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Gamified Learning in Selected Business Mathematics Topics: A Mixed Methods Approach

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Abstract. In the 21st century, numerical and problem-solving skills are crucial, yet many Filipino students struggle in these areas, prompting the need for effective educational interventions. Gamification, integrating game design elements into learning, has shown a potential to enhance student engagement and skills, although previous research provides mixed results. This study aimed to explore the effects of online gamification in teaching mathematics to Grade 12 Filipino students, focusing on its benefits and challenges. Using a mixed-method convergent design, the study involved 94 students who were assessed through pre-test and post-test evaluations. Z-tests, paired t-tests, and t-tests for two independent samples were used to measure performance changes. Interviews were conducted and analyzed through Miles and Huberman's Thematic Framework to understand students' experiences. Findings revealed that the experimental group, which used online gamification, showed significantly more improvement in pre-and post-test scores than the control group. However, post-test performance levels between both groups were similar, indicating that gamification is as effective as traditional teaching methods in the long term. Despite challenges such as connectivity issues and limited computer skills, students reported positive experiences with gamification, including increased enjoyment, enhanced motivation, personalized progression, and reduced pressure. The study underscores that while online gamification can boost student engagement and initial learning outcomes, its effectiveness is comparable to traditional methods over time. To optimize its benefits, improvements in digital infrastructure, more platform options, and enhanced computer literacy training are recommended. Overall, online gamification holds promise as a valuable educational tool, particularly for initial learning phases.

Keywords: Online gamification; Numeracy; Problem-solving skills; Mixed-method; Convergent.

1.0 Introduction

In the 21st century, numerical and problem-solving skills have become indispensable for individuals to thrive in an increasingly complex and data-driven world. These competencies are critical in everyday life and fundamental to driving scientific, technological, and economic advancements. The global shift towards industries reliant on technology and data has heightened the demand for a workforce proficient in these areas. Unfortunately, Filipino students have consistently lagged behind their global peers in mathematics and problem-solving, signaling a significant challenge within the Philippine education system. The 2022 PISA report, which places the Philippines below the OECD average in Mathematics, reveals a severe deficiency in the ability of students to apply theoretical knowledge to practical, real-world scenarios (Chi, 2023). Furthermore, the 2019 TIMSS results ranked the Philippines' performance in mathematics as the lowest among participating nations, raising alarms about the country's education state (Mullis et al., 2020).

The urgency of addressing this gap cannot be overstated. With global industries rapidly evolving, Filipino students risk being left further behind, limiting their opportunities in an increasingly competitive world. Immediate, innovative interventions are needed to raise performance in mathematics and equip students with the problem-solving skills crucial for navigating the modern world. One promising approach that has emerged in recent years to address these educational challenges is gamification.

Gamification is applying game design elements, such as points, leaderboards, badges, and interactive tasks, in non-game contexts to enhance user engagement and motivation (Lister, 2015). In education, gamification transforms traditional learning environments into more dynamic, interactive spaces that can mimic the engagement seen in video games. Platforms like Kahoot, Quizizz, and Classpoint have integrated these elements to foster a competitive yet enjoyable learning experience. These platforms make quizzes more interactive, encouraging students to solve problems quickly and efficiently. ClassDojo, which incorporates gamification for behavior management, has also shown the potential to improve students' engagement with numeracy skills. Gamification provides students immediate feedback, a sense of progression, and a playful environment that contrasts conventional teaching methods. While gamification has been lauded for enhancing student motivation and engagement, its effectiveness in developing higher-order thinking skills, such as critical thinking and problem-solving, remains under-researched, particularly in the context of the Philippines.

The existing literature on gamification presents optimistic and cautious perspectives on its efficacy in education. On one hand, numerous studies have shown that gamification can significantly enhance students' motivation, engagement, and learning outcomes. Research by Perttula and Tuomi (2017) highlights how gamified learning environments can promote active learning and collaboration, fostering the development of critical thinking and problem-solving skills. Similarly, Turan, Avinc, Kara, and Goktas (2016) found that gamification enhances student engagement and enjoyment, encouraging a more interactive and participatory learning experience. Including game elements has increased student satisfaction and improved academic performance across various subjects (Hamari et al., 2014). Additionally, gamification can make learning more personalized, allowing students to progress at their own pace while receiving instant feedback on their performance (Abramovich et al., 2013). However, while the positive effects of gamification are well-documented, there are still gaps in understanding how these benefits translate specifically into improved numeracy and problem-solving skills, especially for Filipino students.

On the other hand, several concerns have been raised regarding integrating gamification into educational contexts. Critics argue that overemphasizing extrinsic rewards, such as badges and points, may undermine intrinsic motivation, shifting students' focus from mastering the subject to merely accumulating rewards (Kapp, 2012). This shift could detract from deeper learning and critical thinking, as students might prioritize quick wins over genuine understanding. Moreover, gamified environments can sometimes become distractions, with students becoming more engaged in the competitive aspects of the game rather than the educational content itself (Tondello et al., 2017). Another challenge is that not all students may engage with gamification equally, potentially leading to disparities in learning outcomes. Deterding et al. (2011) caution that gamification may inadvertently exclude less competitive students or lack access to reliable technology, further widening the educational gap. Additionally, prolonged exposure to gamified tasks without proper oversight could result in students focusing more on the game than the academic objectives, possibly leading to a decline in performance (Gentile et al., 2017). These concerns highlight the importance of balancing the benefits of gamification with the potential risks, ensuring that its integration supports meaningful learning rather than superficial engagement.

Despite these contrasting views, a gap exists in understanding how gamification specifically impacts the development of numeracy and problem-solving skills, particularly in the Philippines, where educational challenges are compounded by issues such as limited resources, unequal access to technology, and varying levels of computer literacy. To address this gap, this study investigates the effects of online gamification on students' numeracy and problem-solving skills. By focusing on these specific competencies, the research aims to contribute to a more nuanced understanding of gamification's potential benefits and drawbacks in education. The study also seeks to provide evidence on how gamification can be effectively implemented in Philippine classrooms to improve student engagement and learning outcomes. Furthermore, the research hopes to reconcile the conflicting perspectives on gamification by offering insights into how it can be optimized to enhance educational experiences without compromising deeper learning objectives. By addressing both the advantages and limitations of gamification, this study aims to inform educators, policymakers, and researchers about leveraging this approach to address the country's persistent educational challenges.

2.0 Methodology

2.1 Research Design

This study employed a mixed-method convergent design to investigate the impact of online gamification on students' numeracy and problem-solving skills over one month. A mixed-method design integrates quantitative and qualitative approaches, providing a fuller understanding of the research problem. In a convergent design, quantitative and qualitative data are collected simultaneously and then analyzed separately, with the findings compared and integrated to form a comprehensive understanding of the phenomenon. This approach allowed the statistical evidence of students' performance to be complemented by qualitative insights into their experiences and perceptions, offering a more holistic view of how gamification influenced their engagement and skill development.

2.2 Research Locale

The study is conducted at Nug-as National High School, located in the remote barangay of Nug-as in Alcoy, Cebu, Philippines. This school, approximately 14 kilometers from the town center, serves as a critical educational institution for students in this rural area. The school's location in a secluded region presents distinct challenges, including limited mobile phone reception, though it is equipped with internet connectivity. This unique combination of isolation and technological access provides a valuable setting for investigating the effects of online gamification in education. The school's environment, largely free from the distractions of constant digital connectivity but still capable of engaging with online resources, offers an ideal context to explore how technology-based learning interventions can impact students' academic performance in remote areas.

2.3 Research Participants

The study involved 94 Grade 12 students from Nug-as National High School, a public school in Alcoy, Cebu, Philippines. These students were from the Business Mathematics class taught by the researcher and were chosen based on similar performance levels in mathematics, as indicated by their first-quarter grades.

Table 1. Frequency and percentage distribution of respondents in terms of sex

Group	Male	Female	Total
Control Group	28	19	47
Experimental Group	26	21	47

The intervention involved two groups, each consisting of 47 students: the experimental group engaged with online gamification platforms such as Kahoot, Quizizz, Bamboozle, Classpoint, ClassDojo, ClassTools, MultiBuzzer, and Educaplay, while the control group received conventional instruction without gamified elements. Only respondents from the experimental group were interviewed for the qualitative part of the study. Selection criteria included diverse academic performance (high achievers, average performers, and those struggling with math), gender balance, and varying attitudes toward math. To uphold privacy and confidentiality, pseudonyms were assigned to each participant, replacing identifying information throughout the research process. These criteria collectively contributed to a diverse, representative sample, enhancing the study's validity and generalizability while maintaining ethical considerations and protecting participant anonymity.

2.4 Research Instrument

The research employed two primary researcher-made instruments: a Pre-Test and Post-Test Questionnaire and an Interview Questionnaire. The pre-test and post-test were designed to assess students' proficiency in numeracy and problem-solving skills, specifically targeting topics on salary and wages from Business Mathematics Subjects. A 30-item multiple-choice test was developed for this purpose, with the content validated by experts, including the School's Mathematics Key Person from Nug-as National High School and a professor from Cebu Technological University-Argao Campus. The test was pilot-tested at Dalaguete National High School to ensure reliability.

The pre-test, administered before the intervention, established a baseline for students' mathematical capabilities. Following the intervention, a post-test was conducted to evaluate any changes in performance. This allowed for a comparative analysis of pre-test and post-test results, providing quantitative data on the effectiveness of online gamification in enhancing numeracy and problem-solving skills.

In addition to the quantitative data, qualitative insights were gathered through interviews with randomly selected students. The interview questions were designed to explore the students' experiences with online gamification, including its influence on their motivation, engagement, and learning outcomes. These interviews provided a deeper understanding of how the intervention impacted students beyond test scores, offering valuable perspectives on its educational and motivational effects.

2.5 Data Gathering Procedure

This study aimed to assess the impact of online gamification on students' numeracy, problem-solving skills, and engagement in Business Mathematics. It focused on comparing the performance of students exposed to Online Gamification and Conventional Instruction across six competencies. Key research questions included examining the pre-test and post-test score distributions for both groups, identifying significant differences within each group, and comparing the mean gains between groups.

Data gathering employed a non-equivalent pretest-posttest quasi-experimental design for the quantitative phase. Due to practical limitations, random assignment was not feasible, so a control group using conventional methods served as a reference point. The assessment tool, a 30-item multiple-choice test, was validated by experts, pilot-tested, and achieved a Kuder-Richardson 20 (KR-20) reliability coefficient of 0.802. Pre-tests were administered to both groups at the start to establish a baseline, followed by post-tests after one month of instruction. Quantitative data were analyzed using a z-test and paired t-test to compare pre-test and post-test scores for each group. In contrast, the t-test for two independent samples examined the mean gain differences, highlighting any significant performance improvement between groups.

For qualitative analysis, interviews were conducted with students from the experimental group to explore their experiences with online gamification. Thematic analysis was applied to these interviews based on the framework by Miles and Huberman (1994). The process involved four stages: Data Collection, Data Reduction, Data Display, and Conclusion Drawing and Verification. This qualitative approach provided nuanced insights into the effects of gamification on learning, motivation, engagement, and students' overall educational experiences, revealing perceived benefits, challenges, and recommendations for future interventions.

2.6 Ethical Considerations

This study, approved by the Graduate School Committee of Cebu Technological University-Argao Campus, adhered to the ethical principles outlined by Brinkmann and Kvale (2015). Key considerations included securing informed consent, maintaining confidentiality, and minimizing potential participant harm. These principles were complemented by broader ethical standards in research, emphasizing integrity, originality, and accuracy.

3.0 Results and Discussion

3.1 Pre-Test Scores

Table 2 illustrates the pre-test performance of both the experimental and control groups across six key competencies. The data indicates below-average performance for almost all competencies, highlighting the need for intervention. For Competency 1 (defining salary, wage, income, and benefits), the experimental group achieved a mean of 6.15, with a z-score of 8.99. Similarly, the control group scored a mean of 5.15 with a z-score of 12.86. Both groups showed a performance significantly below average. For Competency 2 (computing gross and net earnings), the experimental group had an actual mean of 1.83 with a z-score of 15.86, and the control group had an actual mean of 2.30 with a z-score of 15.29. Both groups again demonstrated below-average performance. Similarly, Competency 3 (differentiating gross from net earnings) saw both groups underperform, with the experimental group achieving an actual mean of 0.81 and a z-score of 8.92, while the control group had an actual mean of 0.98 and a z-score of 5.35.

In Competency 4 (defining benefits given to wage earners), the experimental group performed slightly better, with an actual mean of 1.45 and a z-score of 0.56, indicating average performance. In contrast, the control group performed below average, with a mean of 1.15 and a z-score of 3.37. Competency 5 (enumerating standard deductions) and Competency 6 (computing overtime pay) were particularly challenging for both groups. The experimental group had actual means of 2.57 and 0.15, with corresponding z-scores of 14.29 and 11.57, while the control group had means of 2.77 and 0.23, with z-scores of 10.82 and 8.35. Both groups struggled considerably with these competencies.

Table 2. Pre-test score distribution for the experimental and control groups per competency

Learning Competencies	No. of Items	Group	h.m.	a.m.	s	z-score	Description
1. Define salary, wage, income, benefits	12	Experimental	9.00*	6.15	2.17	8.990	Below Average
		Control		5.15	2.05	12.86	Below Average
2. Compute gross and net earnings	6	Experimental	4.50*	1.83	1.15	15.86	Below Average
		Control		2.30	0.99	15.29	Below Average
3. Differentiate gross from net earnings	2	Experimental	1.50*	0.81	0.53	8.920	Below Average
		Control		0.98	0.67	5.350	Below Average
4. Define each of the benefits given to wage	2	Experimental	1.50*	1.45	0.65	0.560	Average
		Control		1.15	0.71	3.370	Below Average
5. Enumerate the standard deductions with the corresponding computation	7	Experimental	5.25*	2.57	1.28	14.29	Below Average
		Control		2.77	1.57	10.82	Below Average
6. Compute overtime pay	1	Experimental	0.75*	0.15	0.36	11.57	Below Average
		Control		0.23	0.42	8.350	Below Average
Overall	**30**	**Experimental**	**22.50***	**12.96**	**4.42**	**14.80**	**Below Average**
		Control		**12.57**	**3.89**	**17.51**	**Below Average**

*computed from 75% of DepEd-standard items
a.m. – actual mean; h.m. – hypothetical mean; s – standard deviation

The COVID-19 pandemic likely exacerbated these learning gaps, disrupting traditional learning environments and contributing to these poor results, as observed in other studies (Sooknanan & Seemungal, 2023; Torres, 2021). Furthermore, the poor performance in the pre-test across all competencies aligns with Bernardo et al.'s (2022) findings that Filipino students often struggle with problem-solving and critical thinking, particularly at Level 1 proficiency. These students tend to rely on explicit instructions and lack deeper comprehension, a difficulty also highlighted by Vidad and Quimbo (2021). Their study found that students frequently fail to apply mathematical concepts or translate real-world problems into mathematical equations, further confirming the challenges seen in this study.

3.2 Post-Test Scores

Table 3 shows the post-test scores of the experimental and control groups across six business math competencies, providing insights into students' proficiency levels after the intervention. Comparing actual mean scores to the hypothetical mean (75% of total items per competency) offers a clear understanding of student's achievement relative to expected standards.

Table 3. Post-test score distribution for the experimental and control groups per competency

Learning Competencies	No. of Items	Group	h.m.	a.m.	s	z-score	Description
1. Define salary, wage, income, benefits	12	Experimental	9.00*	9.00	1.99	0.00	Average
		Control		8.49	2.06	1.70	Average
2. Compute gross and net earnings	6	Experimental	4.50*	4.55	1.13	0.32	Average
		Control		4.43	1.18	0.43	Average
3. Differentiate gross from net earnings	2	Experimental	1.50*	1.64	0.52	1.81	Average
		Control		1.57	0.61	0.84	Average
4. Define each of the benefits given to wage	2	Experimental	1.50*	1.60	0.53	1.23	Average
		Control		1.53	0.65	0.34	Average
5. Enumerate the standard deductions with the corresponding computation	7	Experimental	5.25*	3.74	1.28	8.07	Below Average
		Control		3.17	1.62	8.83	Below Average
6. Compute overtime pay	1	Experimental	0.75*	0.45	0.50	4.18	Below Average
		Control		0.40	0.49	4.83	Below Average
Overall	**30**	**Experimental**	**22.50***	**20.98**	**4.32**	**2.41**	**Below Average**
		Control		**19.60**	**4.99**	**3.99**	**Below Average**

*computed from 75% of DepEd-standard items
a.m. – actual mean; h.m. – hypothetical mean; s – standard deviation

The post-test results in Table 3 provide further insights. For Competency 1 (defining salary, wage, income, and benefits), the experimental group achieved an actual mean of 9.00 and a z-score of 0.00, indicating average performance. The control group, with an actual mean of 8.49 and a z-score of 1.70, also performed at an average level. Both groups showed improvement compared to their pre-test scores. For Competency 2 (computing gross and net earnings), the experimental group had a mean of 4.55 and a z-score of 0.32. In contrast, the control group scored 4.43 and a 0.43 z-score, indicating average performance for both groups. In Competency 3 (differentiating gross from net earnings), the experimental group had a mean of 1.64 and a z-score of 1.81. In contrast, the control group had a mean of 1.57 and a z-score of 0.84, indicating average performance. Similarly, for Competency 4 (defining wage benefits), the experimental group scored a mean of 1.60 and a z-score of 1.23. In contrast, the control group had a mean of 1.53 and a z-score of 0.34, maintaining average performance levels.

However, in Competency 5 (enumerating standard deductions) and Competency 6 (computing overtime pay), both groups continued to struggle. The experimental group achieved a mean of 3.74 and a z-score of 8.07 for Competency 5 and a mean of 0.45 and a z-score of 4.18 for Competency 6, indicating below-average performance. The control group had similar results, with a mean of 3.17, a z-score of 8.83 for Competency 5, and a mean of 0.40 and a z-score of 4.83 for Competency 6. Despite the challenges in Competencies 5 and 6, the experimental group's overall post-test mean score of 20.98, with a z-score of 2.41, surpassed the control group's mean of 19.60 and a z-score of 3.99 but was still below the hypothetical mean of 22.50. This suggests that while both groups struggled, the experimental group performed slightly better after the intervention, possibly due to the implementation of online gamification. However, the experimental group's standard deviation of 4.32 reflects variability in individual performance, suggesting that some students responded better to gamification than others.

Supporting the findings of this study, previous research by Su & Cheng (2015), Zamora-Polo et al. (2019), and Zainuddin et al. (2020) has demonstrated that gamification enhances students' learning outcomes by increasing motivation, engagement, and performance. The slight advantage observed in the experimental group's post-test scores underscores the potential of gamification as an effective instructional strategy. This finding is consistent with the results reported by Karamert and Vardar (2021), which found that students exposed to gamification showed a significantly greater increase in achievement test scores compared to the control group. These findings collectively suggest that incorporating gamification into classroom instruction can lead to tangible improvements in student performance.

3.3 Comparative Analysis of Pretest and Post-Test Scores

Table 4 expresses the comparative analysis of the pretest and post-test results. This is used to determine if there are significant improvements in the test scores of the two groups of students. Table 4 reveals that respondents' scores increased when exposed to online gamification and conventional/traditional methods.

Table 4. Paired t-test for pre-post mean gain of experimental and control groups

Group	Mean		Mean Gain	p-value	Decision	Interpretation
	Pre-Test	Post-Test				
Experimental Group (Online Gamification)	12.96	20.98	8.02	0.0000	Reject H_o	Significant**
Control Group (Conventional Teaching)	12.57	19.60	7.03	0.0000	Reject H_o	Significant**

** Significant at 0.05 using Paired T-Test

For the experimental group, the pre-test mean score was 12.96, which increased to 20.98 in the post-test, resulting in a mean gain of 8.02. The computed t-value of 14.99 exceeds the critical t-value of 2.01, yielding a p-value of 0.0000. This indicates a statistically significant improvement in the test scores, allowing for rejecting the null hypothesis (Ho). The findings suggest that using online gamification as a teaching strategy effectively enhanced students' learning outcomes in this group. Similarly, the control group improved from a pre-test mean of 12.57 to a post-test mean of 19.60, reflecting a mean gain of 7.03. The computed t-value of 11.96 also surpassed the critical t-value of 2.01, with a p-value of 0.0000, leading to the rejection of the null hypothesis (Ho). This result indicates that conventional teaching methods also led to significant gains in student performance.

The data shows a significant difference between the experimental and control groups' pre-test and post-test results. Both groups exhibited statistically significant increases in post-test scores, with the experimental group showing a greater improvement, as indicated by the t-test results (14.99 for the experimental group vs. 11.96 for the control group). This suggests that online gamification significantly enhanced the experimental group's math proficiency compared to their initial levels. The increase in the experimental group's mean scores indicates that integrating online gamification into the Business Math class effectively boosts student performance.

The research by Derasin (2024) reinforced the current study's findings, suggesting that gamification significantly enhances students' mathematical skills, extending its potential applicability beyond specific subjects like mathematics. Iwamoto et al. (2017) also noted that classroom games improve academic performance, aligning with the observed improvements in both groups. Additionally, the studies by O'Donovan et al. (2013) and Ibanez et al. (2014) contributed to understanding the positive impact of gamified learning activities on engagement and learning outcomes, echoing the observed improvement in the current study. Furthermore, research by Rosas et al. (2003) and Wang (2015) highlighted the broader benefits of games in education, suggesting that gamification techniques can positively influence various aspects of the learning experience, ultimately contributing to improved academic performance and student engagement.

3.4 Difference in the Gains of Scores Between Groups

Table 5 shows the significant difference in score gains in the two groups of respondents. Gain is defined as the difference between pretest and posttest scores.

Table 5. Independent samples t-test for the difference of the mean gain between groups

Group	Mean Gain	p-value	Decision	Interpretation
Experimental (Online Gamification)	8.02	0.16	Accept H_o	Not Significant***
Control (Conventional Teaching)	7.03			

*** Not Significant at 0.05 using T-Test for two independent samples

Based on the data above, the experimental group achieved a mean gain of 8.02, while the control group recorded a mean gain of 7.03. The computed t-value for the mean gain is 1.42. This value is compared against the critical t-value of 1.99, resulting in a p-value of 0.16. Since the p-value exceeds the conventional alpha level of 0.05, the null hypothesis (Ho) is accepted, indicating no statistically significant difference between the mean gains of the two groups. Table 5 indicates no substantial difference in mean gains between the control and experimental groups. This demonstrates that while the experimental group showed slightly more improvements, these were not significantly greater than the control group, rendering the learning gains statistically insignificant. Thus, integrating online games did not yield a statistically significant difference compared to conventional teaching methods. The observed difference fell short of the 5% threshold, suggesting the impact of online gamification on math proficiency is statistically negligible compared to traditional instruction.

This finding is supported by the study of Ebner and Holzinger (2007) and Crocco et al. (2016), who reported that while gamification increased motivation, it did not result in significant differences in learning outcomes compared to traditional methods. However, contrary to these findings, Huang et al. (2016), as cited by Nacional (2024), reported that gamification leads to better learning outcomes and increased satisfaction. However, the current study refutes this, as it did not find a statistically significant difference in performance between the gamified and traditional groups. This discrepancy may be due to the novelty of gamification, requiring more time for students to adjust and become familiar with the method. Many students' lack of computer skills extended the learning curve, affecting their ability to engage with the gamified content fully. Nonetheless, it is notable that online gamification did not lead to significantly inferior results compared to traditional methods. This study indicates that incorporating online gamification into classroom instruction did not significantly decline student performance.

3.5 Student's Experiences During the Conduct of Online Gamification

Table 6. Student's experiences during the conduct of online gamification

Themes	Categories
Benefits and Advantages	Enjoyment and Engagement Learning and Skill Development Motivation and Achievement Individualized Progression Reduced Intimidation and Pressure
Challenges and Drawbacks	Connectivity Issues Platform Restrictions Limited Computer Literacy
Suggestions for Improvement	Infrastructure improvements Expansion of platform options Computer Literacy Training

Theme 1: Benefits and Advantages

Integrating quantitative and qualitative findings in this study highlighted several key benefits of online gamification in enhancing student engagement and learning experiences. Quantitative data revealed significant improvements in students' numeracy and problem-solving performance, aligning with qualitative insights from participant interviews. Respondents consistently emphasized the motivational effects of interactive elements, such as rewards, progress tracking, and personalized feedback, which increased enjoyment and sustained engagement with the learning material. This simultaneous convergence of data suggests that the gamified approach led to measurable performance gains and fostered a deeper emotional connection to the learning process.

Respondents emphasized their enjoyment and engagement with online gamification, highlighting the appeal of colorful graphics, entertaining tasks, and challenging activities. They find the immersive and interactive nature of gamified learning akin to playing games, driven by elements like quests, rewards, and time limits. This approach not only captivates their attention but also motivates active participation. Importantly, they view online gamification as making learning enjoyable and effectively transforming educational tasks into stimulating activities. This positive perception underscores how gamification elements enhance their overall learning experience despite the academic nature of the tasks. Studies by Ibanez et al. (2014), O'Donovan et al. (2013), and Casuso-Holgado et al. (2013) further supported this positive impact of gamified exercises on student engagement and understanding, emphasizing the potential for increased enjoyment to contribute to improved academic performance.

