Management: Personal Factors*

Indicators	Weighted Mean	Interpretation
I am pretty good and happy with the Student Internship Program (SIP).	3.51	Very Effective
I am always interested to learn and complete my SIP in industry/corporation.	3.56	Very Effective
I am provided with a lot of valuable hands-on experience during my Student Internship Program in industry/corporation.	3.29	Very Effective
I have developed and improved my skills in Hospitality Management	3.44	Very Effective
I felt supported by my internship coordinator/supervisor.	3.29	Very Effective
Factor Average	3.42	Very Effective

The results show that the program was particularly effective in boosting student motivation (3.56) and satisfaction (3.51). These findings echo the conclusions of Abbasi (2022) and Duffy and Lee (2019), who found that engagement and satisfaction significantly enhance learning and skill development. Additionally, while students rated hands-on experience and supervisor support positively (3.29), there is potential for improvement in task diversity and mentorship structure.

3.2 Effectiveness of the Student Internship Program Based on Environmental Factors

Table 2 illustrates that environmental factors significantly contributed to the perceived effectiveness of the Student Internship Program in Hospitality Management, with a factor average of 3.35, interpreted as very effective. The highest-rated statement, "It improves my personal growth, growing my circle of friends through meeting new people," scored 3.70, reflecting the internship's strong role in enhancing students' interpersonal development.

Table 2. *Effectiveness of the Student Internship Program (SIP) in Hospitality Management: Environmental Factors*

Indicators	Weighted Mean	Interpretation
The internship provided me with opportunities to network with industry professionals.	3.19	Effective
Learning experience operates all levels of human society from individuals to organizations.	3.14	Effective
It improves my personal growth, growing my circle of friends through meeting new people.	3.70	Very Effective
I was able to meet different cultures and ways of thinking.	3.27	Very Effective
I can apply what I've learned in my internships and projects.	3.44	Very Effective
Factor Average	3.35	Very Effective

Students acknowledged growth in social and cultural awareness and improved application of academic knowledge. These results are consistent with findings from Yoo et al. (2021), Kim and Jeon (2022), and Zopiatis et al. (2021), who emphasized the importance of cultural competency and networking in hospitality education.

3.3 Effectiveness of the Student Internship Program Based on Decision-Making Factors

The findings in Table 3 reveal that the decision-making factors in the Student Internship Program (SIP) were perceived as very effective, with a factor average of 3.56. The highest indicator, "It encourages us to pursue this career" (3.68), highlights how internship experiences influence students' motivation and confidence in choosing hospitality as a long-term profession.

Table 3. *Effectiveness of the Student Internship Program (SIP) in Hospitality Management: Decision-Making Factors*

Indicators	Weighted Mean	Interpretation
My understanding of the hospitality sector has become stronger as a result of my hands-on experience.	3.46	Effective
It encourages us to pursue this career.	3.68	Effective
Those experience can process human adaptation and help us retain information and apply it in all areas of our life.	3.56	Very Effective
Through internship I can solve existing challenges based on my exI learn new skills while also discovering and growing my career path.perience.	3.46	Very Effective
I learn new skills while also discovering and growing my career path.	3.66	Very Effective
Factor Average	3.56	Very Effective

These results reflect the SIP's significant contribution to career clarity and decision-making, supporting the studies of Memon et al. (2023), Chen and Huang (2022), and Lo and Au (2022), who emphasize that practical exposure enhances motivation, problem-solving skills, and long-term readiness for the hospitality workforce.

3.4 Correlation Analysis between Student Demographics and Perceived Effectiveness of the SIP

Table 4 presents the correlation analysis showing that age, gender, internship location, and academic status have no statistically significant relationship with personal, environmental, or decision-making factors. All p-values exceeded the standard alpha level of 0.05, indicating no meaningful influence of these demographic variables on students' perceptions.

Table 4. *Test of Significant Relationship between the Perceived Factors that Contribute to the Effectiveness of the Student Internship Program (SIP in Hospitality Management of Negros Oriental and the Profile Variable*

Variables		Correlation value	p	Strength of Relationship	Remarks	Decision Rule
Personal Factors	Age	.03	.827	Positive Negligible Correlation	Not Significant	Failed to Reject Null
	Gender	-.02	.870	Negative Negligible Correlation	Not Significant	Failed to Reject Null
	Internship Location	-.05	.717	Negative Negligible Correlation	Not Significant	Failed to Reject Null
	Academic Status	.20	.208	Positive Negligible Correlation	Not Significant	Failed to Reject Null
Environmental Factors	Age	.07	.656	Positive Negligible Correlation	Not Significant	Failed to Reject Null
	Gender	.02	.875	Negative Negligible Correlation	Not Significant	Failed to Reject Null
	Internship Location	.03	.846	Positive Negligible Correlation	Not Significant	Failed to Reject Null
	Academic Status	.23	.144	Positive Slight Correlation	Not Significant	Failed to Reject Null
Decision-Making Factors	Age	-.04	.797	Negative Negligible Correlation	Not Significant	Failed to Reject Null
	Gender	-.02	.175	Negative Slight Correlation	Not Significant	Failed to Reject Null
	Internship Location	.09	.543	Positive Negligible Correlation	Not Significant	Failed to Reject Null

	Academic Status	.07	.632	Positive Negligible Correlation	Not Significant	Failed to Reject Null

The correlation values, ranging from -0.058 to 0.232, indicate negligible to slight relationships. For example, academic status and decision-making factors yielded the highest correlation (r = 0.232) but were not statistically significant (p = 0.144). These results align with studies by Suhartanto et al. (2022) and Nguyen et al. (2023), which conclude that program quality, mentorship, and hands-on experience are stronger influencers of internship success than demographic characteristics.

4.0 Conclusion

This study aimed to assess the effectiveness of the Student Internship Program (SIP) in Hospitality Management based on personal, environmental, and decision-making factors. The findings reveal that the program was effective across all three dimensions, particularly in enhancing student motivation, fostering personal growth, and aiding career decision-making.

A key contribution of this study lies in demonstrating how structured internship programs significantly support student development in hospitality education, regardless of demographic differences such as age, gender, internship location, or academic status. These findings underscore the value of experiential learning and its potential to standardize positive outcomes across diverse student profiles.

By highlighting the importance of real-world experience, mentorship, and exposure to workplace culture, the study offers practical insights for academic institutions and industry partners to enhance the design and implementation of internship programs. Strengthening these elements can produce more skilled, confident, and career-ready graduates.

To guide future practice, it is recommended that internship programs continue to prioritize hands-on experience and mentorship quality. Institutions may consider regular evaluations and feedback mechanisms to ensure alignment with student needs and industry expectations.

Future research may expand this study by exploring similar internship programs in other disciplines or institutions, enabling comparative analysis and further refinement of best practices in experiential learning. Simplifying internship structures for clarity and accessibility, especially for students from underrepresented groups, could also be a valuable area of inquiry.

In sum, this study reinforces the crucial role of internship programs in bridging the gap between academic learning and industry practice. It provides a foundation for continuous improvement in hospitality education.

5.0 Contributions of Authors

Serdan Mendoza Devero Jr. is responsible for the manuscript's conception, design, encoding, analysis, writing, or revision.

6.0 Funding

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7.0 Conflict of Interests

No conflict of interest.

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