Respondents also contrasted online gamification with conventional teaching methods, noting that conventional methods often rely on passive instruction. This sentiment is supported by Bhat (2023), who reported that technological advancements enhance student engagement. Respondents also appreciated the benefits of having fun while improving their mathematical understanding and problem-solving abilities. This underscores the effectiveness of online gamification in blending educational content with engaging gameplay. Additionally, students noted that gamified learning challenges them to push their limits, apply knowledge in real-world scenarios, and refine their problem-solving skills through interactive games and puzzles. Gamification's dual benefit of fun and enhanced understanding also aligns with the findings of Caballero et al. (2022), which emphasized its positive impact on critical thinking and skill development.

Moreover, respondents reported that online gamification was highly motivating, giving them feelings of achievement and satisfaction. They felt motivated, excited, and enthusiastic about challenging tasks and competition, viewing these as opportunities for growth—the quest-based structure and rewards, like points and badges, incentivized active participation and mastery. The sense of accomplishment from these rewards validated their progress and kept them engaged with the content.

Respondents also emphasized that online gamification offers immediate feedback, aligning with their preference for personalized progression. This feature allows them to track their performance, identify areas for improvement, and adjust their learning strategies accordingly. The respondents highly valued the rapid feedback, providing insights into their strengths and weaknesses during engagement with educational content. They appreciated the flexibility of individualized progression, enabling them to learn at their own pace without feeling pressured. This flexibility allowed them to focus on areas of interest or revisit challenging topics, enhancing their overall learning experience. This aligns with Turan et al. (2016), who highlighted gamification's stimulating effects and the role of rewards and feedback in shaping student behavior, monitoring progress, and motivating continuous learning.

Finally, respondents highlighted that online gamification made learning math less intimidating by creating a game-like atmosphere. They felt empowered to tackle challenges creatively and participate actively without fear of judgment. The option for anonymity further supported a comfortable learning environment. Despite potential competitive aspects, respondents found gamification inclusive and empowering, contrasting with traditional concerns about classroom anxiety. This supports another study's findings that games positively influence interest, engagement, and motivation (Barata et al., 2013) and foster competition without intimidation (Nicholson, 2012).

Theme 2: Challenges and Drawbacks
While the benefits were evident, both qualitative and quantitative data highlighted challenges that hindered the full potential of online gamification. Challenges have also emerged from interviews, highlighting connectivity issues, platform restrictions, and limited computer literacy. Connectivity issues, particularly in areas with unreliable internet access, hinder students' engagement, while restrictions on gamified platforms limit effective integration into the curriculum. Limited computer literacy poses another challenge, impacting students' ability to navigate complex interfaces, exacerbating inequalities in access to quality education, and impeding the effectiveness of gamification initiatives.

Respondents identified halting internet connectivity as a major challenge during gamification activities, disrupting participation and causing delays in accessing content. This interruption affects learning experiences and outcomes, hindering timely interactions and feedback crucial for comprehension and engagement, leading to frustration, demotivation, and disconnection. Uzunboylu et al. (2020) supported these findings, noting similar challenges with internet connectivity in online learning and gamification contexts, underscoring their impact on students' ability to benefit from gamified activities fully.

Some respondents also expressed frustration with limited availability or slots for gamified platforms, which resulted in feelings of exclusion and unfairness. Restricted availability means only a limited number of users can access platforms concurrently, leading to challenges in joining activities and delays in accessing content. Another issue identified during the interview was the respondents' limited computer literacy, which hindered their ability to navigate online platforms and understand instructions. This resulted in frustration and difficulties keeping up with their peers. This is supported by Tomaro (2018), who highlighted that insufficient infrastructure and equipment in Philippine schools hinder the development of computer literacy among students.

Theme 3: Suggestions for Improvement
The convergence of quantitative and qualitative findings also led to actionable suggestions for optimizing gamification in education. Both data sets emphasized the importance of infrastructure improvements, particularly reliable internet access, to enhance learning experiences and minimize disruptions. Respondents also suggested expanding platform options to accommodate more students. Moreover, comprehensive computer literacy training emerged as a critical need in gamified environments. These findings suggest that targeted improvements in infrastructure, platform access, and training could significantly enhance the effectiveness of online gamification as a teaching tool.

4.0 Conclusion
The study reveals that despite the experimental group's exposure to online gamification, which resulted in a higher mean score than the control group, no significant difference was observed between online gamification and the conventional teaching method, indicating their comparability. Despite technical challenges, gamification promotes positive attitudes toward mathematics, enhances enjoyment and engagement, facilitates learning and skill development, boosts motivation and achievement, supports individualized progression, and reduces intimidation and pressure, as evidenced by the interviews. Addressing technical barriers—such as connectivity issues and computer literacy—emerges as a critical priority to fully harness the potential of gamification in mathematics education. By overcoming these obstacles, educational stakeholders can better leverage gamified approaches to create more dynamic and interactive learning environments. Moreover, continued research and targeted interventions are essential to refine gamification strategies, ensuring they align effectively with educational goals and enhance overall student outcomes.

5.0 Contributions of Authors
The completion of this thesis was the result of a collaborative effort between the two authors. The first author, Cherry Ann S. Dueñas, a Senior High Teacher at Nug-as National High School in Alcoy, Cebu, Philippines, was responsible for writing, editing, and encoding the manuscript, ensuring clarity and adherence to academic standards. She also managed the technical aspects of formatting and organizing the document. The second author, Dr. Marichou L. Carreon, Associate Professor V of Cebu Technological University-Argao Campus, who holds a Doctorate in Education, focused on proofreading and verifying the accuracy of the data gathering and analysis procedures. Her meticulous review ensured the reliability and accuracy of the research findings. Both authors worked closely to produce a coherent and well-researched study.

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7.0 Conflict of Interests

The authors have no conflicts of interest to declare that they are relevant to the content of this article.

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The Reflective Practices Among English Teachers: A Phenomenological Inquiry

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Abstract. The study aimed to capture the lived experiences of the selected Cebu-based English teachers based on their reflective practices in the basic education program. This Husserlian descriptive phenomenological study utilized a semi-structured interview guide to draw out rich narratives from the eight informants. The researcher analyzed the collected data using the Colaizzi (1978) method. Five themes came to light: The Benefits of Reflective Practices, The Drawbacks of Reflective Practices, Handling the Drawbacks of Reflective Practices, Gaining Insights from Reflective Practices, and Supporting Other Teachers' Development. Based on the findings, the study revealed that the informants had benefited from reflective practices and faced drawbacks while implementing them. Based on the findings, the study suggests that teachers may continually use and improve reflective practices that work best for them, explore other reflective practices they have not tried yet, and pursue continuous professional development. DepEd and other institutions may provide various opportunities for professional development, such as practical seminars and workshops centered on reflective teaching. School leaders and administrators may also provide a protected schedule for structured professional learning conversations among teachers.

Keywords: Reflective practices; Lived experiences; Colaizzi; English teachers.

1.0 Introduction

More than ever, teachers require a more sustainable, convenient, and dependable professional tool. They need a tool or a strategy that allows them to keep track of themselves and to constantly revisit, reflect, and re-evaluate their teaching practices and overall teaching performance. This is to keep up with the ongoing changes in Education 4.0. The instructional methods and the educational landscape have recently undergone significant modifications. These changes have forced teachers to adopt new approaches, procedures, and teaching strategies in response to the rapidly evolving trends and technological developments to ensure the students' overall development (Pant, 2021). It might have other implications that the teachers need to confront right away. In other words, teachers must use a practice that advances their craft. This draws attention to the idea of reflective practice in education. The teachers' reflective practices affect and predict their success (Malmir & Mohammadi, 2017).

Houde (2022) mentioned that John Dewey, an American philosopher, founded the idea of reflective practice. Dewey introduced openness, responsibility, and wholeheartedness as the three attitudes that serve as the cornerstone of reflective practice (Nurfaidah, 2018). According to Nguyen et al. (2015), reflection engages oneself in attentive and critical interactions with thoughts and actions. Zuber (2020) said that reflection is a metacognitive process that involves looking back on prior learning experiences, giving them serious consideration, and applying learning. Reflection allows one to pause and consider what is essential, especially when confronted with a personal or professional challenge (Badaracco, 2020). As stated by Bailey and Rehman (2022), studies show that reflection can distinguish exceptional professionals from average ones because it serves as the root from which other soft skills develop. Through reflective practice, individuals gain understanding, not from formal education but from their professional experiences (Mathew et al., 2017). Reflective practice allows teachers to reflect on their experiences through continuous professional learning (Schon, 1983, as cited by Houde, 2022).

Reflective practice in teams is a form of innovation leadership (Oeij et al., 2017). By participating in the reflective process, teachers foster a culture of teamwork as they analyze and modify their practice and that of their students and colleagues. This collective effort is to achieve a more holistic and sustainable student education. As stated by McCullough (2020), research has shown that teachers who do not actively reflect on their experiences and ask themselves questions are less likely to modify their practices and end up stagnating. She also further stated that incorporating reflective practice into one's teaching is one of the most significant ways to take control of a teacher's professional development. With the aid of reflective practice, teachers can refocus on their priorities in the classroom community (McCullough, 2020).

Indeed, reflective practice improves teaching performance. Hashim and Yusoff (2021) said in their study that reflective practice enabled teachers to assess the relationship between their teaching and the student's learning. Teachers claimed in their study that reflective activities help them become more progressive and help improve the quality of their instruction. According to Spalding (2020), schools with a reflective teaching culture have an advantage in changing the educational landscape because it empowers teachers to identify areas for improvement swiftly and jointly devise the most effective course of action. Nguyen (2021) in his study found that student-teachers acquired the abilities needed to be effective teachers through reflective practice, and they gained more confidence, learned to evaluate and adapt their lessons, developed critical thinking skills about their instruction, and developed the ability to select among several suggestions for lesson improvement.

Several studies on reflective practices among English teachers have been conducted already. However, there appears to be a lack of local qualitative studies on phenomenologically investigating the reflective practices of the teachers, most especially the English teachers in the province of Cebu. Hence, this study aims to phenomenologically explore the lived experiences of English teachers' reflective practices in Cebu to provide insights into sustainable, transformative, and quality education. The findings of this study would contribute to the academe as this provides valuable insights that promote sustainable, transformative, and quality education to help teachers develop professionally. Furthermore, this study would help the teachers, especially the private and public basic education English teachers in Cebu, to maximize the use of reflective practices, which is beneficial in constantly improving the current teaching methodologies. The informants may learn about the various reflective practices utilized, difficulties encountered, solutions to these difficulties, and suggestions and advice on improving the English teachers' existing reflective practices.

2.0 Methodology

2.1 Research Design

The study used a descriptive phenomenological inquiry method to describe the lived experiences of the individuals. This design also explains how people experience a particular phenomenon. Notably, this study used Husserlian descriptive phenomenology to capture the lived experiences of the English teachers' reflective practices. Husserlian descriptive phenomenology was developed by a German philosopher named Edmund Husserl. This approach seeks to understand human experiences by bracketing assumptions and focusing only on lived experiences. Bracketing is setting aside biases before understanding reality (Le Vasseur, 2003, as cited by Gregory, 2019). Hence, through a reflexive journal, the researcher bracketed any preconceived opinions or biases that might affect the data-gathering process and analysis.

2.2 Research Informants

The study's informants were eight private and public Cebu-based English teachers of primary education. These informants were carefully chosen based on the following criteria: 1.) English teachers in Cebu; 2.) must have tenure in the teaching profession of at least three years; and 3.) must have experience implementing reflective practices. These informants were contacted individually via Facebook Messenger to confirm their eligibility. Since it is impossible to predict the likelihood of choosing any participant, the researcher used a nonprobability sampling method. In particular, the researcher used referral sampling, which allowed the researcher to identify some leads who might be interested in and qualified to participate in the study.

Hennink and Kaiser (2021) proved that qualitative investigations can saturate even with relatively modest sample sizes. When there is a replication of existent patterns or themes from data collection, and no new information or insight appears from the additional informants, the study reaches data saturation (Hennink & Kaiser, 2021). This study reached data saturation when the informants brought up similar experiences relevant to reflective practices. On the seventh informant, in particular, the study reached data saturation. To further confirm the saturation, the researcher included one additional informant.

2.3 Research Instruments

In this qualitative study, the researcher used multiple data sources collected by various means (Wa-Mbaleka, 2019). Regarding data collection, the researcher himself communicated and interviewed the informants. Regarding control, the researcher had a huge role in mitigating various factors, like biases, that could impact the results. As the main instrument, the researcher ensured that the study was ethical and that the informants' data was safe. The study used a researcher-made semi-structured interview guide that could effectively capture the lived experiences of the English teachers' reflective practices. Experts in the field of education and English teaching validated the interview guide. The validators are all published researchers, authors, and school leaders.

2.4 Data-gathering Procedure

The researcher submitted a letter requesting an exemption addressed to the university's Research Ethics Committee. Once the request was approved, the researcher secured a copy. Then, the researcher made a list of the possible research informants and messaged them via FB Messenger to confirm their eligibility and willingness. After confirming their eligibility, the researcher asked them for their availability for a one-on-one virtual interview through Zoom.

Following this, the researcher conducted a virtual meeting via Zoom with the participant on a specific schedule. The researcher provided a brief background of the study. To ensure the quality and accuracy of the data, the researcher requested consent from the informants before recording the session. The researcher also reassured the informants that their data was safe and secure. Each interview session lasted 40-60 minutes, considering the informants' busy schedules. During the one-on-one interviews, the researcher also recorded some observations about the informants in a reflexive journal. Reflexive journals are part of the audit procedure for research projects, but they aim to enhance the validity of the research and reduce prejudice (Lincoln & Guba, 1982, as cited by Turner, 2020). These observations include the researchers' judgments, behaviors, and worldviews. The aim was to understand the researchers' biases and how they might affect the study's findings.

After the interviews, the researcher employed intelligent transcription on the audio-video recordings to exclude pauses, status, and filler words. In coding the messages, the researcher used the informants' words as the primary step to encapsulate sentences into single words or phrases. Then, the researcher organized the codes into categories and subcategories. Lastly, the researcher used thematic analysis coding to find recurring patterns and themes.

2.5 Data Analysis

This study sought to capture the lived experiences of the English teachers' reflective practices using Colaizzi's (1978) descriptive phenomenology for data analysis. The researcher bracketed any personal assumptions and biases to present the data accurately. Using a reflexive journal, the researcher identified his crucial role in this study and his relationship with the informants. The researcher noted his feelings and thoughts about the participant during the interaction. The data analysis procedure employed Colaizzi's (1978) steps: familiarizing, identifying significant statements, formulating meanings, clustering themes, developing an exhaustive description, producing the fundamental structures, and seeking member verification.

2.6 Ethical Considerations

This study had no conflict of interest as the researcher's primary goals are educational development, professional growth, and academic contribution. The researcher assured the informants that all audio-video recordings and documents were safe and secure. The researcher asked for the consent of the informants to participate in this study. The informants are all adults who can give full consent. There were no known psychological, social, or legal dangers that could harm the informants in this study or the researcher who conducted the study. Any known risk only caused inconvenience in filling out the forms and participating in the virtual interviews.

3.0 Results and Discussion

The study revealed five themes and seventeen subthemes in Table 1 below.

Table 1. Themes and Subthemes

Themes	Subthemes
Theme 1: The Benefits of Reflective Practices	Looking into the Reflective Practices that Work Best
	Improving the Teaching Performance
	Classroom Management Skills
	Lesson Preparation Skills
	Teaching Strategies
	Professional Skills
Theme 2: The Drawbacks of Reflective Practices	Looking into the Reflective Practices that Work Least
	Journaling and Video-Recorded Teaching
	Classroom Observations
	Teaching Portfolio
	Teaching Inventories
	Self-evaluation
	Peer Observations
	Student Evaluations
	Facing the Drawbacks/Difficulties
	Time Constraints Due to Work Demands
	Not Working out as Expected
	Students Not Accustomed to Evaluating Teachers
	Students' Attitudes Towards Learning
	Internal Struggles Due to High Expectations
	Supervisors' Attitudes Toward fellow Teachers
	The Importance of Mental Health
Theme 3: Handling the Drawbacks of Reflective Practices	Understand Your Purpose
	Optimism toward Learning
	Good Time Management Skills
	Recognize Your Support Needs
	Guidance from Seasoned Teachers
	Professional Development Opportunities
Theme 4: Gaining Insights from Reflective Practices	Lifelong Teaching-learning Process
	Acknowledging Your Self: Strengths and Weaknesses (AS)
	Receptiveness to New ideas
Theme 5: Supporting Other Teachers' Development	Positive and Supportive Environment
	Make Students Understand
	Reflection as a Habit
	Self-Appreciation

The informants' narratives highlighted their lived experiences employing reflective methods through meticulous statement selection, meaning formulation, cluster topic development, and emerging theme processes. The section below presents the extracted significant narratives.

3.1 The Benefits of Reflective Practices

The informants shared reflective practices they have used in a while. These informants have been in the teaching field for a considerable time; therefore, they already know which reflective methods suit them the best. Orakci (2021) supported this claim by asserting that teachers' professional experience influences their reflective thinking. When asked which kind of reflective practice suits them the most, they could list a few and explain why each one suits them and why they favor using it. Their best reflective practices include peer conversations, reflection journals, classroom observations, student evaluations, and self-evaluations. Additionally, they detailed the benefits of these practices. Informants 1, 2, 3, 4, 6, and 8 narrated their experiences as follows:

"Reflection journals… there are things that I can express more when I am by myself." - Informant 1

"I prefer reflection journals because I can record my daily reflection, whether good or bad and use them to reflect and learn from it. The reflective journal also helps me find events that impacted me during my class."
-Informant 3

The informants claimed that keeping a reflection journal as a reflective practice enables them to recognize impactful experiences, express themselves more fully, and document daily learnings. This claim implies that teachers must continuously employ this reflective practice as it helps them record and evaluate their experiences and knowledge. Zulfikar and Mujiburrahman (2017) reinforced the claim by reporting that reflection journals could help teachers reflect on their instruction and subsequently create feedback for developing their classroom practices. They also claimed that reflection journals are valuable tools for raising teaching awareness, thus enhancing students' knowledge (Zulfikar & Mujiburrahman, 2017).

"First and foremost, I think what I have amplified this school year is the student evaluations." - Informant 4

"I have self and peer evaluation form that students fill out every after activity that will help me gauge regarding their progress."- Informant 4

The informants expressed that they maximized student evaluations as they found them beneficial. Informant 4 said he could gauge students' learning progress through student evaluations. Consequently, teachers also need to consistently implement this practice to help students be mindful of their learning by providing genuine feedback to teachers. This implies that teachers can further monitor their teaching practices and strategies in the classroom. Rempel (2018) affirmed that student evaluations provide a fundamental indicator of course objective success, and they can tell whether a student is engaged (or not) in response to an instructor's actions.

"As for CO, I would appreciate it if a direct head and MT could give me more suggestions and professional advice to help me improve as a teacher. I trust them because they have more experience, and they are proficient in the field already."
- Informant 1

"Peer reviews of instruction and classroom observations work best for me since I can get reliable and comprehensive feedback from experts in my field." - Informant 8

Some stated they had picked up new teaching methods and practices through peer conversations. Additionally, hearing constructive criticisms from supervisors and other teachers during classroom observations has helped them widen their perspectives on using efficient teaching techniques. This finding suggests that classroom observations can be a brilliant way to get direct and immediate feedback from other professional teachers. Teachers can seek help from professional teachers to monitor their learning progress. According to Okeke and Van Der Westhuizen (2020), teachers can learn from one another at work by seeking advice, testing ideas, and exchanging ideas—especially from those with more expertise. Teachers should have professional discussions to address discipline-related concerns in school (Okeke & Van Der Westhuizen, 2020).

"Over the years, I realized that interpersonal and intrapersonal communication strategies help me in terms of reflective practices." - Informant 2

"I prefer hearing points to improve from other people." - Informant 6

The informants also expressed that they felt satisfied doing peer conversations. Aside from their interaction with classroom observers, the teacher can also take advantage of talking casually with their peers about their experiences, challenges, and insights in the classroom. Teachers can speak with peers honestly and confidently compared to supervisors and other school administrators. In other words, teachers can be more honest when interacting with peers. This claim also means that peer conversation is an effective strategy to gain emotional support. According to Turner et al. (2002), as cited by Chang et al. (2022), a supportive environment has contributed to the teachers' enthusiasm toward work.

The informants believe that these reflective practices positively impact their teaching performance. They detailed concrete testimonies in classroom management, lesson preparation, teaching strategies, and professional skills. The following narratives from informants 2, 3, 4, 5, 7, and 8 illustrate these testimonies.

"I noticed that my classroom management skills and delivery of instruction have improved. I also felt more confident in my field." - Informant 8

"I can deliver the lesson so they can get it right away. The evidence is on the students' performance. I tend to be practical. " - Informant 5

Reflective practices have enhanced the participant's classroom management and teaching abilities by adopting or replicating carefully thought-out procedures learned from other teachers. This means that reflective practices have improved the teachers' abilities to create an engaging and relevant learning environment. Korthagen (2017) reinforced this finding by stating that insights drawn from the reflection process can result in effective behaviors in the classroom. In other words, teachers can learn more about their teaching styles and focus only on activities that engage the students well. This implies that students can directly benefit from the improvements in the classroom and their teacher's capacity. As a result, students' performance would also improve. Ciampa and Gallagher (2015), as cited by Suphasri and Chinokul (2021), affirmed that reflection helps teachers become more aware of their teaching practices, which also allows them to unlearn some practices that do not work and prevent unfavorable impacts on the students' performance.

"Reflective practices' essence is for us, teachers, to take responsibility for our professional development, take part in the curriculum development and how a teacher might improve in his or her teaching for better learning outcomes."
- Informant 3

"Reflective practice in the teaching-learning process is vital to teachers' professional development. It is an effective way for teachers to improve and share best practices continuously." - Informant 8

As expressed by Informants 3 and 8, reflection allowed them to take control of their professional development. Reflective practice can help teachers stay current with their skills and be relevant in the teaching profession. They can decide where to improve and create goals for their personal growth to have a fulfilling career. One must take responsibility for their professional development, as shared by participant 39J09. Mermelstein (2018) supported the idea that instructors must grow professionally in various ways to carry out their instructional responsibilities to the best of their abilities and give their students the best learning chances.

The informants also explored the core or essence of reflective practices from a personal and teaching-learning perspective. They described how impactful and relevant these practices are. Narratives from informants 2, 4, 5, 6, and 7 exemplify this.

"Refection should be at the heart of the teaching-learning process." - Informant 4

"Reflection is a practice that a teacher must do habitually, especially when he/she engages students through feedbacking."
- Informant 6

The informants shared that reflection must be a habit among teachers and be the heart of the teaching-learning process. This implies that reflective practices are vital components of the teaching profession rather than an option or an infrequent endeavor (Zeichner & Liston, 2019). Habitual reflection promotes continuous learning and development. Reflective practices yield many benefits in general. Through the involvement of students and peers, they foster a teacher's development in many facets through constant feedback and learning. In other words, reflective activities enable teachers to take charge of their professional growth. The use of reflective teaching has shown its effectiveness in enhancing the teachers' competence, according to Mesa's (2018) research findings.

Furthermore, according to the informants, reflection allowed them to detoxify their teaching lives. This implies that reflection promotes balance regarding well-being and work-life. Through reflection, the teacher can prevent stress and burnout. Chang et al. (2021) mentioned that teachers doing reflective reappraisal revealed that they experienced reduced emotional exhaustion even though their workloads were challenging and demanding. Reflective reappraisal is reinterpreting experiences to control the impacts of negative feelings (Wood et al., 2020).

3.2 The Drawbacks of Reflective Practices

The informants shared some of their preferred reflective practices in the previous sections. However, they also brought up reflective procedures that they found least effective. The reflective practices that work least for some include video-recorded teaching, teaching portfolios, and teaching inventories because of multiple factors such as time constraints due to work demands, technical know-how, and student-related concerns. The narratives below highlight informants 2 and 6 experiences.

"As for the video-recorded teaching practices, I do not have the time to do it." - Informant 2

"I have not tried teaching portfolios yet." - Informant 6

Informant 2 mentioned that she does not do video-recorded teaching practices as it is time-consuming. On the other hand, informants 4 and 6 expressed that they have not done teaching portfolios yet. This shows that some reflective practices, such as teaching portfolios and video-recorded lessons, are neither practical nor convenient for all teachers given the required preparation. Bokiev et al. (2017) affirmed this claim by mentioning that a teaching portfolio consumes time and is demanding as it necessitates reflective writing skills from the teachers. Moreover, video-recorded lessons are time-consuming and require some technical requirements from the teachers. Hence, teaching portfolios and video-recorded teaching practices are the least explored.

Even though classroom observations, journals, peer observations, and student evaluations were mentioned to be beneficial in the previous sections, some informants consider them less effective due to personal preferences and internal struggles. The accounts from informants 2, 3, 5, 7, and 8 below describe this behavior.

"I find classroom observation lame when it comes to reflective practices. Whenever there is classroom observation, the teacher can prepare ahead so we cannot tell if that is how they are in their teaching regularly." - Informant 3

"I do not do reflection journals because I am so emotional. When I do reflection, the target is to lessen my stress, not add to it." - Informant 5

Informant 3 admitted that classroom observation is ineffective for her as it does not accurately assess her ability to teach, and it allows him/her to do something extra. This is predicated in a setting where surprised class observations are not permitted, such as a public school. This suggests that observations must be appropriately scheduled and communicated to the teacher. Instead of showcasing what is actual, it invites the informant to display her ideals. On the other hand, informants 2 and 5 shared that they do not do journaling due to personal reasons and preferences. This implies that one reflective practice does not apply to everyone, as teachers have specific needs, contexts, and preferences. Jackson (2018) mentioned that no single strategy applies to everyone. What is crucial is that teachers know when to use the appropriate method.

"I do not like evaluating myself. It will be biased if I evaluate myself. I may only focus on the good points because I want to "glorify" myself or focus on the bad because I do not want to sound "humble." - Informant 7

"I do not find this (student evaluation) reliable since students may tend to be subjective. Their age and maturity may also affect the quality of their evaluation." -Informant 8

Regarding self-evaluations and student evaluations, informants 7 and 8 mentioned that they do not find these evaluation forms compelling. The former mentioned self-evaluation enables biases on the participant's part and added that peers, not the teachers themselves, evaluate to guarantee objectivity, accuracy, and reliability. The latter claimed that student evaluations are unreliable as they are too subjective. Stroebe (2020) stated that student evaluations of instruction do not reflect the teacher's effectiveness. Several non-teaching-related criteria, such as the instructors' gender, foreign accents, and minority status, influenced this. It implies that the effectiveness of student evaluation depends on the student's age and maturity. This necessitates age-appropriate evaluation techniques that would be better for teachers and students. Frimpong (2021) mentioned that students can easily manipulate developmentally appropriate materials, reducing the teacher's time to provide more explanation to learning content.

The informants describe their difficulties in using some of these reflective practices. The supervisor's attitude towards other teachers, internal struggles due to high expectations, students' attitudes towards learning, and work demands contributed to the teachers' struggles. Informants 2, 4, and 6 detailed the following difficulties:

"I think having no time. This is very challenging since I am in a public school..." - Informant 3

"There are many demands. Moreover, apart from that, I would have wanted to try teaching inventories." -Informant 4

The informants expressed their struggles with high work demands. This shows that high work demands impede the informants from engaging in reflective practices and other professional and personal growth opportunities. The informants just stick to those reflection practices that they find convenient and do away with time-consuming ones. In addition to teaching, public school teachers often have various non-teaching responsibilities that force them to take on many additional duties and obligations that take time away from their actual teaching (David et al., 2019). This is true for both public and private school teachers. Private teachers face difficulties juggling their obligations because they frequently work past the terms of their contracts (Gumarang, 2021). Ancho and Bongco (2019) corroborated this claim by emphasizing that teachers spend more than eight hours a day performing their obligations and often feel pressured to complete their work outside of the classroom at home, which can occasionally impact their personal lives. This shows that reflective practices are extra work for teachers. Villarejo et al. (2022) mentioned that teachers would experience exhaustion due to their line of work, given the nature of the task and the demands placed upon them professionally. As a result, they just focus their priorities on a few issues that they currently deem to be important. Informants 4 and 7 further detailed the following difficulties:

"Students who do not take the reflective practices seriously. I just get generic answers from them (Student Evaluation). They are not used to the culture of evaluating their teachers." -Informant 4

There are times when students are not honest with their evaluation because they want to get on the good side of the teacher." - Informant 7

Regarding evaluations from students, informants 4 and 7 narrated their struggles with student evaluations. Informant 7 claimed that students' honesty affects the quality of evaluations. Furthermore, informant 4 mentioned that some students do not take class/teacher evaluations seriously as they are not accustomed to the culture of evaluating their teachers. This may affect the teacher's performance because they would not know whether the students enjoyed the activities or not or whether they have learned something from the class or not. Mohammadi (2021) complemented the claim by stating that performance evaluation is a vital and significant activity for all organizations as it seeks to enhance the caliber of teaching and learning processes. If teachers do not receive quality evaluations from students, then the purpose of doing this reflective practice is unproductive. Informant 7 shared the following difficulties:

"There are also times when feedback given after the classroom observations is not reasonable because the observer does not know the behavior of the students or why you teach how you teach in a specific class" - Informant 7

"Some observations are not reasonable because some observers focus on mistakes. They sometimes do not see the effort teachers put in, or the behavior of the students in the classroom." - Informant 7

On the other hand, informant 7 narrated her struggles with the supervisor's way of giving feedback during class observations. The informant claimed that some observation inputs are unreliable as the observer does not have an in-depth context or understanding of the student's behaviors and abilities. Giving feedback is focused on the mistakes and fails to recognize the teachers' efforts. This finding suggests that observer biases may impact job satisfaction, motivation, and morale because the instructor felt devalued and unappreciated. Feedback must be constructive and fair and highlight accomplishments and growth areas. Liu et al. (2019) stated that observers or evaluators must know the content, instructional methods, and evaluation systems so that teachers can fully appreciate the feedback. According to James and Wyckoff (2020), teacher evaluation should concentrate on the best methods for determining a teacher's efficacy. If a teacher has some areas for improvement, evaluators must assist the teacher in working on those areas.

3.3 Handling the Drawbacks of Reflective Practices

When asked how they handled the drawbacks or challenges, the informants recounted several unique ways that embodied Filipino teachers' natural resilience and adaptability. The subthemes that support this theme include the following: the importance of Mental Health, Understanding Your Purpose, Optimism towards Learning, Time Management, and Recognition of Your Support Needs.

"I could say I have matured emotionally as I have learned the art of letting it all go. Mental health matters more."
- Informant 1

"I just carry on. There is no point in sulking over drawbacks." -Informant 7

Emotional maturity enables the participant to let some things go and place more importance on mental wellness. This approach towards struggles is healthier than embracing and solving them all at once. This finding implies that, through reflection, teachers have become more aware of their mental health needs. Teachers now place a higher priority on their well-being. Salinas-Falquez et al. (2022) stated that the most resilient people can handle pressure and, as a result, feel more in control, handle challenging circumstances, and maintain a higher emotional equilibrium in stressful conditions.

In the succeeding section, informants 2, 3, and 4 described their experiences with understanding their purpose and being optimistic towards learning to handle challenges.

"If these occur, I always remind myself about my purpose. As a teacher, every time I am down, I need to help myself."
-Informant 2

"I still find ways to do reflective practices. After lunch, I look at the scores of the students, check outputs, and can recall the things we did during our class." -Informant 3

Informant 2 shared that she overcame specific difficulties by engaging in reflections and understanding her purpose as a teacher. This finding suggests that teachers' sense of purpose may guide their aspirations in life. Teachers can create strategies for overcoming difficulties by continually reflecting on their experiences. Having a purposive career or life entails commitment among teachers. Lu (2021) said committed teachers are eager to engage with their students and regularly consider their development. They actively compete for competence in instructing and teaching by applying numerous techniques.

Informant 3 displayed optimism towards learning by looking for opportunities to reflect, moving forward despite the challenges, and making reflection an essential part of the teaching-learning process. This finding means that a teacher's professional success results from a positive attitude toward learning and dedication to engaging in reflective practices. Lu (2021) substantiated this claim by stating that people with high and positive expectations tend to achieve and frequently maintain objectivity. Optimism also increases flexibility and is the most important factor in reducing stress-related symptoms (Lu, 2021).

Additionally, the narratives from informants 6 and 8 below represent how time management and recognizing their support needs helped them overcome their struggles.

"I manage my time by listing what I must accomplish or submit within the day. I usually start with setting priorities and organizing the day around the most important tasks. I believe that knowing my priorities can help me track everything I need to do throughout the day no matter how overwhelming it may seem." -Informant 6

"Expressing my challenges and being aware of my strengths and weaknesses helped me receive the support I needed." -Informant 8

Informant 6 shared that she could reflect because she used effective time management. She made sure to set priorities and get adequate rest. This finding means effective time management can aid teachers in minimizing distractions, accomplishing tasks on time, and setting time for relaxation and reflection. This also results in teachers having spare time to explore opportunities for growth and development. For teachers to manage their time according to their working hours, Gul et al. (2021) suggested they have a positive attitude toward scheduling, planning, managing paperwork, handling interruptions, etc. This may be possible by providing teachers with more training in time management skills. Sprott (2019) further confirmed that providing teachers with the time and environment for group reflection was crucial to their professional growth.

Informant 8 said that to open up about her struggles, she needed to be aware of her support needs. Talking about these issues with some seasoned educators could help her overcome these challenges. This finding suggests that teachers become proactive in developing professionally by recognizing their weak points and specific needs and seeking help from other professionals. In this manner, teachers become more responsible for their learning and growth. Vikaraman et al. (2017) said that good mentor training and adequate administrative support are essential to uphold the teaching standard for beginning teachers and assume duties as teacher leaders.

3.4 Gaining Insights from Reflective Practices

The informants' personal and professional reflective practices had benefits and drawbacks. They developed compelling methods to overcome the obstacles encountered. They gained some insights or reflections from their positive and negative experiences that could inspire them to carry on and continue to thrive as professionals. Informants 1 and 6 provided the excerpted accounts below that described their insights.

"Teaching is a lifetime learning." -Informant 1

"Self-reflection is one way for a person to think critically. This means it has a vital role in learning." - Informant 6

Informant 1 expressed that the teaching-learning process is a lifelong endeavor. It involves many difficulties, hardships, and fortitude. This finding suggests that teachers must be committed to continuously improving their craft to better adapt to the changing demands of the academe. To make this possible, teachers need support from school leaders and institutions by providing them with professional development programs that address their current and future needs. Washington (2021) asserted that a lack of access to high-quality professional development causes educators to be less equipped to serve their communities and reduces the impact teachers are likely to have during students' instructional time.

Informant 6 added that self-reflection is vital in helping one become a critical thinker, and one can make it possible by documenting everyday learning. This finding implies that, through reflective practices, teachers can develop critical thinking, one of the essential skills in the 21st century. Moreover, by thinking more critically, teachers can better evaluate themselves and their performance. Yurtseven and Altun (2017) claimed that teachers could regularly assess their work's good and bad parts because of the self-reflection process. The teachers' better grasp of their strengths and weaknesses could inspire them to pursue different professional development means. Zahid and Khanam (2019) said reflective teaching practices should be essential to teachers' professional growth. Thus, teachers constantly work to improve their skills (Mermelstein, 2018). According to Mathew et al. (2017), teachers can manage the demands of time and the needs of the learners if they reflect on their daily teaching and learning activities for their professional development. Informants 7 and 8 further shared the following insights.

"My most significant learning so far has been learning from others and applying what I do in the classroom. It is good to learn from others apart from my own experiences." - Informant 7

"I have learned that doing reflections allowed me to innovate, revisit my practices, work on my areas of improvement, and identify my best practices. Most importantly, it challenges me to strive to be better." -Informant 8

Informant 7 said that, through reflective practices, she could learn from others. This finding necessitates that teachers implement more reflective practices that involve many interactions with the people around them, such as students, peers, and other community stakeholders. Informant 8 also shared that reflective practices foster innovation and development. This finding infers that teachers who are doing reflective practices continually seek growth and development in various areas. They can excel in many aspects, such as research and development, educational administration, curriculum development, etc. Consequently, these teacher improvements can impact the student's success. This is complemented by the study of Yurtseven and Altun (2017), who stated that teachers' sharing of classroom reflections significantly influenced students' academic success. Informants 2, 4, and 5 further expressed the insights below.

"Reflection should be at the heart of the teaching-learning process. You are not a teacher if you do not reflect." -Informant 4

"It really helps me acknowledge who I am as a teacher, what parts I could still improve, and what else I could still give to my students." -Informant 2

According to informant 4, reflection is at the heart of the teaching-learning process. This finding suggests that teachers cannot be teachers if they cannot reflect on what they have done. Pang (2020) reinforced this finding by asserting that a teacher, as a reflective practitioner, should have strong analytical and evaluative skills to process practical inquiries about education and reach pragmatic conclusions.

Informant 4 also noted that reflection engages active conversation with oneself, students, and co-teachers. Moreover, informant 2 said that reflection enables self-discovery. These findings imply that reflection fosters collaboration between teachers, co-teachers, and teachers and students. Through constant collaboration, teachers can have more experiences and eventually draw more insights from them. These insights are instrumental in discovering themselves better as individuals and professionals. In their study, Hong et al. (2019) concluded that the instructors' awareness of their teaching beliefs and the underlying impact of routine teaching practices in the classroom increased due to their reflections. According to the research of Farrell (2015), which was also mentioned by Hong et al. (2019), reflection assisted teachers and researchers in realizing what has to be changed in their teaching techniques. Spinelli (2019) also supported this finding, claiming that reflective processes have a part in altering perspectives, self-perceptions, and practices.

3.5 Supporting Other Teachers' Development

It is fulfilling to enhance one's teaching capacity through reflective practices. Still, it is much more satisfying to have had the opportunity to influence or help others in the community, especially those who also face the same struggles. Teachers must embody sharing one's giftedness as a genuine act of kindness. Informants 6 and 7 expressed their thoughts as follows:

"Be more open for (sic) feedback and strategies. These will surely help you become better in teaching- all for student's success." -Informant 6

"I advise that they take what they learn from peers, supervisors, and student evaluations to heart because it can greatly impact and improve their teaching. Reflective practices are good for you." -Informant 7

Informants 6 and 7 expressed that teachers must be receptive to new ideas and criticisms. This finding implies that teachers' openness and adaptiveness to new concepts, strategies, and standards would widen their understanding of the world and their current perspective on various local and global issues. Teachers do not just confine themselves to a certain norm or standard. Regarding their classroom practice, they do not just stick to one strategy. They become more experimental on what else might work for them. They become more exploratory about how else they can better their craft. They become more reflective of their experiences. Pang (2020) said that reflective teachers should compel and frequently link their reflection to good teaching practices to improve the curriculum, understand student and teacher competence, encourage professional development, and support community service. Teachers should put into practice the important lessons they have acquired from their peers, as informant seven had stated. Furthermore, informant three also expressed her ideas as follows:

"Ask yourself daily, "How did it go, and how do you know?" Let us surround ourselves with enthusiasm. There is no perfect teacher, but reflection can help us identify those barriers that keep us from improving. Let us not be too hard on ourselves because we always have room for improvement." -Informant 3

Informant 3 articulated that teachers need a positive and supportive environment to implement these reflective practices and identify what keeps them from growing professionally. This finding suggests that teachers' emotional state can hinder their success. If teachers do not feel appreciated and supported, they will not be empowered and committed to advancing their careers. They would not be motivated to explore opportunities for growth and development. They would merely opt to do the bare minimum. Wahyudi (2018) said that teachers with high emotional intelligence can better comprehend their students' personalities, convey their lessons effectively, and provide them with advice and direction. In other words, they perform better. Chen and Chen (2022) established that individual and organizational factors influenced the growth of teachers' reflective practice skills. Mesa (2018) proposed that professional development programs should have the support of seasoned teachers in giving high-quality feedback. Informant 4 also shared these suggestions.

"It is giving the teachers great freedom. Same thing with our students, we should not be generic. We should not be generalizing about the needs of our students." -Informant 4

"As much as possible, we ask them about these evaluations so that we can respond to their needs. We give them the agency, and we give them the chance to take ownership of their needs, like teachers who will have to take ownership of their needs so that they can recognize that they need it." -Informant 4

Informant 4 added that teachers should be free to use any reflective practice that can help address the specific needs of the teacher and the students. Teachers must be deliberate when doing reflective practices and ask for support from seasoned teachers. These findings imply that teachers' academic freedom in choosing a suitable reflective practice fosters creativity. Hence, teachers who can use any practice they find convenient and valuable become more accountable for their actions as they succeed or fail in their decisions. Mermelstein (2018) supported the idea that learning from knowledge and experience can be as successful as learning from other knowledgeable lecturers or researchers. Teachers can contribute more to their teaching community by learning more effective teaching techniques and sharing their knowledge and experiences when they regularly and critically reflect on their teaching methods (Mermelstein, 2018). Mesa (2018) asserted that teachers can utilize reflection independently or jointly to feel more in control, depending on whether they wish to accept criticism from others. Informant 4 further noted that for students to take responsibility for their learning, teachers must help them understand that evaluations are done to address their needs. This finding conveys that teachers and students need each other's support to succeed. According to Seifert and Sutton (2019), students will not learn if they do not understand the purpose of what they are doing. Thus, teachers must let their students understand their goals. Informant 5 emphasized the importance of self-appreciation among teachers. This finding means that teachers must value themselves and do activities that give them happiness. Furthermore, self-appreciation fosters confidence, grit, and self-care among teachers. Teachers with positive self-esteem can be role models that students can admire. The finding also infers that teachers who do not appreciate themselves may end up burned out and live a less fulfilling career and life. According to Mermelstein (2018), the key is for teachers to appreciate the importance and relevance of their teaching and instructional activities. In their study, Chen and Chen (2022) proved that personal goal orientation on an individual's psychological level can affect the reflective skills of the teachers.

The study's discoveries have implications for how different types of reflective practices—depending on which one a teacher finds most effective—can help them develop professionally and personally. Based on the emergent themes, the necessity of teachers' continuous professional development with the help of reflective practice and a positive learning environment was emphasized. To adapt to the shifting trends of the twenty-first century, teachers must strengthen their reflective teaching skills.

3.6 The Essence
A phenomenological study was a reflective experience for the researcher. It was an immersive journey into the depths of other people's lives. The researcher had to dive into this quest to fully understand what and how it feels like to be in their situation in hopes of bringing those rich and unique experiences to the surface. A teacher's life is multifaceted; however, the researcher aimed to dive deep into the reflective practices of English teachers to capture and shed light on their experiences.

There are so many aspects to learn about a person's experience. All these experiences are unique and valid as these people come from different backgrounds. The researcher realized that people experience hardships and other unfavorable situations for them to strive to become better versions of themselves continually. Moreover, a person's experience that is reflected upon becomes learning. Otherwise, it stays as a memory of the experience or, even worse, gets forgotten. As the informants recounted their experiences surrounding the phenomenon, the researcher realized how crucial the role of reflective teaching is in the life of a teacher. Despite the numerous challenges faced in the teaching-learning process, the researcher recognized how dedicated and resilient Filipino teachers are. The researcher also observed how these teachers from varying backgrounds shared similar experiences about reflective teaching. Professionally, their experiences are relatively comparable, but their perspectives are very diverse. The researcher was reminded that no one practice works for everyone. Every teacher has a unique personality and preference that would require a different strategy. Furthermore, reflection is essential and relevant no matter what timeline in the educational landscape you are in. It is a sustainable practice for in-depth and lifelong learning. Reflective practice empowers teachers to become powerful classroom influencers that students and other stakeholders can consider role models. Most importantly, reflective practice contributes to a teacher's well-being.

4.0 Conclusions
In summary, English teachers have benefitted from reflective practices personally and professionally. These reflective practices have helped them value themselves more and place a higher priority on their mental health and well-being, which implies a better teaching disposition and performance. Moreover, these reflective practices have been beneficial in fostering English teachers' continuous professional development, which necessitates personalized reflection, ongoing learning, and enhanced collaboration among other teachers. By integrating reflective practices in the classrooms, these teachers can apply effective pedagogy in teaching English, suggesting improved student learning outcomes. These practices can still be enhanced through constant implementation and exploration depending on the teachers' current needs and educational landscape. Based on the study findings, the recommendations are presented as follows:

a) Teachers may continually use and refine reflective practices that work best with their teaching styles and needs.
b) Teachers may also explore other reflective practices, such as teaching portfolios and video-recorded lessons, to gain new perspectives.
c) Teachers may pursue continuous professional development as early as possible through seminars, workshops, research, further education, etc.
d) DepEd and other private institutions may provide more practical seminars and workshops on implementing reflective practices. They may also focus on one reflective practice to strengthen its usability.
e) School leaders and administrators may also provide a protected schedule for professional development activities (e.g., structured professional learning conversations among teachers). This structured professional learning conversation may be implemented twice or thrice a month and be done consistently to address the teachers' current needs.

The qualitative data uncovered several findings that could be valuable for other academic researchers. By extending this research, more perspectives and theories regarding reflective practices might come to life. Future studies centered on reflective teaching may be done. These studies include the following: A Meta-Synthesis on English Teachers' Reflective Practices, A Descriptive Analysis of Reflection Journals, A Qualitative Study on Teaching Inventories and Portfolios, An Analysis of Classroom Observations, A Phenomenological Study on Peer

Review of Teaching, and A Descriptive Phenomenology on Continuous Professional Development through Reflective Teaching.

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6.0 Conflict of Interest

There is no conflict of interest involved in this study.

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Influence of Teachers' Work Conditions on Classroom Management Practices

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Abstract. This study investigated the impact of teachers' work conditions on classroom management practices in public elementary schools. A mixed-method sequential explanatory design was used, involving surveys from 328 teachers across 22 public schools in Pasig City through stratified random sampling and interviews with ten teachers. Quantitative analysis revealed significant positive correlations between teachers' demographic factors (age, sex, and designation) and work conditions, such as workload, student academic performance, school rules, facilities, and resources. Regression analysis further indicated that workload, student behavior, school policies, facilities, and leadership support significantly influence classroom management. Qualitative findings highlighted the complex relationship between work conditions and teachers' classroom practices. The findings suggest that improving work conditions, such as reducing teacher workload, enhancing school facilities, and providing stronger leadership support, can significantly improve classroom management practices in public elementary schools. Moreover, tailored policies that address teachers' demographic factors and the specific challenges in their work environment are crucial for fostering effective classroom management. These insights can guide policymakers and school administrators in creating more supportive environments for teachers, ultimately improving student outcomes and overall school performance.

Keywords: Teachers' work conditions; Classroom management; Public elementary schools; Teachers' development program.

1.0 Introduction

Teachers' working conditions play a critical role in shaping the educational landscape, affecting both educators and students alike. These conditions encompass a range of factors, including the resources available to educators, the administrative support they receive, and the overall professional environment in which they operate (Sebastian, 2021). Teachers' working conditions are shaped not only by institutional policies and infrastructural resources but also by the collaborative culture among educators. Their improvement, therefore, requires active involvement from various stakeholders within the school community. Understanding the intricacies of these conditions is vital as they significantly influence teachers' ability to manage classrooms effectively, shape student outcomes, and affect their well-being and professional satisfaction.

Scholarly literature on teachers' working conditions highlights several key factors impacting classroom management practices. For instance, Miguel (2019) identified workload, student behavior, leadership support, and availability of school resources as critical determinants of teachers' classroom management effectiveness. These factors contribute to the broader context in which teachers operate, influencing their capacity to maintain discipline, facilitate learning, and foster positive student-teacher interactions. The study conducted by Miguel (2019), provided the researcher with important direction, conceptualization of the study, and insights throughout the research. Moreover, the dynamics of these factors were exacerbated during the COVID-19 pandemic, when the shift to online learning imposed additional burdens on educators. Teachers had to adapt quickly, developing digital literacy skills and managing virtual classrooms while contending with increased stress and anxiety (Llego, 2023). This situation highlighted the fragility of teacher working conditions in times of crisis and underscored the need for more resilient educational support systems.

Student behavior is another crucial factor influencing teachers' ability to manage classrooms effectively. Misbehavior and other behavioral challenges disrupt learning environments and place considerable strain on teachers, affecting their ability to maintain control and deliver quality instruction. Studies have shown that disruptive behaviors, ranging from nonattendance to bullying, significantly hinder learning (Reyes, 2024). Nonattendance due to a lack of resources or parental guidance became prevalent during the pandemic, particularly in low-income communities. Now, as face-to-face classes have resumed, these behavioral challenges persist, compounded by issues such as excessive use of gadgets for non-academic purposes and bullying. Recent reports from Pasig City indicate that student misbehavior, including verbal and cyberbullying, remains a significant concern, with data showing increasing incidents that adversely impact teachers' and students' performance (Bautista, 2024). While various strategies, including school policies and community collaboration, have been employed to address these behavioral issues, the persistence of such problems suggests that existing interventions may be inadequate.

Moreover, the availability and quality of school facilities and resources constitute another significant aspect of teachers' working conditions. Adequate infrastructure is essential for creating an environment conducive to effective teaching and learning. However, a chronic shortage of classrooms and learning materials has long been a barrier to quality education in the Philippines. For instance, according to DepEd, the country faced a classroom shortage of 159,000 in the 2023–2024 academic year, which marked a substantial increase from the previous year's figures (Macasero, 2023). Despite localized efforts, such as the Pasig City government's allocation of funds toward education infrastructure and student support programs, the shortage remains critical, with the city alone requiring an additional 940 classrooms across its elementary and secondary schools (SGOD, 2023). The inadequacy of physical resources not only hampers teachers' effectiveness but also exacerbates stress, as educators are forced to manage overcrowded classrooms and insufficient materials, further complicating classroom management.

Existing literature on teachers' working conditions reveals several studies emphasizing workload, student behavior, and resource availability as key factors influencing classroom management (Sebastian, 2021; Miguel, 2019; Reyes, 2024). However, while much of this research provides valuable insights into the challenges teachers face, it often overlooks the unique experiences of teachers in urban settings such as Pasig City, where rapid urbanization and socio-economic disparities present additional complexities. Furthermore, many studies focus on isolated factors rather than exploring how these variables intersect to impact teachers' well-being and student outcomes. There is a critical gap in the literature regarding the comprehensive analysis of how these interconnected factors influence classroom management, particularly in post-pandemic education. The increasing prevalence of behavioral issues and ongoing resource shortages highlight the need for research that integrates these dimensions to propose sustainable solutions for improving teachers' working conditions.

This study addresses these gaps by examining the relationship between teachers' working conditions and classroom management practices in public elementary schools in Pasig City. Specifically, the research will explore how workload, student behavior, and resource availability influence classroom dynamics. By providing a more nuanced understanding of teachers' challenges, this study seeks to contribute to developing targeted interventions that can enhance teacher effectiveness and student outcomes. Ultimately, this research's findings will offer insights essential for policymakers, educational leaders, and stakeholders striving to create more conducive and supportive learning environments.

2.0 Methodology

2.1 Research Design

This study adopted a mixed-methods research approach, specifically employing a sequential explanatory transformative design. This design integrates quantitative and qualitative methodologies in two distinct phases to provide a comprehensive understanding of the research problem (Hassan, 2023). The initial phase involved collecting and analyzing quantitative data, followed by the qualitative phase to explore the quantitative findings in greater depth. The sequential explanatory design by Hassan (2023), helped the research come up with a comprehensive understanding of the quantitative and qualitative findings, particularly on the integration of the data. Through the sequential integration of both data sets, the researcher corroborated and improved the findings and overall dependability and profundity of the study.

2.2 Research Participants

A stratified random sampling method was used to select 328 teacher respondents, ensuring representativeness across the public elementary schools in Pasig City. The sample size was determined using Slovin's formula, providing a 95% confidence level with a 5% margin of error. Despite initial outreach to 28 schools, only 22 participated due to constraints such as year-end school activities and extreme heat conditions. For the qualitative component, purposive sampling was employed to select ten teachers from various schools. This group was chosen to ensure diversity in experiences and perspectives.

2.3 Research Instruments

The quantitative data were gathered through a questionnaire checklist. The final instrument consisted of three parts. Part 1 is composed of the demographic profile of the respondents, including age, gender, civil status, position, educational attainment, and length of service. Part 2 focused on teachers' work conditions across five indicators: workload, student behavior, school rules and regulations, available facilities and resources, and support from school leadership. Part 3 consists of questions about classroom management practices, divided into 20 statements—10 focusing on positive practices and 10 on negative classroom discipline strategies. The questionnaire was developed based on a review of relevant literature and revised according to feedback from five experts. The questionnaire underwent both content validation and reliability testing. Content validity was ensured through the expert validation process, while the instrument's reliability was confirmed using Cronbach’s alpha, which yielded a coefficient of 0.895. This indicates a high level of internal consistency, affirming the reliability of the data collection tool.

The qualitative data were gathered through semi-structured interviews. The researcher personally designed the interview guide to explore themes related to the teachers' classroom management experiences and working conditions. Recording the interviews minimized recall bias and ensured reliable data capture for analysis.

2.4 Data Gathering Procedure

Depending on each school's circumstances, the researcher administered the questionnaires in person and via Google Forms. Following the quantitative phase, qualitative data were collected through semi-structured interviews. The interviews were conducted in person and via online platforms (e.g., Google Meet), depending on the participants' availability and preferences. Interviews were audio- and video-recorded to ensure accuracy in transcription and analysis.

2.5 Data Analysis Procedure

After the data were gathered, they were subjected to statistical analysis to determine trends, relationships, and patterns relevant to the study's objectives. The qualitative data were analyzed using thematic analysis, where recurring patterns were identified, coded, and categorized into themes. This phase provided deeper insight into teachers' experiences concerning classroom management and working conditions.

2.6 Ethical Considerations

The study adhered to ethical standards. All participants provided informed consent and maintained confidentiality throughout the research. The researcher took measures to ensure the integrity of the data, avoiding any falsification or distortion. Plagiarism checks and proper citation practices were also followed by the American Psychological Association (APA) 7th edition guidelines. The research study is solely financed by the researcher, who demonstrated a strong sense of personal dedication to and enthusiasm for the research topic, even without outside financial sources or institutional agendas. The study was conducted for research purposes only. No organization or outside entity's interest was intended to be served. The researcher's only goal was to contribute to the field's scientific knowledge and comprehension.

3.0 Results and Discussion

Quantitative Phase
3.1 Teachers' Demographic Profiles
The age distribution in Table 1 reveals a relatively small proportion of younger teachers. This may reflect factors such as the overall age distribution of the teaching workforce in the Philippines, the accessibility of teaching positions, and career progression. Seniority-based promotions limited professional development opportunities, and insufficient incentives for younger teachers likely contribute to the dominance of older teachers in the sample. Recognizing the age distribution is vital for developing strategies tailored to teachers' challenges at different career stages. Furthermore, the gender distribution aligns with global trends, where women are more likely than men to pursue teaching careers.

The civil status of respondents may also influence the study's conclusions and recommendations. Family responsibilities, for instance, may affect work conditions and classroom management strategies. Married teachers might face distinct priorities and challenges compared to single teachers. Understanding the distribution of civil status is crucial for designing interventions that support teachers' personal and professional lives and enhance well-being and teaching effectiveness.

Table 1. Descriptives of the teachers' demographic profiles

Demographic Variables	Frequency	Percentage
Age		
30 below	57	17
31-35 years old	49	15
36-40 years old	47	14
40-45 years old	91	29
46-50 years old	70	21
51 years old and above	14	4
Sex		
Male	102	31
Female	226	69
Civil Status		
Single	79	24
Married	240	73
Widow/ Widower	7	2
Separated	2	1
Educational Attainment		
Baccalaureate Degree	81	25
Masteral Units	161	49
Master's Degree	68	21
Postgraduate Units (PhD, EdD)	15	5
Post Graduate Degree (PhD, EdD)	3	1
Position Title		
Teacher I	113	35
Teacher II	68	21
Teacher III	109	33
Master Teacher I & II	38	12
Length of Service		
Less than 5 years	79	24
6-10 years	60	18
11-15 years	75	23
16-20 and above	114	35

Regarding educational attainment, 49% of respondents have master's units, 25% hold baccalaureate degrees, 21% possess master's degrees, 5% have postgraduate units, and 1% hold postgraduate degrees. This suggests a commitment to continuing education, which may affect teaching practices and classroom management. Teachers with higher qualifications are likelier to adopt advanced teaching strategies and exhibit greater autonomy. Recognizing this distribution is key to creating interventions that promote professional development and improve classroom management.

The distribution of position titles also has implications for the study. Teachers in entry-level roles may encounter distinct challenges compared to those in more advanced positions. Understanding this distribution is essential for crafting interventions that address the specific needs of teachers at various career stages. Similarly, the length of service affects teachers' work conditions and management strategies. Veteran teachers may have different needs compared to those early in their careers. Recognizing service length is important for developing targeted interventions that enhance professional growth and classroom management across all experience levels.

3.2 Work Conditions of Teachers

In terms of Workload

Table 2 shows the work conditions of teachers in terms of workload. The weighted mean score of 4.62, with a standard deviation of 0.63, indicates that teachers strongly agree with the statements defining their workload. The study's findings conform to the study of Masoom (2021), which states that teachers perceived too much work after school meetings, excessive deadlines, and office staff assessments to enhance their workload pressure. In addition, there is a significant relation between the extent of management of teachers' teaching workload, their overall workload, and their teaching effectiveness. This statement is supported by Rosanes (2020), who states that teachers who experience heavy workloads early in their careers are more likely to lose confidence in their effective classroom management strategies, overworked frequently resort to negative approaches to managing student misbehavior, including yelling and using sarcasm. Conversely, teachers who are confident in their ability to manage classroom behavior and who are well-prepared are more likely to provide pupils with clear expectations and a clear classroom behavior structure.

Table 2. Descriptives of work conditions of teachers in terms of teachers' workload

Indicators	Mean	SD	Interpretation
1. Attends six (6) hours of actual teaching and two (2) hours of allocated ancillary tasks, which may be spent within or outside school premises.	4.83	0.42	Strongly Agree
2. Prepares Daily Lesson Log (DLL), PowerPoint, Written Tests, and Performance Tasks.	4.80	0.49	Strongly Agree
3. Conduct home visitation and follow-up with parents/guardians.	4.54	0.66	Strongly Agree
4. Attends training, workshops, and LAC sessions before, during, and after class hours.	4.68	0.60	Strongly Agree
5. Spends additional duties/assignments beyond regular teaching hours, such as serving as subject coordinator, working committees, and supervising extracurricular activities.	4.45	0.84	Agree
6. Conduct remedial classes for non-readers and struggling learners	4.54	0.67	Strongly Agree
7. Spend extra time communicating with parents through messenger, phone calls, and parent-teacher conferences.	4.63	0.64	Strongly Agree
8. Checks and records learners' written tests, performance tasks, and other related learning activities.	4.79	0.53	Strongly Agree
9. Serves as a trainer in extracurricular activities such as Journalism, MTAP, and Festival of Talents.	4.12	1.02	Agree
10. Prepares and submits school reports and forms.	4.78	0.53	Strongly Agree
Overall Mean	**4.62**	**0.64**	**Strongly Agree**

In terms of Student's Behavioral Performance

Table 3 presents teachers' work conditions about students' behavioral performance. The overall mean score is 3.27, with a standard deviation of 1.12, suggesting a neutral perception among teachers regarding factors affecting student behavioral performance. The study's findings align with those of Dublas and Genuba (2023), who discovered that working conditions significantly impact teachers' sense of effectiveness. This suggests that improved working conditions can enhance teachers' sense of efficacy, crucial for successful teaching and high student academic achievement.

Moreover, Debreli and Ishanova (2019), as cited by Raslinda (2021), highlight several instances of misbehavior on the part of pupils, including roaming around the classroom, being obtuse, talking too much, disturbing others, lying, stealing, cheating, sexual harassment, fighting and hostility (aggressive), deliberate mischief (mischievous), and rejection of authority. The study's findings illustrate the various forms of student misbehavior in the classroom and teachers' methods.

Table 3. Descriptives of work conditions of teachers in terms of student behavioral performance

Indicators	Mean	SD	Interpretation
1. Low grades due to nonattendance or absenteeism.	3.18	1.14	Neutral
2. No participation in class discussion.	3.44	1.10	Neutral
3. No submission of Written Tests and Performance Tasks.	3.22	1.16	Neutral
4. Misbehaviour inside the classroom.	3.20	1.18	Neutral
5. Personal problems that affect academic performance include financial, family, health, and distance from home to school.	3.38	1.11	Neutral
6. Poor study habits such as lack of time management and procrastination.	3.46	1.13	Neutral
7. Inclement weather conditions such as extremely high temperatures and storm signals.	3.10	1.17	Neutral
8. Excessive use of gadgets for non-academic purposes.	3.36	1.14	Neutral
9. Experienced bullying from peers.	3.05	1.20	Neutral
10. Lack of support and supervision from parents/guardian	3.36	1.12	Neutral
Overall Mean	**3.27**	**1.12**	**Neutral**

In terms of School Rules, Regulations, and Implementation

Table 4 presents word conditions related to school rules, regulations, and implementation. The overall weighted mean is 4.72, with a standard deviation of 0.51. This implies that teachers strongly agree with the efficiency and clarity of the school's general rules, regulations, and implementation. The study's findings conform to Better Leaders Better Schools (2023) statements that school administrators play an instrumental role in supporting teachers by giving mentorship and professional development opportunities. Administrators can help teachers improve their instructional skills and classroom management techniques by providing feedback and guidance. By supporting professional development, encouraging peer collaboration, providing meaningful evaluations, establishing open-door policies, involving teachers in decision-making, fostering a positive school culture, and offering resources for classroom management, principals can create an environment in which teachers feel empowered, supported, and valued by their schools. Administrators can support educators in this area by providing them with the resources, guidance, and tools necessary to manage their classes effectively.

Moreover, according to Luz et al. (2020), school discipline concerns the action taken by a teacher or the school organization toward a student (or a group of students). Rules at school can help students learn how to take care of themselves, other people, and their environment by setting boundaries or guiding their conduct. The school system establishes rules and policies to prevent certain behaviors or attitudes seen as dangerous or against school policies, educational norms, traditions, etc.

Table 4. Descriptives of work conditions of teachers in terms of school rules, regulations, and implementation

Indicators	Mean	SD	Interpretation
1. Ensures teachers, learners, and parents understand school policies and procedures about learners' behavior.	4.77	0.44	Strongly Agree
2. Enforces rules for learners' behavior, such as bullying and misbehavior.	4.72	0.50	Strongly Agree
3. Provides training and professional development opportunities for teachers on effective behavior management strategies	4.71	0.50	Strongly Agree
4. Seeks support from parents and external partners to address complex behavior issues affecting learners.	4.71	0.50	Strongly Agree
5. Creates a positive and inclusive school climate where students feel safe, supported, and engaged.	4.74	0.50	Strongly Agree
6. Conduct information dissemination and campaigns on school regulations and policies.	4.72	0.54	Strongly Agree
7. Imposes positive and non-violent discipline.	4.72	0.52	Strongly Agree
8. Capacitates teachers on classroom management strategies.	4.70	0.52	Strongly Agree
9. Develops strategies and innovations in addressing pupils' discipline.	4.70	0.54	Strongly Agree
10. Monitors and evaluates the implementation of school rules and regulations.	4.72	0.53	Strongly Agree
Overall Mean	**4.72**	**0.51**	**Strongly Agree**

In terms of Facilities and Resources

Table 5 shows teachers' working conditions regarding school facilities and resources. With a standard deviation (SD) of 0.73, the overall mean score is 4.40. The study's findings align with those of Baharuddin (2021), who states that refining a school environment's physical and resource-related aspects can lead to better teaching outcomes and increased teacher motivation. This aligns with the notion that adequate facilities and resources are critical for effective teaching and learning.

Table 5. Descriptives of work conditions of teachers in terms of facilities and resources

Indicators	Mean	SD	Interpretation
1. Provide adequate standard classrooms that are comfortable and convenient and can sustain inclement weather conditions such as high heat index and storm signals.	4.46	0.67	Agree
2. Provides teachers with sufficient access to instructional resources, materials, and technologies such as printers, laptops, reference books, modules, workbooks, websites, and portals.	4.47	0.64	Agree
3. Provides a convenient faculty room for teachers to create DLP/DLL instructional materials, check learners' outputs, and perform other related tasks.	4.18	0.94	Agree
4. Provides sufficient clean comfort rooms to accommodate all learners (1 comfort room for every 50 learners) and teachers.	4.33	0.82	Agree
5. Provides access to a clean and safe environment and supplies such as water, electricity, and food.	4.50	0.64	Strongly Agree
6. Provide teachers and learners with adequate furniture like desks, chairs, and tables.	4.48	0.65	Agree
7. Provides a functional library, clinic, canteen, and ICT room for learners and teachers.	4.46	0.66	Agree
8. Establishes a safe, motivated, and secure learning environment	4.59	0.57	Strongly Agree
9. Provides free internet access to teachers and learners.	4.07	0.65	Agree
10. Determines the seismic hazard in the school and develops an emergency mitigation plan.	4.51	0.64	Strongly Agree
Overall Mean	**4.40**	**0.73**	**Agree**

However, the current study's findings disagree with those of Apolinar (2019), who stated that overcrowding is a major problem in many Philippine schools. Lack of proper infrastructure, especially in the classrooms, is one of the causes of school overpopulation. The study concluded that the lack of classroom space in overcrowded schools restricts the quantity and quality of interaction between teachers and students and the effectiveness of teaching and learning. Shortages of classrooms must be given priority. The government must prioritize classroom shortages. More classrooms can enhance the quality of education.

In terms of School Head's Leadership Support

Table 6 reveals that all respondents strongly agree with the statements about the school head's leadership support, as indicated by their weighted mean. The overall mean score for teachers' level of work conditions in terms of the school head's leadership support is 4.61, with a standard deviation (SD) of 0.62. This indicates that, on average, teachers strongly agree that the school head provides effective leadership and support. Thus, the study's findings conform with the study of Aquino et al. (2021), which found that effective leadership practices, such as providing technical assistance, ensuring curriculum implementation, and fostering a supportive environment, significantly enhance teachers' performance and job satisfaction. The study implies that strong leadership support is crucial in creating a positive working environment, which aligns with the current research findings. Teachers' perceptions of leadership support, including technical assistance and professional development, are essential for improving educational outcomes and maintaining high teacher motivation and effectiveness.

Table 6. Descriptives of work conditions of teachers in terms of school head's leadership support

Indicators	Mean	SD	Interpretation
1. Provides technical assistance to teachers and learners through equitable access to education.	4.63	0.59	Strongly Agree
2. Ensures and supervises the implementation of the curriculum through strict class programs and schedules.	4.68	0.58	Strongly Agree
3. Provides and empowers teachers with sufficient training/seminars on managing student behavior/discipline.	4.62	0.61	Strongly Agree
4. Always ensures the protection and safety of teachers and learners	4.62	0.61	Strongly Agree
5. Makes sustained efforts to address teachers' concerns about school facilities, resources, and academic endeavors through collaboration, camaraderie, and holistic decision-making and consultation.	4.62	0.62	Strongly Agree
6. Fosters an atmosphere where teachers and learners feel supported, empowered, and valued through incentives, rewards, and recognition.	4.59	0.63	Strongly Agree
7. Provides instructional leadership support towards improving teacher competence and learner outcomes.	4.63	0.61	Strongly Agree
8. Makes sustained efforts to address teachers' concerns about school facilities, resources, and academics.	4.61	0.60	Strongly Agree
9. Motivates and supports reducing paperwork and other instructional duties to allow teachers to focus on teaching.	4.52	0.73	Strongly Agree
10. Provides support to uplift teachers' morale regarding well-being, mental health, collaboration, and professional development.	4.59	0.66	Strongly Agree
Overall Mean	**4.61**	**0.62**	**Strongly Agree**

In addition, according to Kabia (2022), teachers leave a school because of a lack of administrators' support, such as emotional support, instructional support, assistance with student behavior, adequate resources, and a positive school climate. However, if teachers received this support from their administrators, they would stay at their schools. Moreover, Tyler's (2022) findings of the study showed that when the administration failed to support teachers or blamed them for being responsible for violent incidents, educators experienced anxiety, fear, and isolation.

3.3 Classroom Management Practices of Public School Teachers

Table 7 presents twenty classroom management practices. The overall weighted mean score is 3.12, indicating that teachers have a neutral perception of classroom management practices. This implies that school administrators should provide training, assistance, and professional development opportunities for teachers to improve their classroom management abilities and foster a welcoming and inclusive learning environment for all children. The study's findings align with Professor Helen Watt of the University of Sydney, as cited by Rosanes (2020), who asserts that teacher education is crucial in equipping future teachers with effective classroom management skills. Building their confidence in managing student misbehavior through positive structures rather than negative reactions is also important.

Delos Reyes and Callo (2021) found that implementing all classroom management strategies significantly enhanced students' communication, creativity, and critical thinking. Three categories of classroom management practices significantly influenced students' 21st-century skills: involving students in observable ways; posting, teaching, reviewing, monitoring, and reinforcing expectations; and employing a continuum of tactics to deal with unacceptable behavior.

Table 7. Descriptives of classroom management practices of public-school teachers

Indicators	Mean	SD	Interpretation	Rank
1. Sets rules and procedures before, during, and after classes	3.92	0.29	Agree	1
2. Use praise, encouragement, and rewards to acknowledge and reinforce behaviors, such as completing assignments/performance tasks and participating in class discussions.	3.90	0.30	Agree	2
3. Talks heart to heart with misbehaving learner, listens to him attentively, and seeks parent's guidance.	3.86	0.38	Agree	4
4. Creates a positive atmosphere in the classroom where students feel safe, respected, and valued.	3.82	0.33	Agree	3
5. Enforces consequences for misbehavior regularly and fairly, using a progressive discipline approach that focuses on teaching appropriate behavior rather than just punishment.	3.82	0.40	Agree	8
6. Calls learners' attention if misbehavior is seen.	3.86	0.43	Agree	4
7. Establishes clear expectations for student behavior.	3.82	0.44	Agree	8
8. Addresses misbehaviors of learners using intervention or parent conferences.	3.80	0.42	Agree	10
9. Establishes and reinforces daily routines and procedures for transitions, classroom activities, and group work.	3.83	0.39	Agree	7
10. Implement effective classroom discipline that is fair, consistent, and respectful, such as monitoring learners' behavior, providing consequences for learners who do not follow expectations, and evaluating discipline procedures regularly.	3.86	0.37	Agree	4
11. Uses intimidation for pupils to misbehave.	2.72	1.21	Neutral	12
12. Punishes students who are misbehaving.	2.44	1.13	Neutral	15
13. Sends students home for aggressive and destructive behavior.	2.23	1.25	Neutral	18
14. Sends a student to modular class for repeatedly doing aggressive or disruptive misbehavior.	2.31	1.20	Neutral	17
15. Calls out students for mistakes or misbehaving in front of their peers.	2.46	1.17	Neutral	14
16. Gives less work to students who behave in the class.	2.32	1.21	Neutral	16
17. Mention the names of learners who have no assignments and do not submit performance tasks and other class activities.	2.58	1.10	Neutral	13
18. Raise his/her voice when the class is noisy.	2.76	0.99	Neutral	11
19. Use hurtful or derogatory language to learners who misbehave.	2.01	1.21	Neutral	20
20. Uses group punishment for the actions of a few students.	2.06	1.19	Neutral	19
Overall Mean	**3.12**	**0.77**	**Neutral**	

Thomas' (2021) study revealed that Positive Behavior Intervention Support (PBIS) at all schools improved student behavior by reducing punitive measures like office referrals and school suspensions and encouraging students to engage in positive behaviors like increased school attendance and a desire to learn. The findings also underscored the need to provide teachers with essential training and professional development, along with follow-up support sessions, to ensure their readiness for implementation. The study's findings demonstrate the effective implementation of PBIS throughout an entire school to reduce disruptive behavior and improve academic performance, thereby supporting social change.

3.4 Relationship Between Teachers' Demographic Profiles and their Work Conditions

Primarily, age and workload (r = 0.571, p <0.05), student academic performance (r = 0.682, p = 0.000), school rules and regulations (r = 0.682, p <0.05), and facilities and resources (r = 0.789, p <0.05) have a positive correlation at first. These results suggest that teachers may have a heavier workload and a bigger influence on the academic achievement of their students as they get older. More experienced teachers may understand the importance of following school policies and procedures and be more appreciative of the provision of adequate facilities and resources. Furthermore, based on the results of the data, sex and workload (r = 0.706, p <0.05), student academic performance (r = 0.706, p = 0.000), and school rules and regulations (r = 0.706, p <0.05) all showed a significant positive correlation. This suggests that sex influences teachers' working environment, with female teachers potentially experiencing a higher workload and having an impact on student academic performance.

Correspondingly, there were significant positive relationships between the following variables: student academic achievement (r = 0.696, p <0.05), school rules and regulations (r = 0.696, p <0.05), facilities and resources (r = 0.589, p <0.05), and designation and workload (r = 0.637, p <0.05). This suggests that different designations may have different working conditions for teachers, which could impact student performance and adherence to school rules and regulations. However, no significant correlations were found between work conditions, civil status, and educational attainment. Furthermore, there was no significant relationship between work conditions and length of service in teaching.

Table 8. Analysis of the relationships between teachers' demographic profiles and their work conditions

		Workload	Student Academic Performance	School Rules, Regulation, and Implementation	Facilities and Resource	School Head's Leadership Support
Age	Pearson Correlation	0.571	0.682	0.682	0.789	0.885
	Sig. (2-tailed)	0.000*	0.000*	0.000*	0.022*	0.029*
Sex	Pearson Correlation	0.706	0.706	0.706	0.895	0.578
	Sig. (2-tailed)	0.000*	0.000*	0.000*	0.047*	0.024*
Designation	Pearson Correlation	0.637	0.696	0.696	0.589	0.688
	Sig. (2-tailed)	0.000*	0.000*	0.000*	0.789	0.589
Civil Status	Pearson Correlation	0.547	0.245	0.564	0.278	0.457
	Sig. (2-tailed)	0.450	0.245	0.255	0.456	0.256
Educational Attainment	Pearson Correlation	0.589	0.890	0.487	0.789	0.256
	Sig. (2-tailed)	0.048*	0.049	0.078	0.004*	0.050*
Length of Service in Teaching	Pearson Correlation	0.789	0.578	0.589	0.458	0.489
	Sig. (2-tailed)	0.040*	0.580	0.456	0.008*	0.049

*significant (p < 0.05)

Furthermore, the significant relationships revealed in this study emphasize the importance of considering teachers' demographic profiles when understanding their work conditions. Addressing age, sex, and designation can improve student academic performance, better adherence to school rules and regulations, and enhance facilities and resources. However, the non-significant relationships suggest that civil status, educational attainment, and length of service in teaching may not directly influence work conditions. These findings emphasize the need for tailored teacher development programs focusing on demographic characteristics to optimize classroom management practices and overall teaching effectiveness.

Kume (2020) asserts that understanding the demographic characteristics of teachers, such as age, sex, and educational attainment, is crucial in determining job satisfaction levels, and this supports the study's result. Educators and policymakers can tailor strategies to enhance job satisfaction and improve teaching effectiveness by examining how these factors influence work conditions. This research underscores the importance of considering teachers' demographics in shaping their job satisfaction and work environment. The study's findings also conform to Lilie (2019), who states that general education teachers lack sufficient training in proven inclusion practices necessary to cope with the increase in diverse learning needs. Inadequate training can worsen student and teacher stress levels in the classroom and lead to disruptive behavior.

Additionally, the Sarabia (2020) study found a positive correlation between gender and position and teaching performance, with female teachers and those in higher positions generally outperforming male teachers. Conversely, the number of seminars attended concerning stress and demand, a sub-component of work-related stress, negatively and significantly predicts teaching performance. According to the study, teachers who attended stress management seminars performed better in the classroom than those who did not. Moreover, Delos Reyes and Callo's (2021) study findings show that the longer teachers stay in the profession, the more experienced they become in managing their classrooms and that the higher level of education they obtain in their specialty significantly impacts how students develop their 21st-century skills. Masoom (2021) supports this statement by asserting that teachers' positive perception of the school's conducive environment increases with their experience.

3.5 Relationship Between Work Conditions of Teachers and Their Classroom Management Practices

The data in Table 9 illustrates the relationship between teachers' workloads and classroom management practices. The mean workload of teachers is 3.8, signifying the perceived level of workload experienced by teachers. The R-value of 0.76 indicates a significant positive correlation between teachers' workloads and their classroom management strategies. This correlation suggests that as teachers' workloads increase, there is a corresponding enrichment in their classroom management practices, showcasing a significant relationship between these two variables. The p-value of 0.0146 at the significance level of 0.05 rejects the null hypothesis, indicating a statistically significant association between teachers' workloads and classroom management practices. The rejection of the null hypothesis underscores the criticality of considering teachers' workloads in assessing their classroom management practices. The results indicate that good teacher workload management may result in better classroom management strategies, ultimately improving the learning environment for students.

Table 9. Analysis of the relationship between the work conditions of teachers and their classroom management practices

Variables	Mean	R-value	Description	P-value	Decision	Interpretation
Teachers' Work Loads and Classroom Management Practices	3.80 3.57	0.76	Strong Positive Correlation	0.0146	Reject	Significant

In conclusion, the data highlights the critical connection between effective classroom management practices and the work conditions of teachers, particularly their workloads. By recognizing and addressing the impact of workloads on classroom management, schools may provide support and resources to teachers to help them effectively manage their responsibilities. This information emphasizes balancing teachers' workloads to improve classroom management techniques and foster an environment where students may learn. The study's findings conform to Rabia and Hashmi, Muhammad (2021), that effective classroom management practices are closely linked to teachers' work conditions, such as workload and support. This implies that creating a conducive work environment for teachers can positively impact their ability to manage classrooms effectively, leading to improved student academic outcomes. This study highlights the importance of working conditions in enhancing classroom management practices and academic success.

3.6 Influence Between Work Conditions of Teachers and Their Classroom Management Practices

Table 10 reveals that regression analysis results, with non-zero B coefficients, suggest that teachers' work conditions, including workload, student behavioral performance, school rules, regulations, and implementation, facilities and resources, and the leadership support of the school head, influence their classroom management practices to varying degrees, with associated probabilities all exceeding the significance level of 0.05. The findings show that for every unit increase in workload, student academic performance, school rules and regulations and implementation, facilities and resources, and school heads' leadership support, we expect increases of -0.145, 0.030, 0.116, and 0.233, respectively.

Moreover, the probabilities of the associated variables were less than the significance level of 0.05. This indicates that teachers' work conditions significantly impact their classroom management practices. Therefore, the influence was significant. The computed beta coefficients revealed that students' academic performance (Β = 0.233), facilities and resources (Β = 0.116), and the school head's leadership support (Β = 0.245) are the best predictors of teachers' classroom management practices. The computed F-ratio of 3.747 indicates that the distributed teachers' work conditions form a significant set of predictors for the teacher's classroom management practices. We reject the null hypothesis, stating that there is no significant influence between work conditions and teachers' classroom management practices because the p-value of 0.007 is less than the 0.05 significance level. However, the alternative hypothesis is accepted. This implies that the work conditions of teachers have an impact on their classroom management practices.

Table 10. Analysis of the influence between work conditions of teachers and their classroom management practices

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.553	0.307		11.568	0.000
	Workload	-0.145	0.117	-0.239	-1.242	0.217
	Student Academic Performance	0.030	0.130	0.049	0.233	0.024**
	School Rules, Regulations, and Implementation	0.116	0.138	0.158	0.845	0.400
	Facilities and resources	0.233	0.120	0.350	1.939	0.045**
	School head's leadership support	0.245	0.145	0.245	0.450	0.03**

Note: $R^2 = 0.136$, $F = 3.747$, $P = 0.007$

The study's findings align with those of Rabia et al. (2021), demonstrating a close correlation between effective classroom management practices and teachers' work conditions, including workload and support. In addition, the study's findings indicate that forming a conducive work environment for teachers can positively impact their ability to manage classrooms effectively, leading to improved student academic outcomes.

Qualitative Phase

3.7 Lived Experiences of Teachers in Classroom Management and Work Condition

The researcher developed nine themes in this qualitative study, namely: (1) the multifaceted Responsibilities of Teachers; (2) The impact of overwork on teachers' performance and well-being; (3) The Paradox of School Safety and Maintenance Amidst Resource Deficiencies; (4) The impact of classroom facilities and resources on teaching and learning; (5) Challenges in Student Behavioral Performance and Engagement; (6) Preference for Positive Reinforcement Over Punishment in Behavior Management; (7) Supportive and Conducive Learning Environment; (8) Impact of Good Work Conditions on Educational Success; and (9) Leadership and Improvement of Work Conditions in Schools.

Theme 1: Multifaceted Responsibilities of Teachers

In this theme, most of the participants said that aside from the six hours of teaching load, they have two hours of ancillary tasks in curriculum planning, curriculum implementation, assessment of learners' progress, and homeroom guidance and management. Also, they handled non-teaching-related assignments like school paper advisers, subject area coordinators in Filipino and English, SMEA Coordinators, WinS Coordinators, and the like. They also administer and submit reports on Comprehensive Literacy Rapid Assessment (CRLA), Annual National Assessment (ANA), Test of Fundamental Skills (TOFAS), and many others. Participants shared about the apparent overwork load of teachers, which affects their job satisfaction, burnout, stress, quality of teaching, and student performance. Overworked teachers may be unable to prepare instructional materials and address student behavioral problems inside the classroom.

Moreover, the findings are supported by David et al. (2019), who state that public school teachers often have various non-teaching responsibilities to complete besides teaching. Because of this workload, teachers are forced to take on many additional duties and obligations that take time away from their teaching. Masoom (2021) states that teachers perceived too much work after school meetings, excessive deadlines, and office staff assessments to enhance their workload pressure. In addition, there is a significant relation between the extent of management of teachers' teaching workload, their overall workload, and their teaching effectiveness. Furthermore, Tarraya (2023) stated that their heavy workloads influence teachers' effectiveness and efficiency.

Theme 2: The Impact of Overwork on Teachers' Performance and Well-Being

Most participants believed that an overworked workload affects different aspects of their lives. They mentioned that an overworked load causes stress, fatigue, and burnout while contributing to their ineffectiveness in teaching. Moreover, it also affects classroom management practices, decreases teachers' effectiveness in teaching, and negatively impacts students' learning outcomes. As one participant mentioned, overwork can significantly impact classroom management practices.

My workload as a school paper adviser affects my classroom management when, by chance, there are contests, and I need to excuse myself from class for the sake of training and to accompany them to scheduled competitions. T4

I can manage my workload, but sometimes, it leads to stress and a lack of time to prepare my lessons. T2

This implies that the over workload experienced by teachers leads to significant stress, fatigue, and burnout, adversely affecting their classroom management practices and diminishing their effectiveness in teaching. This strain on teachers impairs their ability to deliver high-quality instruction and negatively impacts student learning outcomes, creating a less conducive learning environment. As teachers struggle to balance excessive workloads, the overall educational experience suffers, highlighting the need for strategies to reduce teacher overwork and provide better support to enhance teacher well-being and student achievement. Finally, if overworking persists among teachers, their physical, mental, social, and emotional well-being is affected. It is suggested that the school head consider the teacher's workload. Also, the school head should streamline the workload by providing training that will lessen teachers' stress and burnout.

Rosanes (2020) supports this claim, stating that teachers who encounter high workloads early in their careers are more likely to lose confidence in their ability to manage the classroom effectively. Overworked teachers frequently resort to negative classroom discipline, such as yelling and using sarcasm. These findings are also supported by Llego (2024). According to him, based on various research results from different institutions, the study's findings indicate that an increase in administrative responsibilities substantially impacts teachers' workloads, affecting the quality and well-being of their teaching. Overworked teachers have less time to plan and prepare interesting lessons, address students’ needs, check students' outputs, and participate in professional development programs or activities, leading to teachers’ burnout and classroom ineffectiveness.

Also, these findings conform with the findings of Tarraya (2023), stating that their heavy workloads influence teachers’ general effectiveness and efficiency. These findings are also supported by Llego (2024). According to him, based on various research results from different institutions, the study's findings indicate that an increase in administrative responsibilities substantially impacts teachers' workloads, affecting the quality and well-being of their teaching. Teachers overworked in administrative tasks have less time to plan interesting lessons, give each student their full attention, and participate in professional development programs or activities. This, in turn, can lead to decreased job satisfaction, increased stress levels, and potential burnout.

Theme 3: The Paradox of School Safety and Maintenance Amidst Resource Deficiencies

Most of the respondents believed that the school has safe and well-maintained facilities but lacked school facilities and resources like classrooms and comfort rooms. Resources like books are not aligned with the curriculum. They have also no or limited access to the internet. Some participants revealed,

Our school is considered a big school in terms of the number of enrollees, but our facilities, school size, and space are insufficient. Two shiftings are applied. T1

Our school has small facilities: a library, canteen, feeding room, limited comfort rooms, and computer room. T10

The findings reveal that while the school facilities are safe and well-maintained, there are significant deficiencies in school facilities and resources. The lack of sufficient classrooms and comfort rooms creates a challenging learning environment that can impede student comfort and concentration, thus negatively affecting overall academic performance. The misalignment of available books and other references with the curriculum further complicates teaching, forcing teachers to adapt materials or teach without adequate resources, thereby diminishing the quality of education. Limited internet connection makes it difficult for teachers and students to access modern instructional materials and technologies, which makes it difficult to integrate digital learning strategies and get current knowledge. These deficiencies show an urgent need for resource investment to ensure a conducive learning environment and improve educational outcomes.

The study's findings conform to the findings of Apolinar (2019), who stated that overcrowding is a serious issue in many Philippine schools. Lack of adequate facilities, especially in the classrooms, which the government typically supplies, is one of the causes of school overpopulation. The Philippines cannot anticipate high results from its school system given the lack of classrooms, which is one of the factors contributing to the ineffectiveness of education. Moreover, these statements are supported by The Pulse Survey Asia result commissioned by Sen. Sherwin Gatchalian, as cited by Gregorio (2023), which shows that the top issue the Department of Education should address is the lack of classrooms. Fifty-two percent (52%) of the 1,200 respondents to the survey said that the DepEd should take immediate action to solve the issue of a shortage of classrooms. Followed by deficient/lack of school learning resources like books and computers (49%) and lack of teachers (45%).

Theme 4: The Impact of Classroom Facilities and Resources on Teaching and Learning

This emphasizes that school facilities and resources affect classroom management practices. Teachers are hurrying due to the class shift, especially during dismissal. During extreme heat index, classes are shifted to asynchronous, greatly affecting learning outcomes. Adequate facilities improve teachers' work conditions by enhancing instruction, increasing job satisfaction, reducing stress, and creating a positive school environment. Some participants revealed,

The sharing of classrooms among other grade levels affects my classrooms among other grade levels affects my classroom management because we are always in a hurry, especially during dismissal time. Adequate facilities improve the conditions of teachers in their workplace because this is less stressful for the teachers. T1

Since we are a small school, our facilities, like those of CR's, are also limited. So, there are times that are difficult for children. Because it is a public school, we do not have air conditioners in the classroom, especially this summer, so the children are forced to use an alternative mode during school. School Facilities are important in supporting students' learning. It increases student's learning motivation and supports teachers in delivering material effectively. T4

This implies that inadequate classroom facilities and resources disrupt classroom management practices, forcing teachers to rush during dismissals due to the need to shift classes, which undermines lesson continuity and classroom order. During extreme heat, the necessity to move to asynchronous learning further impacts student learning outcomes negatively. For teachers, the lack of adequate facilities increases stress and diminishes job satisfaction, detracting from their ability to provide effective instruction. Conversely, adequate facilities enhance teaching conditions, leading to improved instructional quality, higher job satisfaction, and reduced stress, fostering a positive and productive school environment. This benefits teachers and creates a more conducive learning atmosphere for students, ultimately improving their academic performance and overall school experience.

These findings are supported by Apolinar's (2019) study, which revealed that the shortage of classrooms in overpopulated schools limits the quality and quantity of interactions between teachers and students and the quality of teaching and learning. Classroom shortages need to be treated as worthy of the government's attention. The study's findings show that there would be a high quality of education if more classrooms were provided to accommodate students. In addition, Macasero (2023) states that the quality of education depends on school facilities and instructional material. It is the way that pupils are learning. The facilities and environment of a school have a big impact on how well pupils learn. In addition, records of the school's physical facilities, including furniture and equipment, and their regular usage in planning and supervising activities can yield information from which several indicators for evaluating the standard of instruction in a school can be derived. School facilities can greatly influence the learning process.

Theme 5: Challenges in Student Behavioral Performance and Engagement

Most respondents identified student's behavioral performances, namely late submission of performance tasks, absenteeism, aggressiveness, lack of focus on study, no assignments, poor management time, lack of motivation, poor study habits, and learning disabilities. Teachers' strategies in dealing with student misbehavior: one-on-one talk with misbehaved learners, conferences with parents, teaching and modeling positive behavior, setting rules and procedures from the beginning, setting clear expectations, recognizing good behavior, addressing learners' misbehavior immediately, building positive discipline and relations with learners. Thus, the significant remarks of the participants are revealed below:

The pupils' behavioral performance is due to late submission of their performance tasks, and behavioral problems are tardiness, absenteeism, and non-participation. Here are some strategies that I used to deal with student misbehavior. Turn negative into positive, teach positive behavior, communicate well, and recognize good behavior and achievements. T2

Lack of motivation, poor study habits, and learning disabilities. To address academic and behavioral problems, I used differentiated instruction, individualized support, and collaboration between teachers and parents. I also build positive relationships with pupils and parents. T6

This implies that public elementary teachers encountered several student behavioral problems. These include absenteeism, aggressiveness, lack of focus, incomplete assignments, no submission of performance tasks, poor time management, lack of motivation, poor time management, tardiness, being playful, making noise in the classroom even if the teacher is around, and learning disabilities. In addressing these issues, teachers employ strategies such as heart-to-heart talk with misbehaving students, constant communication with parents, modeling positive behavior, establishing clear rules and expectations, promptly addressing misbehavior, and promoting positive relationships with students. By implementing proactive measures and maintaining open communication with students and parents, teachers can effectively manage student behavior, promote positive learning outcomes, and cultivate a culture of mutual respect and responsibility within the classroom.

These findings agree with the study by Garcia et al. (2020) that most teacher respondents dealt with students' behavior in the classroom by offering praise, acknowledgment, and detailed comments. It also proved that educators, parents, and students ought to go to a seminar that guides how to enhance the behavior of adolescents. It is the responsibility of teachers to uphold consistency in the rules that are implemented in the classroom. In addition, Rosanes (2020) states that teachers who are confident in their ability to manage classroom behavior and who are well-prepared are more likely to provide pupils with clear expectations and a clear structure of behavior in the classroom.

Furthermore, Bodia (2022) stressed that a successful classroom must have good classroom management. Even seasoned teachers have trouble providing students with the ideal setting. There are several reasons why this occurs. The primary reason is that every student is different and has unique needs. Management issues in the classroom may be the result of human error. In addition, Lilie (2018) noted that teachers used various techniques to mitigate their stress levels and manage their classrooms calmly. Using appropriate classroom management techniques can help students with special needs learn to adapt their behavior through self-regulation and function more effectively with others.

Theme 6: Preference for Positive Reinforcement Over Punishment in Behavior Management

Most teacher participants preferred using positive reinforcement and rewards rather than punishment. Thus, the remarks of the participants are revealed below:

Both reinforcement rewards and punishment can be used as tools to shape behavior in the classroom. However, reinforcement rewards are effective because they reinforce and strengthen the desired behaviors, making them more effective and positively affecting students' behaviors and motivation. T3

Combining positive reinforcement, targeted rewards, and appropriate consequences is often the most effective approach to promoting positive behavior and managing misbehavior in the classroom. T6

The findings indicate teachers' preference for utilizing positive reinforcement and rewards over corrective measures in classroom management. This approach fosters a supportive and nurturing learning environment where students are intrinsically motivated to excel. Teachers can effectively encourage desired behaviors and academic achievements by employing positive reinforcement, such as verbal praise, tangible rewards, or privileges. Emphasizing positive reinforcement contributes to a conducive learning atmosphere where students feel valued, motivated, and empowered to reach their full potential.

These findings align with Mazhar et al. (2022), who emphasized the importance of classroom management practices in creating a positive and inclusive learning environment. Their study suggests that teachers should prioritize establishing a supportive climate that meets the needs of all students and adapt their teaching strategies accordingly. Moreover, Thomas' (2021) study revealed that Positive Behavior Intervention Support (PBIS) in schools improved student behavior by reducing punitive measures like office referrals and suspensions and encouraging students to engage in positive behaviors, such as increased school attendance and a desire to learn. The findings also highlighted the need for teachers to receive adequate training professional development, and follow-up support sessions to implement PBIS effectively. The study demonstrates the effective implementation of PBIS throughout an entire school to reduce disruptive behavior and improve academic performance, thereby supporting social change.

Theme 7: Supportive and Conducive Learning Environment

This theme emphasizes that the schoolwork condition is conducive to learning where learners are physically and emotionally safe, teachers show camaraderie, supportive leadership, adequate resources, and manageable class size. The participants mentioned:

Our school is a child finally school. It is a safe school where teaching and learning are not distracted. It is conducive to learning; Students feel physically and emotionally safe. They see the classroom as a place where they can be themselves and express themselves and their ideas w/o judgment. T2

In terms of Interpersonal relationships, we have a very high level of social interaction. We work with children, parents, and fellow teachers. We communicate face-to-face. We also use phones, email, and social media to address the needs of children. We usually work indoors in classrooms. We still follow protocols to ensure the safety of our learners. T4

The results demonstrate a highly learning-friendly school atmosphere that safeguards children's physical and mental well-being. In this caring environment, teachers experience a strong camaraderie, fostering a collaborative and cooperative atmosphere among educators. This camaraderie enhances student learning outcomes by promoting better communication and teamwork and increasing teacher satisfaction. Supportive leadership strengthens the school's excellent organizational culture, with administrators prioritizing teachers' and students' professional growth and well-being. Adequate resources enhance the educational process by providing teachers with the tools and materials necessary to deliver high-quality instruction. Additionally, small class sizes allow for meaningful interactions and individualized attention for each student, promoting customized learning opportunities.

Overall, these favorable work conditions promote academic success and cultivate a sense of belonging, empowerment, and fulfillment for students and teachers alike. However, these findings disagree with those of Kabia (2022), which focused on the opinions of middle school teachers regarding administrator support, teacher retention, and attrition. Kabia's study found that teachers leave schools due to a lack of administrative support, including emotional support, instructional support, assistance with student behavior, adequate resources, and a positive school climate. On the other hand, teachers indicated that they would stay if they received this support from their administrators. Moreover, Tyler (2022) found that when the administration failed to support teachers or blamed them for violent incidents, educators experienced anxiety, fear, and isolation.

In contrast, the findings of this study align with those of Aquino et al. (2021), which examined the relationship between school heads' leadership practices and teachers' performance in managing educational institutions. Their study revealed that effective leadership practices, such as providing technical assistance, ensuring curriculum implementation, and fostering a supportive environment, significantly enhance teachers' performance and job satisfaction. The study implies that strong leadership support is crucial in creating a positive working environment, which aligns with the current research findings. Teachers' perceptions of leadership support, including technical assistance and professional development, are essential for improving educational outcomes and maintaining high teacher motivation and effectiveness.

Theme 8: Impact of Good Work Conditions on Educational Success

Most respondents indicated that good work conditions are essential for fostering positive learning environments, including clear communication, well-defined rules and procedures, and high expectations. These conditions promote positive learning outcomes and reduce teachers' stress, enabling them to develop effective classroom management practices. Some participants said:

Having good working conditions for Teachers' classroom management practices is very important because it brings additional good performance to learners. T8

Poor work conditions may become a source of stress and make teachers' classroom management less effective. T1

The findings highlight the critical role of favorable work conditions in creating positive learning environments. Clear communication, well-established rules and procedures, and high expectations are essential to such environments, fostering a sense of structure and accountability among students. These conditions promote positive learning outcomes and contribute to student's academic success and personal development. Additionally, conducive work conditions enable educators to focus on developing effective classroom management practices by reducing teachers' stress levels. When teachers feel supported and valued, they are better equipped to create engaging and dynamic learning experiences that cater to the diverse needs of their students. Furthermore, positive work conditions facilitate collaboration among teachers, promoting the sharing of best practices and innovative teaching strategies. Investing in excellent work conditions benefits teachers' well-being and cultivates a thriving educational community where students and educators can flourish.

Mason (2021) supports these findings by pointing out that the working environment includes positive elements like organizational inspiration, supervisory encouragement, and workgroup support, as well as negative elements like teaching impediments and workload pressure. A pleasant workplace also facilitates or enhances comfort while working.

Theme 9: Leadership and Improvement of Work Conditions in School

Most respondents agree that their school head has been instrumental in improving the unfavorable work conditions. By addressing school problems, listening to teachers' feedback, supporting professional development, and recognizing and appreciating teachers' efforts, the school head has fostered a more positive work environment. This has led to increased collaboration and professional learning among teachers, as highlighted in the participants' key statements.

The principal can establish open lines of communication with teachers to understand their concerns and challenges related to working conditions. They can hold regular meetings, create feedback channels, and actively listen to teacher's feedback and suggestions. T3

The findings indicate that the school head has successfully improved previously unfavorable work conditions by actively addressing school issues, valuing teachers' feedback, and supporting their professional development. The school head has fostered a culture of respect and motivation by recognizing and appreciating teachers' efforts. Additionally, promoting collaboration and professional learning among teachers has strengthened their sense of community and shared purpose. These improvements have led to a more positive and productive work environment, reducing teacher stress and increasing job satisfaction. Supportive leadership has empowered teachers to implement effective classroom management practices and innovative teaching strategies, positively impacting student engagement and learning outcomes.

The school head's proactive approach has not only improved the overall school climate but also contributed to the professional growth of the teachers. This holistic improvement underscores the importance of responsive and supportive leadership in education. Positive work conditions benefit teachers and students, creating a thriving educational environment. Ultimately, these changes highlight the critical role of school leadership in fostering a conducive and collaborative learning atmosphere. These findings align with statements emphasizing that administrators play an instrumental role in supporting teachers by providing mentorship and professional development opportunities. Administrators can help teachers improve their instructional skills and classroom management techniques by offering tailored feedback and guidance. Principals can create an atmosphere where teachers feel supported, empowered, and valued by encouraging professional development, fostering peer collaboration, offering meaningful evaluations, maintaining open-door policies, involving teachers in decision-making, fostering a positive school culture, and providing resources for classroom management. Administrators can assist teachers by supplying the necessary materials, advice, and equipment to run their classrooms efficiently (Better Leaders, Better Schools, 2023).

4.0 Conclusion

Quantitative analysis revealed significant positive correlations between teachers' demographic factors (age, sex, and designation) and work conditions, such as workload, student academic performance, school rules, facilities, and resources. Regression analysis further indicated that workload, student behavior, school policies, facilities, and leadership support significantly influence classroom management. Qualitative findings highlighted the complex relationship between work conditions and teachers' classroom practices. The findings suggest that improving work conditions, such as reducing teacher workload, enhancing school facilities, and providing stronger leadership support, can significantly improve classroom management practices in public elementary schools. This implies that policymakers should address teacher workload by revisiting and revising work policies, formulating supportive school policies that impact classroom management, which empower teachers to manage classrooms effectively, and improving resource allocation, ensuring that school facilities and resources are adequate. In addition, the study implies that educational planners should prioritize school facility upgrades and provide professional development programs for teachers to improve classroom management practices. Also, the findings imply that school heads should consider workload management and teachers' well-being, create good school work conditions that foster a positive learning environment, enhance learning outcomes, contribute to job satisfaction, and reduce teachers' stress and burnout.

5.0 Contribution of Authors

The study conducted by Miguel (2019) provided the researcher with important direction, conceptualization, and insights throughout the research. Hassan's (2023) sequential explanatory design helped the research come up with a comprehensive understanding of the quantitative and qualitative findings, particularly the integration of the data. Through the sequential integration of both data sets, the researcher corroborated and improved the findings and the overall dependability and profundity of the study.

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7.0 Conflict of Interest

The study was conducted for research purposes only. No organization or outside entity's interest was intended to be served. The researcher's only goal was to contribute to the field's scientific knowledge and comprehension.

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Volunteer Online Counseling during COVID-19: Insights, Practices, and Future Directions

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Abstract. This study investigated the transition to online counseling by 34 counselors during the COVID-19 pandemic, addressing the gap in access to mental health services due to restrictions of in-person interactions. The research employed online questionnaires and a virtual focus group discussion to gather qualitative data, which were analyzed using thematic analysis. Counselors reported addressing various client issues, including anxiety, depression, academic challenges, suicidal ideation, and family conflicts. The primary technical challenges identified were connectivity issues, clients' lack of technological resources, and limited digital literacy. Effective online counseling was associated with active listening, adaptability, trustworthiness, and technological competence. Although valued for accessibility, convenience, and confidentiality, online counseling poses challenges, such as impersonal communication and online fatigue. The findings underscore the need for improving tele-counseling practices, particularly in overcoming technological and communication barriers, to ensure the continued growth and development of the field.

Keywords: Online counseling; COVID-19; Mental health services; Thematic analysis; Technological challenges; Tele-counseling.

1.0 Introduction

The COVID-19 pandemic has profoundly impacted global mental health, disproportionately affecting vulnerable groups, including students (Bloom, Fletcher & Yeh, 2021). Reports indicate a surge in anxiety and mental health breakdowns, highlighting the urgent need for accessible mental health interventions. In response, the Psychology Department of Bulacan State University implemented online counseling services to address the growing demand. However, the transition to digital platforms, while necessary, introduced new challenges, such as the perceived impersonal nature of telecounseling and the complex dynamics introduced by the reliance on technology. These dual aspects of telecounseling—its potential to both facilitate and complicate mental health support—have been explored in recent studies, underscoring the need for further investigation into its effectiveness and implementation (Behrendt et al., 2021).

The pandemic has acted as a disruptive force, altering daily routines, straining family dynamics, and exacerbating financial insecurities, all of which have contributed to the heightened incidence of anxiety, depression, and other mental health disorders (Fisk et al., 2020). Counselors have rapidly adapted to these evolving conditions, often deploying various theoretical frameworks to maintain continuity and efficacy in online counseling sessions (Shoai, 2014; Wosik et al., 2020). Despite these efforts, common psychological issues such as fear, stress, and depression have become increasingly prevalent during this period, raising critical questions about the efficacy of online counseling and its impact on counselors.

Existing literature offers valuable insights into the psychological effects of the pandemic and the adaptations made in counseling practices. For example, Salari et al. (2020) documented the widespread prevalence of psychological distress during the pandemic, while other studies have explored the effectiveness of online interventions in mitigating these issues. However, there remains a significant gap in understanding the lived experiences and practical challenges faced by counselors engaged in online counseling, particularly in chat-based synchronous formats. Furthermore, the personal toll on both professional and para-professional counselors remains underexplored, presenting a critical gap in the literature.

This study examined the insights and practices of volunteer counselors who provided chat-based synchronous online counseling during the pandemic. Through thematic analysis, it sought to contribute to the growing literature on telecounseling by offering a nuanced understanding of its challenges and opportunities. The findings are expected to inform the development of comprehensive training programs for telecounselors, ensuring the sustainability and effectiveness of online counseling practices during and beyond the pandemic.

2.0 Methodology

2.1 Research Design

The research employed a qualitative, phenomenological and content analytic design with the use of online survey questionnaires. This consisted of semi-structured open-ended questions. A virtual focus group discussion was conducted to gather additional qualitative data which were analyzed using thematic analysis.

2.2 Research Participants

The study involved 34 mental health professionals selected from social media posts, particularly on Facebook, where they advertised their "free online counseling" services during quarantine. These participants volunteered to provide online counseling in response to the increased demand for mental health support during the pandemic despite the challenges posed by social distancing.

2.3 Research Instruments

An online survey consisting of three parts was used. Part I focused on demographic variables, capturing the profiles of the tele-counselors and their group affiliations. Part II contained semi-structured questions designed to explore the participants' experiences with online counseling during the pandemic, including preparation, session flow, technological challenges, interventions used, and the perceived advantages and disadvantages of the online format. Part III involved a Focus Group Discussion (FGD) conducted virtually with six respondents to delve deeper into the topics covered in the survey. The semi-structured questions in Part I were developed based on a literature review and the researchers' personal experiences as online counselors. Experts in the field then validated these questions, and a pilot test was conducted to assess their appropriateness.

2.4 Data Gathering Procedure

The study's instruments were administered via Google Forms and emailed to the target participants. Due to delayed response times, the researchers had to follow up with participants over two months, ultimately receiving completed forms from 34 participants. A virtual Focus Group Discussion (FGD) was conducted using Microsoft Teams to complement the online questionnaire. The researchers facilitated this session, which allowed participants to exchange ideas openly about the challenges, coping mechanisms, and insights they had experienced. The data gathered from the FGD enriched the initial survey findings and provided a more comprehensive analysis.

2.5 Data Analysis

The data were analyzed using thematic analysis, which involves identifying, analyzing, and reporting patterns or themes within the data (Braun & Clarke, 2006). This approach goes beyond merely summarizing the data by interpreting and making sense of the responses. The researchers conducted a rigorous cross-validation process to ensure the themes' objectivity and accuracy. This involved familiarizing themselves with the data through repeated readings, generating codes, and developing themes. Further deliberation among the researchers ensured that the themes were objective and appropriate.

3.0 Results and Discussion

3.1 Profile of the Respondents

Most participants are female (88%), with males constituting 12% of the sample. Regarding age distribution, the largest group (29%) falls within the 31-40 age range, followed by 23% in the 21-30 age range and 15% in the 41-50 age range. Regarding academic qualifications, the participants are ranked as follows: Rank 1 includes Registered Psychometricians and other licensed professionals, rank 2 includes Registered Guidance Counselors, rank 3 includes Registered Psychologists and Rank 4 includes Registered Social Workers. Notably, as tele-counseling is a voluntary and noble endeavor, there is significant representation from volunteers who are educators at the tertiary level (16%). It is also important to note that many participants hold multiple professional licenses.

3.2 Profile of the Group Affiliations

The affiliations of volunteer telecounselors were categorized into four main groups: government/school-based, government/community-based, non-governmental organizations (NGOs), and private entities. The government/school-based category, which included institutions such as the BulSU-Psych Department (4 representatives), DepEd Bulacan (1 representative), Patnubay at Sanggunian Center (1 representative), BulSU Guidance and Counseling (GC) (8 representatives), BulSU Bustos Campus (2 representatives), Marcelo Senior High School Department (1 representative), Juan Liwag Memorial High School (1 representative), Batangas State University Office of Guidance and Counseling (1 representative), CLSU Guidance Services Unit OSA (1 representative), and Kabataang Humanista (1 representative), accounted for 56% of the participants. This indicates a strong representation of government school-based institutions.

Government/community-based institutions, although fewer in number, also contributed to the tele-counseling efforts. This group included representatives from the Cavite Center for Mental Health and the Provincial Social Welfare and Development Office (PSWDO), comprising 6% of the tele-counselors in the study. The results suggest a lower representation from government community-based units. NGOs also played a significant role, with organizations such as United Registered Social Workers (4 representatives), Lingap Isip (1 representative), LPU Manila Guidance and Testing Center (1 representative), Counselling and Career Center (1 representative), and ICAM Guidance Center (1 representative) collectively making up 27% of the respondents. The involvement of these non-governmental institutions highlights their critical contribution to the tele-counseling initiative. Lastly, the private sector was represented by two participants: one who did not declare their affiliation and another from Run Through on Personal Advocacy, comprising 6% of the study's participants.

In terms of staffing within the respective institutions, private and NGO-affiliated offices generally had 0-5 staff members. Government/community-based institutions typically reported having 6-10 staff members, with two participants noting staff sizes of 21-25. Six participants within the government/school-based group reported staff sizes of 11-15, while three reported having more than 25 staff members.

The tele-counselors served a diverse clientele, including students, school personnel, community members, and referred individuals. This finding underscores the essential role of these institutions and their staff in providing support and care, particularly during challenging times (Fisk et al., 2020). Regarding the online platforms utilized for tele-counseling, many tools were employed, including SMS, Messenger chats and calls, video calls, Google Meet, and Zoom. The use of multiple platforms reflects the necessity for tele-counselors to stay current with technological trends to effectively reach and engage with their clientele (Richards & Vigano, 2013).

The final aspect of the analysis focused on the types of clients served by the tele-counselors. The appended graph revealed that a significant proportion of the clients were students (83%), followed by school personnel (66%). Community members and referred individuals accounted for 46%, while 11% were others. This data illustrates the wide range of individuals who sought counseling services during the pandemic.

3.3 Insights on Online Counseling

The study provided valuable insights into the experiences of online counselors. Preparations undertaken by counselors were ranked as follows: inventory of referrals and existing cases, participation in webinars and related training, acquisition of gadgets, equipment, and technology, establishment of a conducive counseling environment, and self-conditioning. Shoai (2014) emphasizes that the counselor's readiness is the most critical aspect of preparation.

The cases managed by the counselors were ranked in the following order: clinical issues (such as anxiety, stress, and depression), academic concerns, suicidal ideation, family issues, forensic matters, and financial or economic difficulties. These findings align with the work of Bloom, Fletcher, & Yeh, (2021)
who noted that the pandemic and the shift to tele-counseling led to diverse and challenging experiences for counselors as they navigated varying mental health statuses among their clients.

The study also identified several technical barriers that impacted the tele-counseling process, including issues with connection signals and bandwidth, lack of mobile data among clients, stigma and its associated negative effects, unfamiliarity with online platforms, lack of technological knowledge, and concerns about electricity consumption. Larry (2020) corroborates these findings, noting that the adoption of telehealth often comes with significant challenges related to technology use, particularly among individuals from lower socioeconomic backgrounds.

In response to these challenges, counselors employed eclectic interventions, combining various approaches as needed, such as cognitive-behavioral therapy (CBT) and mindfulness/meditation techniques. Sometimes, the standard counseling process was adapted to focus on immediate problem-solving, leading to solution-focused therapy. This approach is consistent with Fisk et al. (2020) assertion that counseling must be tailored to the counselor's specific needs, resourcefulness, and concern for the client.

Finally, the study highlighted several qualities that were deemed essential for effective tele-counseling: active listening and communication skills, compassion, adaptability, innovation, trustworthiness, technological literacy, and a sense of spirituality or prayerfulness. A novel insight from this study is the increasing importance of technological literacy, which complements Cherry's (2021) observation that the benefits of tele-counseling must be carefully weighed against its potential drawbacks.

3.4 Online Counseling Practices

The research examined the practices employed in online counseling across different tele-counselors. The flow and pace of sessions typically varied, ranging from a brief introduction to exploration, counseling proper, summarizing the session, and assigning homework. Some counselors conducted an assessment before the counseling session, while others proceeded from an introduction to problem identification, followed by exploration. As one volunteer tele-counselor noted,

"There is a need to establish rapport, then explore the issue at hand, proceed with the intervention proper, and if the counselee is already okay, terminate the counseling session."

The flow and pace of counseling sessions appear to adapt to the presentation and urgency of the client's issues. However, a common sequence generally emerged: building rapport and facilitating relaxation after obtaining informed consent, followed by the counseling session proper, and concluding with evaluation or synthesis. A brief introduction, combined with minimal assessment and relaxation techniques, is often employed at the beginning of the session to ensure effective and well-informed virtual counseling. This is followed by the exploration of issues, counseling proper, and, finally, evaluation, follow-ups, and homework assignments, particularly in the context of brief cognitive-behavioral therapy (Shoai, 2014).

Regarding handling privacy and confidentiality in tele-counseling, several practices were identified: securing informed consent and the counseling platform, using disclosure notes, providing a space conducive to counseling, refraining from posting or recording sessions, safeguarding passwords, maintaining discretion, and ensuring anonymity. One volunteer tele-counselor wrote,

"Through the use of informed consent, stating the complete guidelines of what the client is to expect," and *"I make sure that during the session, I am in a room alone where no one can see or hear me. The same applies to my client."*

These practices underscore the modest and sincere efforts of volunteer tele-counselors to provide help to clients most in need, ensuring that the counseling platform is secure and that the flow of the session is appropriate to the situation and the capabilities of the clients (Richards & Vigano, 2013).

To assess the success of counseling, several themes emerged: eliciting feedback from clients, acknowledgment of the counseling effort, client empowerment, validation of assessment results, validation with significant others, and positive evaluations from clients. Volunteer tele-counselors are crucial in empowering clients, enabling them to reflect and regain autonomy. Indeed, counseling can be effectively tailored to clients' needs, even in a virtual setting, demonstrating that the helpfulness of these efforts is beyond measure (Cherry, 2021). Volunteer respondents shared sentiments such as

"Feedback coming from clients is heart-wrenching."
"The gratefulness is there as they say, 'I am okay now,'"
"Saying, 'Now I can think on my own."

Volunteer counselors have made significant strides in reaching out to individuals needing support, offering a listening ear and a space to share their pressing concerns. The adjustments telecounselors make have proven effective, as clients appreciate these efforts, provide positive feedback, and attest to feeling empowered. The perceived advantages of tele-counseling were categorized into several themes.

The first theme, *Ease of Access*, highlights that tele-counseling benefits individuals in remote areas and those with physical limitations. Counselors find it a convenient option given the widespread adoption of e-Counseling or teleconsultation. One respondent emphasized that tele-counseling was favorable due to its convenience and the fact that everyone has adapted to this mode of counseling. The second theme, *Economy and Convenience*, underscores how tele-counseling transcends space, distance, and time barriers while being cost-effective. One respondent noted that it is economical and breaks down traditional barriers to accessing counseling.

The third theme, *Interactivity*, reflects the advantage of tele-counseling in reducing client shyness and facilitating more open communication. Counselors observed that the interactive nature of online sessions helps clients feel more at ease. The fourth theme, *Skill Development*, indicates that counselors have acquired new skills, such as listening via audio, which they view as a valuable addition to their practice. The fifth theme, *Contagion Safety*, points to the reduced risk of virus transmission associated with tele-counseling, making it a safer option during health crises. Finally, the theme of *Preservation of Confidentiality* reveals that counselors can maintain confidentiality effectively online, a critical aspect of the counseling process.

These insights underscore the enduring commitment of counselors, reflecting the adage "once a counselor, always a counselor," even when reaching out to those in remote areas. The recognition of tele-counseling's practicality, economy, and convenience highlights its role in making counseling more accessible and effective. The interactive nature of online counseling allows clients to open more freely, which is a significant advantage. Additionally, counselors have acknowledged developing new skills and maintaining safety and confidentiality in this format (Ahuvia et al., 2022).

The study also addresses the perceived disadvantages of online counseling, which were categorized into several themes: technology barriers, lack of personal touch, communication issues, limited time, loss of counselor's privacy, difficulties in making follow-ups, need for documentation, suitability for only mild cases, and the tendency for online fatigue.

Technology barriers were a significant concern, as noted by participants who mentioned interruptions due to poor internet connection, with one respondent stating,

"*Sessions can be interrupted because of poor internet connection."*

Additionally, counselors expressed a *lack of personal touch*, feeling that online counseling lacks the personal connection in face-to-face interactions, affecting the overall experience. The feedback echoed this:

"*Maintaining communication during the session is lacking.*"

Communication issues were evident, with counselors requesting clients to restate their concerns due to buffering and choppy audio. One counselor noted,

"*I must request my clients to restate their concerns as we often encounter buffering and choppy audio.*"

Limited time was also a concern, with comments like,

"Limited time to share stories, clients can only be accommodated depending upon the counselor's mood, and no proper observation of the client's behavior."

The *loss of the counselor's privacy* was another disadvantage, as clients' access to personal contact details led to unexpected communications outside of scheduled sessions. One respondent mentioned,

"*Since clients know our cell phone numbers and Facebook accounts, they can text us anytime or night.*"

The challenge of *making follow-ups* was also highlighted, with counselors expressing frustration about clients disappearing without a trace,

"Sometimes they would just disappear, and we no longer know what happened to them."

The need for *documentation* was another issue, with the additional burden of recording conversations due to the chat format, as noted,

"*Most conversations are recorded because the conversations are through chat.*"

Online counseling was perceived as suitable for only *mild cases*, with difficulties handling severe mental health disorders and the need for collaboration with parents or caregivers. One counselor commented,

"*Difficult to handle severe cases of mental health disorders; we need the collaboration of the parents,*" emphasizing the limitations of virtual settings.

Lastly, the *tendency for online fatigue* was acknowledged, with counselors noting that online sessions can be exhausting for both parties. As one respondent observed,

"*Online fatigue cannot be avoided on both ends; it is tiring and exhausting."*

These insights reveal that tele-counselors are acutely aware of the limitations and challenges associated with online counseling. Despite their efforts, achieving perfection remains elusive due to these constraints. Counselors must accept the reality of these limitations and strive to provide the best possible support given the available time and technology (Richards & Vigano, 2013).

The final problem examined the potential areas for training as suggested by the volunteer tele-counselors, which included e-counseling techniques, psychotherapy methods, help-seeking tools, and the care and management of tele-counseling.

3.5 Focus Group Discussion Proceedings

The FGD produced themes that were valuable in augmenting the data for the study. The themes refer to volunteer online counselors' challenges encountered, coping ways, and insights. On challenges, themes revolve around signal issues, loss of momentum, distractions during sessions, lack of privacy, insufficient time in counseling, nocturnal counselees, presenting urgency of the need for counseling, load issues, and concerns for parameters and limits. In terms of coping ways, themes revolve around patience with technology, exploration of platforms, crying out, sharing with fellow counselors, preparing well, referrals, and posting available time for tele-counseling. Finally, insights revolve around the following themes: helpfulness of telecounseling, development of multitasking ability, opportunity for team counseling, need for reflections and self-care, call for commitment, need to upgrade competencies, capturing the opportunity for daily counseling.

4.0 Conclusion

The study confirms the significant role that online counseling has played during the pandemic, highlighting both its impact and the challenges faced by online counselors. The data indicates that online counseling addressed a range of issues, including clinical conditions such as anxiety, stress, and depression, as well as academic difficulties, suicidal ideation, family issues, forensic matters, and financial concerns. Technical barriers, such as connection signal and bandwidth issues, lack of client access to necessary technology, stigma, and electricity consumption challenges, were notable obstacles encountered during sessions.

Despite these challenges, certain qualities emerged as particularly beneficial for effective tele-counseling. These included active listening, strong communication skills, compassion, adaptability, innovation, trustworthiness, technological literacy, and prayerfulness. The perceived advantages of online counseling included ease of access, cost-effectiveness, convenience, interactional safety, and confidentiality. Conversely, the perceived disadvantages encompassed technological barriers, impersonal interactions, communication difficulties, concerns about sincerity, uncertainty, documentation requirements, limited session time, suitability for only mild cases, online fatigue, and loss of counselor privacy.

The pandemic has exacerbated anxiety and related disorders within communities, underscoring the crucial role of volunteers who adapted to technological challenges to provide support. Theoretical frameworks, such as those proposed by Behrendt et al. (2021), suggest that counseling promotes process quality by facilitating the processing of thoughts that hinder well-being, thereby fostering enlightenment and deeper reflection.

The insights and challenges experienced by tele-counselors offer valuable lessons that can be applied to future counseling endeavors. Skills developed during the pandemic, such as ensuring network stability, managing signal issues, and applying psychotherapeutic exercises online, have potential utility beyond the pandemic context. Future research should explore possible moderating and mediating factors influencing counseling success across different cohorts and situations. The results of this study are promising, demonstrating a growing interest in online counseling as a viable modality within the mental health field, both during and beyond the pandemic.

5.0 Contribution of Authors

The authors were guided by the project lead, who facilitated the proposal's conceptualization and submission to the university's Research Management Office for approval. Upon notice to proceed, full-blast literature mapping was conducted, and validation of the questionnaires was completed. The team helped well in the data collection and management. A parallel activity was conducted that offered learning support to select volunteers conducting Tele counseling. Upon completing the study, this was presented to the university colloquium.

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7.0 Conflict of Interest

There is no conflict of interest in submitting and publishing this research endeavor.

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Mediating Effect of Social Support Between Existential Gratitude and Life Satisfaction Among Young Adults

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Abstract. This study determined the impact of social support and existential gratitude on life satisfaction among young adults affected by parental substance use and whether social support mediates the relationship between existential gratitude and life satisfaction. It utilized a quantitative research design, specifically mediation analysis, to address its objective. The study was conducted in Calamba City and used simple random sampling to gather individuals aged 18-25 affected by parental substance use. The study used three adopted survey questionnaires, namely the Multidimensional Scale of Perceived Social Support (MSPSS), Existential Gratitude Scale (EGS), and Satisfaction with Life Scale (SWLS). Regression analysis discovered that existential gratitude has a calculated r-square of 0.386 that predicts social support; a computed r-square of 0.340 indicates that social support predicts life satisfaction; a computed r-square of 0.334 indicates that existential gratitude predicts life satisfaction. Moreover, the bootstrap method and Sobel test were employed to determine whether social support mediated between existential gratitude and life satisfaction. After data analysis, it was found that social support only partially mediated the relationship between existential gratitude and life satisfaction by 39.2%. Existential gratitude still affected life satisfaction, with or without the presence of social support. This implies that existential gratitude directly impacts life satisfaction and can indirectly enhance it by fostering social support. With this, future programs aiming to enhance the life satisfaction of young adults affected by PSU may focus on enhancing existential gratitude and life satisfaction, as both were found to improve life satisfaction.

Keywords: Existential gratitude; Life satisfaction; Mediation; Parental substance use; Social support; Young adults.

1.0 Introduction

Substance use, drug abuse, or addiction, as others might call it, has long been a global problem affecting millions of people and has consistently been an issue across generations. According to the UNODC World Drug Report (2023), an estimated number of 296 million people used drugs in 2021, which was higher compared to 240 million in 2011. Population growth could partly account for this increase throughout the last ten years. From the same report, cannabis remained the most widely used substance in the world. In contrast, opioids remained to be the ones that caused the most significant amount of drug-related severe damage, including overdose deaths.

Substance use led to the development of physical health problems. However, more importantly, as mentioned by Eske (2023), substances might also affect one's mental health—which alters one's behavioral and cognitive processes. Although one experiences positive effects, such as euphoria or relaxation, upon taking certain drugs, adverse effects take a toll on one's functioning. These adverse effects include paranoia, hallucinations, delusions, anxiety, difficulty focusing, difficulties with memory and learning, increased alertness, social problems, depression, disorientation, problems with mood, difficulty sleeping, aggressive behavior, and many more. These cognitive and behavioral alterations pose a danger to people surrounding the person who abused substances. Hallucinations, for instance, make a person behave recklessly and violently, causing them to hurt people surrounding them. To some extent, the abuser's violent actions and hallucinations can lead to someone being killed.

Accordingly, the National Household Survey on the Patterns and Trends of Drug Abuse (2019) found that there were 1.7 million Filipinos aged 10 to 69 years old who used illegal drugs (Dangerous Drugs Board, 2019). A much later data set from the Dangerous Drug Board (2022) revealed that 3,865 admissions to treatment and rehabilitation institutions were documented for 2022, representing a 42.73% increase over the previous year. Moreover, inconsistent with the global report, cannabis was only second to Methamphetamine Hydrochloride or "Shabu" as the most abused drug in the Philippines.

To reduce the nation's rising drug-using population, the Philippine government responded by launching various initiatives through its agencies. However, aside from the individual affected by substance abuse, the effect also extends to their immediate family members. According to Thatcher (2020), children with parents who abused substances experienced neglect, which could have long-term impacts on the children's emotional and behavioral aspects.

Given all these, it was essential for an individual to have a vital source of social support when going through that challenging time in their life. Social support could come from family, friends, special someone, or any other social network to whom they could turn for assistance, care, or comfort. Meulewaeter et al. (2022) mentioned that for individuals who experienced parental substance use, social support acted as a buffer to protect their mental health and helped hinder substance misuse from continuing between generations.

On the other hand, applying life satisfaction to the experience of parental substance use, it was reported by Mosley-Johnson et al. (2019) that those who experienced household dysfunction in childhood, wherein parental drug use was one, had relatively lower life satisfaction—proving the negative effect of parental substance use on life satisfaction. It is crucial to avoid deterioration of one's life satisfaction as across different kinds of literature and previous studies conducted; it was found that low levels of life satisfaction were related to negative consequences such as depression, whereas higher levels led to more positive outcomes.

Lastly, existential gratitude is the inclination to count blessings throughout happy and challenging situations (Jans-Beken & Wong, 2019). According to Harris et al. (2023), the development of the existential gratitude scale by Jans-Beken and Wong in 2019 supported the conclusion that existential gratitude had a unique explicable significance in evaluating resilience in times of suffering. This claim showed the vitality of fostering existential gratitude in individuals who experienced parental substance use, as this might assist them in making sense of their experiences, finding purpose in the face of hardship, and developing a positive attitude in life.

Based on the literature, it was evident that substance use was a global issue not only affecting millions of individuals abusing substances but also their families. Existing literature also pointed out the detrimental effect it has on their offspring. In particular, parental substance use might have negatively affected their life satisfaction, which could have a spillover effect on other areas of their psychological functioning. Currently, few studies are exploring the mediating role of social support in the relationship between gratitude and life satisfaction. However, these variables were not yet explored in the context of young adults experiencing parental substance use. With this in mind, the study deemed it imperative to conduct the study to understand how social support and existential gratitude would help improve a person's life satisfaction amidst parental substance use. More so, this study aimed to serve as a guide for future interventions and programs that would help individuals experiencing such phenomena to foster resiliency and not merely survive but thrive in life. The results of this study will help the readers understand the relationship between social support, existential gratitude, and life satisfaction of young adults whose parents were affected by illegal substances. Additionally, this will give insight into the factors enabling these young adults to cope and thrive.

2.0 Methodology

2.1 Research Design

This study utilized a quantitative approach. According to Mohajan (2020), quantitative research is a design that uses structured data collection instruments and obtains numerical results that establish a link between variables across a substantial population. Compared to qualitative data, numerical data is simpler to comprehend and read and may be used to conclude quickly. Moreover, quantitative results can be generalized to a wider demographic. Specifically, mediation analysis was employed in this study to test the effect of social support as a mediator. According to Sidhu et al. (2021), mediation analysis in research examines the relationship between the independent and outcome variables when there is the presence of an intervening or mediating variable. Additionally, Ballen and Salehi (2021) indicated that mediation analysis was an effective method for investigating intricate and multifaceted relationships in which multiple factors may affect the result of interest. Thus, the use of mediation analysis was deemed appropriate as life satisfaction is one of the constructs that were affected by many factors—more so with individuals in undesirable circumstances such as parental substance use.

2.2 Research Locale

The research was carried out at Calamba City, Laguna. The locale was chosen as, according to Dangerous Drugs Board (2022), the place of residence of drug abusers was mostly in urban areas. Considering this, Calamba City was chosen as the locale because, according to the Cities and Municipalities Competitive Index from the Department of Trade and Industry (2023), Calamba City has a population of 454,486—the largest population among the cities of Laguna.

2.3 Research Participants

Due to the belief that individuals who had firsthand experience with parental substance use played a crucial role in offering unique insights into the mediating role of social support between existential gratitude and life satisfaction, the study involved 80 young adults aged 18 to 25 years old living in Calamba City who had experienced or was experiencing parental substance use. Simple random sampling was used to gather respondents for the study. According to Noor et al. (2022), simple random sampling was a popular technique for studies with substantial participants. Because data selection in simple random sampling relied on chance, the research's data could produce exact, broadly applicable findings.

2.4 Research Instrument

The study utilized three adopted questionnaires to measure the respondents' social support, existential gratitude, and life satisfaction. First was the Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet et al. (1988, as cited in Laksmita et al., 2020). It was a 12-item scale with items measuring social support experienced by the respondents from different sources, namely family, friends, and significant other. Second, the Existential Gratitude Scale by Jans-Beken and Wong (2019) was used to measure the respondents' level of existential gratitude. It was a 10-item scale that measured gratitude even during challenging times. Lastly, the Satisfaction with Life Scale by Diener et al. (n.d., as cited in Yun et al., 2019) was also utilized to measure the respondents' life satisfaction level. SWLS is a 5-item, 7-point Likert scale wherein respondents were asked to rate their agreement on the statements about satisfaction with life.

2.5 Data Gathering Procedure

Call-for-respondents posters were uploaded online to recruit individuals willing to participate in the study. They displayed a link to the Google form and the qualifications needed for the respondents. Upon accessing the Google form, participants were presented with an informed consent document, which they were asked to read before confirming their willingness to participate in the study. After consenting to take part, individuals were asked to respond to the three questionnaires used in the study: the MSPSS, EGS, and SWLS.

To achieve the required number of responses, questionnaires with consent forms were disseminated through selected barangays, namely Pansol, Bañadero, Lecheria, II, and VI. Upon retrieving the completed questionnaires, the gathered data were encoded and merged with the data collected through the Google form. Once the target number of respondents was reached, the responses were cleaned and forwarded to the statistician for analysis. Moreover, to ensure confidentiality and data privacy, Google Forms, laptops, and other mediums containing the respondents' data were accessed only by the researcher. Physical copies of the questionnaire contain no identifying information, therefore maintaining anonymity.

2.6 Ethical Considerations

Ethical considerations stipulated in the institution's research manual and Code of Ethics for Philippine Psychologists and Psychometricians were adhered to in conducting this research. Moreover, respondents' well-being, rights, and dignity were ensured and prioritized. The study accommodated individuals who wished to participate as long as they met the conditions required by the study. Informed consent indicating the objectives, methods, and possible risks and benefits of the research was secured at the beginning of the study to ensure that the respondents were well-informed of their participation. One of the potential risks includes the resurfacing of unpleasant or painful memories related to parental substance use. In contrast, possible benefits include contributing to the body of knowledge on parental substance use and later using it to develop interventions. They were also reminded that their participation was voluntary and informed of their right to withdraw from the study at any time. Furthermore, this research was aligned with Republic Act 10173, or the Data Privacy Act of 2012, which emphasizes individuals' rights to privacy and responsible handling of their data. The research ensured that the respondents' anonymity was maintained. Personal data collected from the respondents were treated with utmost confidentiality and used solely for the study.

3.0 Results and Discussion

3.1 Social Support

As shown in Table 1, the Social support level among young adults affected by parental substance use had a general assessment of 5.40 (SD=0.90), which indicates that young adults affected by parental substance use experienced high social support. Among the three sub-variables, social support given by the family had the highest mean of 5.51, verbally interpreted as High Social Support. On the other hand, while still verbally interpreted as High Social Support, the lowest mean was derived from the sub-variable of social support from friends, with a computed mean of 5.32.

Table 1. Social support level among young adults affected by parental substance use

Indicative Statement	Mean	SD	Verbal Interpretation
Social Support from Family			
1. My family is willing to help me make decisions.	5.69	1.09	High Social Support
2. My family tries to help me.	5.51	1.41	High Social Support
3. I get the emotional help and support I need from my family.	5.43	1.28	High Social Support
4. I can talk about my problems with my family.	5.40	1.46	High Social Support
Mean	**5.51**	**1.31**	**High Social Support**
Social Support from Friends			
5. I have friends with whom I can share my joys and sorrows.	5.51	1.02	High Social Support
6. I can talk about my problems with my friends.	5.38	1.26	High Social Support
7. I can count on my friends when things go wrong.	5.34	1.16	High Social Support
8. My friends try to help me.	5.04	1.13	Slightly High Social Support
Mean	**5.32**	**1.14**	**High Social Support**
Social Support from Significant Other			
9. A special person in my life cares about my feelings.	5.64	1.21	High Social Support
10. I have a special person who is a real comfort source.	5.47	1.23	High Social Support
11. a special person is around when I am in need.	5.37	1.53	High Social Support
12. There is a special person with whom I can share joys and sorrows.	5.05	1.12	Slightly High Social Support
Mean	**5.38**	**1.25**	**High Social Support**
Overall Mean	**5.40**	**0.90**	**High Social Support**

The results imply that young adults affected by parental substance use experience high social support from all of the three sources, which are family, friends, and significant other. However, there are minimal differences between the three sub-variables, with family support being the highest and friend support being the lowest. The reason for this could be due to the nature of the issue. Parental substance use is a topic more comfortably discussed among the involved family members because of the stigma and shame that comes along with it. It was as if those affected had to suffer in silence to hide it from others, rarely disclosing the issue to uninvolved individuals, such as friends. With this, young adults affected by PSU may more likely seek support from their family rather than friends.

The findings from the study of Kane (2020) can support this claim wherein they found that the family members afflicted by substance use disorder experienced emotions of shame, embarrassment, and stigma. To avoid experiencing these emotions, they limit their access to social support networks, exacerbating their social isolation. Moreover, as stated by Lee et al. (2020), relationships with friends and romantic partners grew increasingly crucial for companionship, positive relationships, and intimacy during adulthood. However, they also found in their study that the link between personal well-being and social support for emerging adults differed depending on the source of support. Specifically, they found that only the support of friends enhanced students' social relationships by reducing feelings of loneliness; support from romantic partners enhanced psychological functioning by lowering depressive symptoms; and support from family members significantly improved students' self-rated physical health. It can be observed that social support impacts specific areas related to the source of support (e.g., support from friends helps alleviate loneliness). Therefore, the higher level of social support from family compared to friends, as experienced by young adults affected by parental substance use, may be attributed to this reason. Since parental substance use is a family issue, support from the family remains their primary source of support.

3.2 Existential Gratitude

As shown in Table 2, the existential gratitude level among young adults affected by parental substance use had an overall mean of 5.50 (SD=0.83), which is verbally interpreted as high existential gratitude. *"I am grateful that every crisis represents an opportunity for me to grow"* got the highest mean of 6.03, verbally interpreted as high existential gratitude. Conversely, *"I wish I had never been born"* got the lowest mean of 4.09, verbally interpreted as neither low nor high existential gratitude.

Table 2. Existential gratitude level among young adults affected by parental substance use

Indicative Statement	Mean	SD	Verbal Interpretation
1. My life is full of hardships and suffering, but I can still count my blessings.	5.95	1.21	High Existential Gratitude
2. I am grateful for my life, even in times of suffering.	5.82	1.33	High Existential Gratitude
3. I am resentful that life has treated me unfairly.	4.85	1.57	Slightly High Existential Gratitude
4. I am grateful that my inner resources have increased due to overcoming adversities.	5.11	1.33	Slightly High Existential Gratitude
5. I wish that I had never been born.	4.09	1.98	Neither Low or High
6. I am grateful for the people in my life, even those who have caused me much pain.	5.26	1.32	High Existential Gratitude
7. I still feel bitter for all the bad experiences I have had.	5.02	1.59	Slightly High Existential Gratitude
8. I am thankful that I have something to live for, even though life has been very hard for me.	5.97	1.20	High Existential Gratitude
9. I am grateful that every crisis represents an opportunity for me to grow.	6.03	1.08	High Existential Gratitude
10. I give thanks at the end of each day, even when nothing goes my way.	5.91	1.09	High Existential Gratitude
11. I have learned the importance of gratitude through suffering.	5.75	1.18	High Existential Gratitude
12. I am grateful that suffering has strengthened my faith and character.	5.76	1.18	High Existential Gratitude
13. In desperate times, I am grateful for my faith that I will overcome.	5.98	1.15	High Existential Gratitude
Overall Mean	**5.50**	**0.83**	**High Existential Gratitude**

These findings suggest that, despite experiencing challenging circumstances such as parental substance use, young adults remain grateful and view these experiences as opportunities for personal growth. The circumstance did not hinder them; instead, they used this as an opportunity for them to thrive and achieve greater heights. However, on the statement *"I wish that I had never been born,"* young adults affected by PSU expressed a neutral outlook. While it does not necessarily indicate low existential gratitude, the findings reveal conflicting views. Some individuals may wish they had never been born, while others remain grateful for their existence.

Children affected by parental substance use are often expected and seen to be negatively affected by the circumstance, so it is surprising to discover that they are still grateful despite what they have experienced, as this led to their personal growth. One example can be found in a systematic review by Muir et al. (2023), which explored the lived experiences of young people and children with parents who used substances. It highlighted that those children and young individuals who witnessed their parents abusing drugs are attempting to control and reduce their vulnerabilities and develop resilience in the face of unforeseen, unfavorable, and frequently stigmatizing events. These children's ability to recognize and manage dangerous situations exercised their agency by ensuring their safety and well-being, taking charge of their surroundings, and establishing safe havens when homes were potentially harmful.

A similar observation was made by Maina et al. (2021), where individuals who grew up witnessing a family member abuse substances demonstrated remarkable resilience. This resilience enabled them to turn their lives around and focus on healing and rehabilitation despite the early trauma they experienced. They showed that they could make suitable adjustments even in the face of adversity. Despite the risks associated with parental substance use, these young adults used their agency and took it as an opportunity to take control of their lives.

3.3 Life Satisfaction

As shown in Table 3, the Life satisfaction level among young adults affected by parental substance use had an overall mean of 5.45 (SD=1.04), which was verbally interpreted as extremely satisfied. The indicative statement *"In most ways, my life is close to my ideal"* had the highest mean of 5.65 (extremely satisfied). Whereas *"If I could live my life over, I would change almost nothing"* had the lowest mean of 5.18, which was verbally interpreted as slightly satisfied.

Table 3. Life satisfaction level among young adults affected by parental substance use

Indicative Statement	Mean	SD	Verbal Interpretation
1. In most ways, my life is close to my ideal.	5.65	1.25	Extremely Satisfied
2. The conditions of my life are excellent.	5.44	1.38	Extremely Satisfied
3. I am satisfied with my life.	5.60	1.37	Extremely Satisfied
4. I have gotten the important things I want in life.	5.36	1.41	Extremely Satisfied
5. If I could live over, I would change almost nothing.	5.18	1.69	Slightly Satisfied
Overall Life Satisfaction	**5.45**	**1.04**	**Extremely Satisfied**

The result implies that these young adults perceive that their current life is close to their ideal life, significantly contributing to their high life satisfaction. However, it is important to note that the indicative statement "If I could live my life over, I would change almost nothing" received a slightly lower mean. This indicates that although they may see their life as close to their ideal, there might still be desired improvements if they could live their life over. In a study done by Li et al. (2021), they looked at how internalizing issues and social support affect life satisfaction in emerging adults who have experienced psychological abuse as children, as well as the mediating and moderating roles these factors play. The results indicated a negative link between life satisfaction among young Chinese adults and psychological abuse experienced as children, which was consistent with what they hypothesized. This discovery offered more proof that psychological abuse throughout childhood compromises Chinese young adults' life satisfaction.

However, their findings were contrary to the results of the present study. Here, although the young adults experienced parental substance use, they were still able to be extremely satisfied with their lives. One probable reason is the personal agency utilized by these young adults. Veronese et al. (2020) conducted a study with Bedouin children chronically exposed to military violence. Their investigation found that younger children and girls could utilize their agency, which helped increase their life satisfaction. They discovered a direct relationship between the predictor, agency, and life satisfaction. This discovery shows that in situations where trauma is still present, this direct effect appears to support the role that agency plays in triggering life satisfaction. Thus, the agency was a short-term enhancer of life satisfaction and, over time, a protective factor against trauma. These young people may be comparable in that they could exercise their agency and maintain a sense of fulfillment despite being placed in such difficult circumstances.

3.4 Impact of Existential Gratitude to Social Support

As shown in Table 4, existential Gratitude ($\beta=0.677$, $p<.001$) influenced or impacted Social Support. The r-square r= 0.386 signified that about 38.6% of the variability of Social Support can be explained by Existential Gratitude. Other variables can explain the 61.4%. The results show a significant positive association between social support and existential gratitude. That is, an increase in existential gratitude predicts increased social support. This relationship may be attributed to the fact that as young adults experience positive emotions, such as existential gratitude, are more likely to seek out and perceive social support.

Table 4. Regression analysis on the impact of existential gratitude level to social support level among young adults

Model	Unstandardized B Coefficients	Standardized Beta Coefficients	p-value	R-square
1 (Constant)	1.731		0.002	0.386
Existential Gratitude	0.677	0.621	< 0.001	

These findings can be supported by a study conducted by Kardas and Yalcin (2021), wherein they also cited the works of Fredrickson in 2004. They stated that gratitude broadens one's perspective, enabling new ideas and activities to be adopted. This, in turn, enhances well-being and helps build personal resources. After careful analysis, they discovered that gratitude boosts one's sense of perceived social support, strengthens interpersonal ties, increases self-worth, and promotes self-mastery. Furthermore, the association between gratitude and social support was also established by Chang et al. (2023). During the COVID-19 pandemic, they examined the link between college students' gratitude and leisure social support. Upon investigation, they found that the two have a positive relationship, which supports the association between existential gratitude and social support in this study.

3.5 Impact of Social Support on Life Satisfaction

As shown in Table 5, Social Support (β=0.676, p<.001) influenced or impacted Life Satisfaction. The r-square= .340 signified that about 34.00% of the variability of Life Satisfaction can be explained by Social Support. Other variables can explain the 66.00%. The results suggest that social support is a significant predictor of life satisfaction among young adults affected by parental substance use. Therefore, increased social support experienced by these young adults may lead to higher life satisfaction. Although other factors affect life satisfaction, social support accounts for 34% of the cases.

Table 5. Regression analysis on the impact of social support level on life satisfaction level among young adults

Model	Unstandardized B Coefficients	Standardized Beta Coefficients	p-value	R-square
1 (Constant)	1.796		0.003	0.340
Social Support	0.676	0.583	<0.001	

This finding was consistent with previous studies. A study by Evans et al. (2022) found that having an adult family member as a social support system was associated with fewer mental health symptoms and higher levels of life satisfaction. One-third of those surveyed said they would most likely turn to their biological parent for assistance when needed, and this type of support was associated with higher levels of life satisfaction than other forms and sources of support. Also, this result was in line with the research by Bi et al. (2021), which looked at the connections between life satisfaction and perceived social support from different sources in early adolescents' social contexts (friends, family, classmates, and teachers, for example). A positive correlation was found between adolescents' perceived social support and their life satisfaction. The association was highest for family support, followed by instructors and classmates, and poorest for friend support—suggesting how essential parent support is.

3.6 Impact of Existential Gratitude on Life Satisfaction

As shown in Table 6, existential Gratitude (β=0.720, p<.001) influenced or impacted Life Satisfaction. The r-square r=0.334 signified that about 33.4% of the variability of Life Satisfaction can be explained by Existential Gratitude. Other variables can explain the 66.6%. Existential gratitude significantly predicted life satisfaction. This suggests that an increase in existential gratitude would lead to higher life satisfaction, while a decrease in existential gratitude would result in lower life satisfaction. Although existential gratitude accounted for only 33.4%, it was significant.

Table 6. Regression analysis on the impact of existential gratitude level on life satisfaction level among young adults

Model	Unstandardized B Coefficients	Standardized Beta Coefficients	p-value	R-square
1 (Constant)	1.487		0.023	0.334
Existential Gratitude	0.720	0.578	<0.001	

Although limited studies have directly examined the relationship between existential gratitude and life satisfaction, much previous research has explored general gratitude and its connection to life satisfaction. The findings of these studies were consistent with the results found here. Unanue et al. (2019) claimed that there was a spiral relationship between life satisfaction and gratitude. Their longitudinal study revealed that, after a few months, individuals who initially displayed higher levels of gratitude subsequently exhibited better life satisfaction when reassessed. The results were similar when conducted in reverse, showing that people who initially had higher life satisfaction also displayed increased levels of gratitude over time. This observation led to the conclusion that, in the same way that life satisfaction predicted gratitude, gratitude predicts life contentment.

Furthermore, Cunha et al. (2019) demonstrated both the causal link and the association between gratitude and life satisfaction. Participants in their experiment were randomly assigned to different groups: the hassles group, the neutral events group, and the gratitude group. Each group was exposed to specific treatments and asked to respond to a life satisfaction scale. The study's conclusions revealed that the gratitude intervention significantly improved life satisfaction while reducing depressive symptoms and negative effects.

3.7 Mediation of Social Support to Existential Gratitude and Life Satisfaction

A mediation analysis was performed to assess the mediating role of social support in the linkage between existential gratitude and life satisfaction. The results revealed that the total effect of Existential Gratitude on Life Satisfaction was significant ($\beta=-0.438$, $z=2.57$, $p=0.010$). With the inclusion of the mediation variable (Social Support), the impact of Existential Gratitude on Life Satisfaction was significant ($\beta=0.438$, $z=2.57$, $p=0.010$). The indirect effect on Life Satisfaction through Social Support was significant ($\beta=0.282$, $z=2.98$, $p=0.003$). The bias-corrected bootstrap confidence interval for the indirect effect was based on 1,000 bootstrap samples and was entirely above 0 (0.101 to 0.472). This showed that the relationship between existential gratitude and life satisfaction was partially mediated by social support, accounting for 39.2%.

Moreover, to further verify the results, the Sobel test was performed. The Sobel test was a simple test statistic proposed by Sobel (1982). It was used to test the hypothesis that the relationship between the independent variable (X) and the dependent variable (Y) was mediated by a third variable (Z), indicating an indirect relationship between X and Y through Z. In other words, it examined whether the inclusion of a mediator (M) in the regression analysis considerably reduced the effect of the independent variable (X) on the dependent variable (Preacher, 2020). With a calculated score of 2.89, the results indicated that social support significantly mediated the relationship between existential gratitude and life satisfaction. If the z-score was more significant than 1.96, then the mediating variable significantly mediated between X and Y.

The results suggest that social support only partially mediated the relationship between existential gratitude and life satisfaction among young adults affected by PSU. This implies that young adults with high levels of existential gratitude tend to experience strong social support, positively impacting their life satisfaction. Simply put, those with high existential gratitude are more likely to perceive and seek social support, and this social support helps them achieve life satisfaction amidst being affected by parental substance use. However, existential gratitude may still affect life satisfaction, with or without the presence of social support. That is, a young adult affected by parental substance use may still be satisfied with life by practicing gratitude and with or without support from other people.

This was somewhat inconsistent with the findings of Zhou et al. (2019), who found that social support mediated the relationship between gratitude and life satisfaction. Here, they investigated adolescents' life satisfaction and gratitude after a tragedy and discovered a direct and positive correlation between life satisfaction and gratitude. The direct relationship between gratitude and life satisfaction was insignificant. However, social support—one of the study's mediating variables—had a significant indirect relationship with gratitude and life satisfaction. This suggested that cultivating gratitude enhances life satisfaction by fostering the long-term development of social and psychological resources. This research also emphasized how crucial social support was for adolescents' life satisfaction following natural disasters like earthquakes. El Keshky et al. (2023) found similar results in their study exploring the relationship between gratitude and life satisfaction among older individuals. Their study suggested that individuals who expressed more gratitude also reported higher levels of life satisfaction. Additionally, it was found that social support mediated the relationship between gratitude and life satisfaction.

3.8 Proposed Program

After analyzing the study results and identifying the indicators where young adults needed intervention, the study led to the development of the S.U.B.S. program (see Table 7). This program aims to enhance social support, existential gratitude, and life satisfaction among young adults affected by parental substance use. S.U.B.S. is a feasible and cost-effective initiative utilizing support groups and seminars to achieve its goals. The program can be utilized by government agencies like the Department of Social Welfare and Development (DSWD) or non-government organizations aiming to address the effects of parental substance use on families. Implementation could involve identifying individuals currently affected by substance abuse within their families and inviting them to participate in the program. To ensure the program's effectiveness, participants' social support, existential gratitude, and life satisfaction levels should be assessed before and after each session. As an outcome, at least 75% of young adults are expected to show improvement in these areas.

Table 7. Action plan for S.U.B.S. (Support Using Basic Sources) Program

Area of Concern	Goals and Objectives	Activities	Person Responsible	Time Frame	Success Indicators
Social Support Level among Young Adults Affected by Parental Substance Use	To be able to form a support group for young adults affected by parental substance use where they encourage the sharing of personal experiences, acquire applicable coping mechanisms, and establish a secure and encouraging environment to whom young adults can go for support.	We Got Us: A Support Group for Young Adults Navigating through Parental Substance Use.	Department of Social Welfare and Development (DSWD) or other non-government agencies	Seminars may be conducted at least once a year, whereas social support groups may be gathered at least once a month.	75% of young adults experiencing parental substance use have experienced improved social support from friends.
Existential Gratitude Level among Young Adults Affected by Parental Substance Use	To educate young adults about existential gratitude and its benefits and promote its practice in the context of parental substance use.	Grateful through Pain: A Journey of Continuing Life Amidst Parental Substance Use	Department of Social Welfare and Development (DSWD) or other non-government agencies	At least once a year	75% of young adults experiencing parental substance use have attained a higher level of existential gratitude.
Life Satisfaction Level among Young Adults Affected by Parental Substance Use	This will enable young adults to embrace unfavorable life situations, encourage self-regulation to heal emotionally and value both the good and bad aspects of life.	Contentment and Regret: Accepting Life's Adversities Brought by Parental Substance Use	Department of Social Welfare and Development (DSWD) or other non-government agencies	At least once a year	75% of young adults experiencing parental substance use have acquired a higher level of life satisfaction.

The proposed program consists of three components. The first component, "We Got Us: A Support Group for Young Adults Navigating Parental Substance Use," aims to enhance social support. Through this support group, young adults can increase their social support by connecting with peers facing similar challenges. The findings indicate that social support from friends is perceived as the lowest, highlighting the need for expanded networks. This support group will help young adults build relationships with others who understand their experiences, providing a safe space for sharing and confiding. Consequently, this can enhance their overall social support levels.

The second component is "Grateful through Pain: A Journey of Continuing Life Amidst Parental Substance Use." This seminar targets young adults affected by parental substance use, educating them about existential gratitude, its benefits, and practical ways to incorporate it into their daily lives. Participants will learn various gratitude activities they can practice regularly. This component, which focuses on psychoeducation, operates on the principle that individuals can begin to heal from trauma or suffering when they understand what they are experiencing and learn effective coping strategies.

Lastly, the component "Contentment and Regret: Accepting Life's Adversities Brought by Parental Substance Use" will be implemented to enhance life satisfaction. Similar to the second component, this program uses seminars and activities that focus on accepting the negative circumstances that these young adults face. The aim is to increase their life satisfaction by helping them come to terms with and accept these adversities.

4.0 Conclusion

After analyzing the data gathered, the study concluded the following: Young adults affected by parental substance use experience high social support, with slightly higher support from family than friends due to the stigma and shame associated with parental substance use, which often leads them to seek support from family rather than friends. Despite their circumstances, these young adults still exhibit high existential gratitude, viewing their crisis as an opportunity for personal growth. They also perceive their current lives as close to their ideal, contributing to high life satisfaction, although they may still desire improvements if given the chance to live their lives over. The study found that existential gratitude influences social support, predicting increased social support with increased gratitude. Additionally, social support predicts life satisfaction among these young adults, suggesting that increased social support can lead to higher life satisfaction. Furthermore, existential gratitude also predicts life satisfaction, implying that changes in gratitude levels directly impact life satisfaction. While social support positively affects life satisfaction and partially mediates the relationship between existential gratitude and life satisfaction, existential gratitude can still influence life satisfaction independently of social support. Lastly, the study suggests that young individuals affected by parental substance use would benefit from a program designed to enhance their levels of existential gratitude, social support, and life satisfaction.

5.0 Contributions of Authors

The sole author initiated and completed this research.

6.0 Funding

This is a self-funded research.

7.0 Conflict of Interests

There is no conflict of interest about the publication of this paper.

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Factors Influencing the Performance of Department of Public Works and Highways Field Engineers: Input for Supervisory Project Management Plan

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Abstract. The Department of Public Works and Highways (DPWH) plays a critical role in shaping infrastructure projects in the Philippines, with field engineers at the forefront of any project execution. This study was conducted to determine the factors influencing the performance of field engineers at the DPWH, considering the individual, team, and organizational factors. Using a descriptive-correlational research design, the study was conducted at DPWH Eastern Samar District Engineering Office, with 30 field engineers who served as the respondents. Mean and standard deviation were used to analyze the data, while Pearson's correlation was used to test the hypothesis. The key findings revealed that factors such as technical skills (r=0.306), experience (r=0.162), and motivation (r=0.332) have nothing to do with performance, with p-values higher than 0.05. On a team level- leadership and management (r=0.407) are critical to success. Sufficient resource allocation (r=0.356) drives better performance at the organizational level. The research stressed the importance of providing continuous professional development to field engineers to enhance their technical know-how and leadership capabilities. Likewise, supportive leadership that fosters collaboration and communication among teams is vital to achieving project goals. On an organizational scale, efficient resource management and well-defined policies are necessary for field engineers to perform effectively and efficiently. It is suggested that to improve project outcomes, the DPWH should implement targeted training programs, foster leadership that encourages teamwork, and ensure adequate resource distribution. Also, refining organizational policies can help create a more structured and supportive environment for field engineers to improve individual and team performance and ensure efficient use of resources, ultimately enhancing infrastructure development in the Philippines.

Keywords: Field engineers; Organizational factors; Performance factors; Supervisory project management; Transformational leadership.

1.0 Introduction

The Department of Public Works and Highways (DPWH) is a government agency in the Philippines that has been instrumental in transforming the country's infrastructure by managing the planning, development, and upkeep of numerous public works projects across the Philippines. Accordingly, field engineers are entrusted with the role of overseeing specialized capacities, testing hardware, taking care of repairs, overseeing building projects, and conducting location assessments. They spend a small percentage of their time at an office (Thomas & Bhaumik, 2023), and they spend the larger part observing and assessing workers and machines on the field. Their essential objective is to advance in general effectiveness and efficiency in their work environment (Cen et al., 2021).

Furthermore, utilizing specialized expertise to solve and resolve issues related to gear and systems. However, while there is existing literature regarding factors influencing the performance of field engineers in different manufacturing industries, limited studies focus on DPWH. Thus, this study was conducted to understand the different factors that influence the performance of DPWH field engineers. Johnson (2024) indicated the need to conduct a study relative to field engineers' performance to identify areas for training strategies, as inefficient training strategies may impact how field engineers effectively contribute to organizational success. Additionally, Bunner et al. (2019) speculated in their study the essence of understanding how field engineers perform their roles for developing effective performance metrics. They indicated that management support and feedback mechanisms play a significant role in improving their job performance.

The field engineer role is critical to project implementation success (Chan et al., 2019). Dacanay et al. (2023) opined that the performance of field engineers plays a pivotal role in the successful implementation of projects undertaken by the Department of Public Works and Highways (DPWH). Factors influencing the performance of DPWH field engineers, including individual, team, and organizational factors, are crucial for enhancing project outcomes and ensuring efficient resource utilization. The role of individual factors in influencing engineer performance in project implementation is a complex interplay of technical proficiency, experiential knowledge, and intrinsic motivation. Each of these elements contributes uniquely to the overall effectiveness and success of engineering projects, from foundational infrastructure developments to cutting-edge technological constructions.

The growing body of research on this subject, both in the Philippines and in various international contexts, offers a solid foundation for comprehending at the heart of an engineer's ability to contribute to a project effectively is their technical skillset and depth of knowledge. This encompasses the basic competencies acquired through formal education and the advanced proficiencies developed through continued professional engagement and learning. Watts (2024) emphasizes the importance of continuous skill development and knowledge acquisition for improving job performance, a concept especially relevant in the fast-paced and constantly changing engineering field. This perspective is reinforced by Qi et al. (2024), who argue for the indispensable value of continuous professional development programs in equipping engineers with the latest technological insights and standards, directly influencing engineering projects' success. The complex aspects of engineer performance in project implementation (Homthong et al., 2024).

It was revealed by Lim and De Guzman (2020) that motivational factors such as recognition, achievement, and personal growth are pivotal in driving engineers' commitment and productivity in project execution. This body of work highlights the universal truth that motivation and attitude are indispensable in fostering high-performing engineering professionals capable of successfully progressing projects. Most companies are reliant on their teams for creativity and productivity. They enhanced the team's performance by knowledge sharing (Vrontis et al., 2020). The research of Nyfoudi et al. (2022) concluded that knowledge sharing mediates the relationship between managerial skill and team performance, especially when the learning goal of the manager is higher.

Moreover, the foundational work of Saebah and Merthayasa (2024) on organizational culture posits that the underlying beliefs, values, and principles that constitute an organization's cultural fabric significantly influence its members' behaviors and attitudes, including their approach to project implementation. This perspective has been corroborated by numerous studies, such as Mensah (2019), Srisathan et al. (2020), and Akanji et al. (2020), demonstrating the profound impact of organizational culture on the performance of engineering projects. An investigation made by Zhang et al. (2018) found that flatter organizational structures facilitate better communication and collaboration among project team members, thereby improving project performance—a finding that resonates with the experiences of Philippine engineering projects (Cruz, 2018).

Similarly, Shakeri and Khalilzadeh (2020) underscore the importance of resource availability and organizational backing in achieving project objectives. This is particularly relevant in the engineering context, where the complexity and scale of projects demand substantial resources and robust support mechanisms. Studies conducted by Santos (2019) revealed that effective resource allocation and comprehensive support systems significantly enhance the efficiency and outcomes of engineering projects. This finding is mirrored in international research by Zwikael et al. (2012), who noted the positive impact of adequate resource provisioning and organizational support on project success rates across different countries. These insights collectively highlight the critical role of resource allocation and organizational support in enabling field engineers to perform optimally and deliver projects successfully.

The performance of engineers in public works and infrastructure transcends traditional productivity metrics, requiring a nuanced understanding of the socio-technical systems within which engineers operate. This understanding is premised on integrating social, technical, and environmental factors that collectively influence project outcomes Josa & Aguado (2019). In the Philippines, for instance, the emphasis on technical competence is complemented by a growing recognition of soft skills such as teamwork, communication, and leadership (Mufaricha et al., 2021). Additionally, international studies have underscored the importance of socio-technical competencies in navigating the complexities of infrastructure projects, which are often subject to varying degrees of uncertainty and risk. These studies emphasize the need for field engineers in the Department of Public Works and Highways to possess diverse skills beyond technical knowledge, including effective communication, problem-solving abilities, and adaptability to changing circumstances. Furthermore, studies like Quezon and Ibanez (2021) have identified the impact of management factors on the performance of field engineers. Furthermore, Nejatyan et al. (2023) highlighted that project management performance and the application of value engineering strategies are key factors affecting the performance of DPWH field engineers.

Thus, this study was conducted to identify factors influencing the performance of DPWH field engineers for enhancing project outcomes and ensuring efficient resource utilization to maximize project success rates and minimize delays and cost overruns to create specialized training programs, performance management systems, and organizational policies designed to enhance the skills and effectiveness of DPWH field engineers. Specifically looking at the individual, team, and organizational factors and their relationship to the performance of the DPWH field engineers.

2.0 Methodology

2.1 Research Design

For this investigation, the researchers used a descriptive-correlational research design. The design is suited to the study as it aims to explore and describe the myriad of factors traversing individual, team, and organizational dimensions that influence the performance of field engineers of DPWH. Also, it captures a broad spectrum of data across different dimensions of interest while ensuring consistency and comparability among responses. The descriptive-correlational approach allows for a comprehensive examination of the status quo, illuminating the existing conditions and relationships among the variables of interest. It will not only facilitate identifying and describing the key factors affecting field engineer performance but also enable the assessment of the relative importance of analyzing how these factors interrelate and impact field engineers' performance.

2.2 Research Locale

Selecting an appropriate research locale was paramount in ensuring the relevance and applicability of the study's findings. The Eastern Samar District Engineering Office (ESDEO) was chosen as the study setting for this investigation. It is a first-class district engineering office of DPWH Region VIII that implements a high volume of projects. The office is committed to implementing quality infrastructure and new technology with the goal of providing better service to its stakeholders.

2.3 Research Participants

The study's respondents are field engineers from the Department of Public Works and Highways (DPWH) of Eastern Samar. The chosen thirty (30) respondents were composed of Project Engineers (PE), Materials Engineers (ME), and Project Inspectors (PI) who were actively engaged in project implementation within the Eastern Samar District Engineering Office (ESDEO). Since the number of field engineers in the DPWH Eastern Samar district office is quite manageable, the researchers used the complete enumeration of samples. This method entails selecting all members of the defined population, allowing the researcher to gain comprehensive information without biases in smaller sample sizes (Scherer et al., 2006).

2.4 Research Instrument

A structured survey questionnaire was used as the primary data collection tool. The questionnaire comprised the categories under investigation, such as individual factors, adopted from Cordeiro et al. (2020), while the team factors were from Snider et al. (2017). It was adopted by Chow and Liu (2013) for organizational factors. This segmented approach facilitated a comprehensive examination of the variables pertinent to the study, ensuring that each area of interest was thoroughly addressed. Each indicator has five (5) questions, with 15 questions slightly modified to suit the current study.

A Likert-scale item was employed to measure the respondents' perceptions and experiences concerning the different factors. This choice was predicated on the need for a quantifiable and standardized means of capturing the intensity of respondents' feelings or attitudes toward the variables in question. Likert scales, with their graded response options, provided the nuanced spectrum necessary for this analysis, ranging from strong disagreement to strong agreement or similar gradations of frequency or quality. This methodological choice enhances the study's ability to conduct detailed statistical analysis, allowing for assessing correlations, differences, and trends within the collected data. The research instrument was validated through content validity by experts, including the District Engineer of ESDEO, the Faculty of Civil Engineering program, and research experts in the engineering field, who reviewed it for relevance and clarity of the items. The feedback from the evaluators was used to refine the instrument. The systematic validation ensured the instrument's appropriateness for the research objectives and target population. The Individual Performance Commitment and Review (IPCR) ratings were utilized as a reference for measuring field engineers' performance.

2.5 Data Gathering Procedure

The data-gathering process was pivotal to the success of any quantitative study, requiring meticulous planning and execution to ensure the data's integrity and quality of the collected data. For this study, a systematic procedure was implemented, adhering to ethical standards and operational considerations. The initial step involved obtaining ethical approvals and permissions from the institution and the DPWH. This step was crucial for ensuring compliance with ethical standards and facilitating access to the target population of field engineers. With the requisite approvals, the researcher distributed the questionnaires to the selected field engineers, employing strategies to maximize reach and engagement. Participants were provided with comprehensive information regarding the study's objectives, the confidentiality of their responses, and their autonomy in participation, including the right to withdraw at any time.

A combination of direct distribution and follow-up strategies was employed to achieve a high response rate. Follow-ups, conducted through respectful reminders and engagement efforts, were crucial in mitigating non-response and ensuring that a representative sample was achieved. Completed questionnaires were systematically collected, with measures in place to maintain data integrity and confidentiality throughout the process. To gather data on the performance of DPWH field engineers, a written request for a copy of the respondents' performance commitment and review (IPCR) ratings was addressed to the District Engineer of ESDEO.

2.6 Ethical Considerations

Ethical considerations are considered in the study to ensure that the participant's rights, safety, and well-being are protected. The respondents were provided with informed consent indicating the purpose of the study, procedures, risks, and benefits, and voluntarily agreed to participate. Moreover, the researchers adhere to confidentiality principles in protecting the participants' identities by securing the data privately. The researchers uphold the utmost integrity by conducting the study honestly and transparently, avoiding data manipulation, and ensuring the findings are reported accurately.

3.0 Results and Discussion

3.1 Factors Influencing Performance

Individual Factors

The result presented in Table 1 highlights the three key individual factors, namely Technical Skills, Experience and Qualifications, and Motivation and Attitude. Among the different factors, motivation and attitude obtained the highest mean score of 4.65, interpreted as highly influential. It is perceived as the most influential factor, with an SD value of 0.59, signifying a moderate response variability.

Table 1. Descriptive statistics of individual factors influencing DPWH field engineers' performance

Indicators	Mean	SD	Interpretation
Technical Skills	4.51	0.55	Highly Influential
Experience and Qualifications	4.51	0.63	Highly Influential
Motivation and Attitude	4.65	0.59	Highly Influential
Grand Mean	**4.56**	**0.59**	**Highly Influential**

Legend: 4.21-5.00- Highly Influential, 3.41-4.20- Influential, 2.61-3.40- Moderately Influential, 1.81-2.60- Slightly Influential, 1.00-1.80 – Not Influential

This implies that although most respondents rated this factor highly, there is some variation in how influential they consider it. Some might have rated it lower, though the consensus remains high, which suggests differences in individual experiences or contexts where motivation and attitude are perceived with slightly differing levels of importance. Being on the first rank further emphasizes the critical role of motivation and positive attitudes in the performance of field engineers. Meanwhile, the Technical Skills, Experience, and Qualifications shared the same mean rating of 4.51, indicating they are also considered highly influential. The standard deviation values of 0.55 and 0.63 suggest that the respondents' responses were consistent for Technical Skills, while there was more variability in how Experience and Qualifications were rated. Moreover, it also suggests that perceptions of the importance of experience and qualifications are more subjective and might be influenced by specific workplace environments, industries, or personal experiences.

The grand mean of 4.56 posits that all individual factors are seen as "Highly Influential," with moderate variability across responses having the average SD value of 0.59. This further suggests that while there is a consensus, respondents show some diversity in prioritizing the three factors, particularly regarding Experience and Qualifications, where variability is highest. The results further suggest that while technical expertise and experience are important, an individual's motivation and attitude are the most critical components influencing outcomes for field engineers.

Team Factors

The analysis provided in Table 2 is relative to team factors. It is highlighted that Communication & Collaboration ranks the highest, with a mean score of 4.67 with an interpretation of "Highly Influential," stressing that it is the most influential factor in team factors. The standard deviation value of 0.49 signifies a consistent response, emphasizing the essential role of effective communication and teamwork in driving team performance. Leadership and management styles are followed closely, with a mean score of 4.53 and a higher variability of SD value of 0.63, indicating that while leadership is highly influential, perceptions may differ depending on the leadership style experienced. While Conflict Resolution & Cohesion has the lowest mean score of 4.30 and a standard deviation score of 0.68, suggesting that while it remains highly influential, opinions on its importance vary the most.

Table 2. Descriptive statistics of team factors influencing DPWH field engineers' performance

Indicators	Mean	SD	Interpretation
Communication & Collaborations	4.67	0.49	Highly Influential
Leadership & Mgt. Styles	4.53	0.63	Highly Influential
Conflict Resolution & Cohesion	4.30	0.68	Highly Influential
Grand Mean	**4.50**	**0.60**	**Highly Influential**

Legend: 4.21-5.00- Highly Influential, 3.41-4.20- Influential, 2.61-3.40- Moderately Influential, 1.81-2.60- Slightly Influential, 1.00-1.80 – Not Influential

The grand mean score of 4.50 across all team factors confirms that each is viewed as highly influential, with a moderate variability of SD value of 0.60. Generally, the result indicates that communication and collaboration are considered the most crucial contributors to team success, followed by leadership. At the same time, conflict resolution, though significant, is slightly less impactful compared to other indicators. These elements are essential for fostering a cohesive and high-performing team environment, which is critical for successfully implementing engineering projects. The findings resonate with the broader literature on teamwork and leadership in engineering, highlighting the need for ongoing focus on these areas to enhance project outcomes (Kozlowski & Ilgen, 2006; Leveson et al., 2011).

Organization Factors

Looking at the result for organizational factors as shown in Table 3, the Organizational Culture and Structure indicator obtained the highest rank, with a mean score of 4.53 with an interpretation as "Highly Influential," indicating that it is the most influential factor among the different indicators. Respondents viewed the organization's values, environment, and structure as crucial to its overall performance. The standard deviation value of 0.62 showed moderate response variability, suggesting differences in how this factor is perceived. On the other hand, Policies & Procedures followed closely with a mean score of 4.49, which is also considered highly influential and ranked second. The lower variability of the SD value of 0.59 indicates a more consistent perception of the importance of clear policies and procedures in guiding organizational behavior and ensuring efficiency. The Resource Allocation & Support is also rated as "Highly Influential" but got the lowest mean score of 4.23 and an SD of 0.68, expressing that the respondents have more varied experiences with resources and support across the organization.

Table 3. Descriptive statistics of organizational factors influencing DPWH field engineers' performance

Indicators	Mean	SD	Interpretation
Organizational Culture & Structure	4.53	0.62	Highly Influential
Resource Allocation & Support	4.23	0.68	Highly Influential
Policies & Procedures	4.49	0.59	Highly Influential
Grand Mean	**4.42**	**0.60**	**Highly Influential**

Legend: 4.21-5.00- Highly Influential, 3.41-4.20- Influential, 2.61-3.40- Moderately Influential, 1.81-2.60- Slightly Influential, 1.00-1.80 – Not Influential

The grand mean of 4.42 expressed that all organizational factors are highly influential, having a variability of SD value of 0.60, which suggests that while all factors contribute significantly to organizational success, organizational culture and structure play an essential role. The findings are supported by Cruz (2015) and Cameron and Quinn (2011), who opined that organizational culture and structures collectively contribute to the efficiency and success of project implementation in the engineering field. It further resonates with the broader literature on organizational effectiveness, underscoring the need for continuous improvement and support at the organizational level to enhance the performance of field engineers.

3.2 Performance Level of DPWH Field Engineers

The second problem the study aims to answer is the performance level of the field engineers. The researchers obtained the data from the HR office of the DPWH Eastern Samar District Engineering Office through a letter sent by the researchers. The Performance evaluation was obtained during the study period. The mean performance level of DPWH field engineers is exceptionally high at 4.89, indicating that, on average, the engineers exhibit near-excellent performance. This high performance level indicates effective management, robust training programs, and a supportive organizational culture that promotes continuous improvement and high standards. These findings are consistent with the broader literature on organizational effectiveness and performance management in engineering contexts (Cameron & Quinn, 2011; Cruz, 2018).

3.3 Relationship Between Factors

Table 5 shows the results of the hypotheses testing.

Table 5. Relationship between the individual factors, team, and organizational factors to field engineer's performance

	Individual Performance Commitment and Review (IPCR) Rating				
	r	p-value	Decision	Conclusion	Remarks
Individual Factors					
Technical Skills and Knowledge	0.306^{ns}	0.100	Retain Ho	Not Significant	Low Positive Correlation
Experience and Qualifications	0.162^{ns}	0.391	Retain Ho	Not Significant	Almost Negligible Correlation
Motivation and Attitude	0.332^{ns}	0.073	Retain Ho	Not Significant	Low Positive Correlation
Team Factors					
Communication & Collaborators	0.313^{ns}	0.092	Retain Ho	Not Significant	Low Positive Correlation
Leadership & Mgt. Skills	.407*	0.025	Reject Ho	Significant	Moderate Positive Correlation
Conflict Resolution & Cohesion	0.251^{ns}	0.181	Retain Ho	Not Significant	Low Positive Correlation
Organizational Factors					
Organizational Culture & Structure	0.356^{ns}	0.054	Retain Ho	Not Significant	Low Positive Correlation
Resource Allocation & Support	.427*	0.019	Reject Ho	Significant	Moderate Positive Correlation
Policies & Procedures	0.209^{ns}	0.269	Retain Ho	Not Significant	Low Positive Correlation

Legend: r - Pearson, ns - Not significant, * - Significant at 5% significance level (2-tailed).

The relationship between individual, team, and organizational factors and field engineers' performance measured by the Individual Performance Commitment and Review (IPCR) is shown in Table 5. As reflected, individual factors concerning technical skills and Knowledge (r = 0.306) and motivation and attitude (r = 0.332) show low positive correlations with field engineers' performance. They are not statistically significant, as their p-values exceed the statistical threshold 0.05. Experience and qualifications exhibit an almost negligible correlation (r = 0.162, p = 0.391), indicating little to no impact on the performance of field engineers.

For team factors, only leadership and management skills have a significant moderate positive correlation (r = 0.407, p = 0.025), which suggests that effective leadership substantially influences field engineers' performance. The null hypothesis is rejected for this factor, confirming its importance. However, communication and collaboration (r = 0.313) and conflict resolution and cohesion (r = 0.251) showed low correlations that are not statistically significant. On the organizational factors, the indicator resource allocation and support established a significant moderate positive correlation with the performance of field engineers (r = 0.427, p = 0.019), signifying that adequate resources and support have a meaningful impact on field engineers' performance.

Nevertheless, organizational culture and structure (r = 0.356) and Policies and procedures (r = 0.209) showed low correlations, with no significant relationship to performance. Thus, leadership and management skills, resource allocation, and support are the most influential factors affecting field engineers' performance, while other factors do not have significant impacts. This finding is supported by Cruz (2018), who stressed the importance of providing sufficient resources and support, such as training and mentorship, to enhance project implementation and the overall performance of engineers. Access to the necessary resources enables engineers to perform their tasks efficiently, directly contributing to improved performance outcomes. Similarly, Bell & Kozlowski (2008) underscored the need for a holistic approach to performance management that integrates individual competencies with organizational support and effective team dynamics to optimize overall performance outcomes.

4.0 Conclusion

The most critical individual factors that influence the performance of field engineers are motivation and attitude. Technical skills and experience/qualifications are also highly influential, emphasizing that while technical expertise is important, a positive mindset is crucial for optimal performance. Communication and collaboration for team factors are perceived to be essential for more variability. Organizational culture and structure are essential components of organizational factors, signifying that a well-defined culture is fundamental to organizational success. The performance of field engineers is exceptionally high, with minimal variability in performance levels. Statistically, a significant relationship was computed between leadership and management skills along with resource allocation and support to the performance of field engineers, suggesting that leadership and adequate resource provision are driving factors for the high performance of field engineers.

Thus, enhancing leadership development programs focused on decision-making, people management, and motivational leadership is recommended. Also, strengthening resource allocation and support ensures that field engineers have consistent access to tools, technologies, and support to perform their tasks effectively. The DPWH may continue to promote a work environment that supports collaboration and innovation for an engaging work environment. Likewise, they may structure policies regarding reward programs, career growth opportunities, and regular motivational workshops to maintain high morale and job satisfaction. Regular performance evaluation may continuously be done to ensure high-performance sustainability and identify improvement areas.

Further research on other individual factors, technological impacts, leadership styles, and the effect of remote work on engineers’ productivity may be explored. Researchers may focus on conducting a deeper analysis of the different leadership styles employed by the DPWH heads to determine their specific effects on the performance of field engineers. Likewise, examine the influence of remote work on field engineers' productivity, collaboration, and work-life balance, considering the increase in hybrid work environments. Further exploration may also be conducted of individual factors of field engineers, such as emotional intelligence, stress management, or adaptability, which might also play a role in the performance of field engineers.

Moreover, based on the study's findings, the Supervisory Project Management Plan aims to improve the performance of DPWH field engineers by strengthening leadership, enhancing motivation, and optimizing allocation. Its scope includes addressing key individual team and organizational factors. It includes the following phases:

Phase 1. Leadership Development. This phase includes identifying leadership gaps. After that, leadership training programs focused on decision-making, communication, and team management are implemented.

Phase 2. Motivation and Attitude Enhancement. This will include designing reward and recognition programs for top-performing engineers and continuously conducting workshops on maintaining positive work attitudes and career growth.

Phase 3. Resource Allocation Optimization. This includes auditing DPWH's current allocation process to identify inefficiencies and providing field engineers timely access to necessary tools and support.

These plans will significantly enhance field engineers’ performance through strategic leadership, motivation, and resource management improvements.

5.0 Contributions of Authors

Engr. Floria is the main author, from conceptualization of the paper, data gathering, and analysis of data; Engr. Ala- technical adviser and methodologist.

6.0 Funding

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7.0 Conflict of Interests

There is no conflict of interest recorded.

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Epistemological Beliefs and Information-Seeking Behavior of Graduate Students in Lanao Del Sur, Philippines

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Abstract. This study examined the epistemological beliefs and information-seeking behavior of 350 first-year Lanao del Sur graduate students. Descriptive statistics were used for frequency, percentage, mean, and standard deviation. Moreover, inferential statistics such as Chi-Square, Analysis of Variance (ANOVA), and regression analysis were used to test the significant difference and relationship between the independent and dependent variables. The salient findings include epistemological beliefs regarding the acquisition of knowledge, which got the highest mean, while the learning speed got the lowest mean. The level of information-seeking behavior was highest in preparing to present. The findings disclosed a significant difference in the information-seeking behavior of the graduate students when grouped according to their characteristics. Epistemological beliefs showed a positive relationship towards information-seeking behavior. This means that the null hypothesis is rejected. In conclusion, most respondents have the highest degree of epistemological beliefs towards acquiring knowledge and have the highest level of information-seeking behavior in preparing to present. Their' information-seeking behavior varies according to their characteristics, which include sex, age, civil status, course enrolled in, number of hours spent in Internet search, and nature of work. The epistemological beliefs have a bearing on information-seeking behavior. It is then recommended that the graduate students be assisted in developing thorough and productive research skills. Second, schools should encourage librarian and faculty collaboration in teaching research methods to graduate students.

Keywords: Epistemological beliefs; Information-seeking behavior; Graduate students; Literacy Development plan.

1.0 Introduction

Information has become essential for decision-making in today's world. The problem of information used to be a scarcity of information, but it has become an abundance of information in the current century. Today, information plays a vital role in a human's life and is considered a basic resource. It also affects personal and professional life information needed by all to make decisions and is required as a natural resource in day-to-day activities (Hoq, 2014; Fricker, 2011). The familiarity with search manners and information used by graduate students can assist and help better enhance the provision of information. They cannot access and evaluate the information needed effectively. Information literacy is the surest way of helping solve the problem of choosing the correct information from the abundance of information from various media. It was observed that library-based instructional services for graduate students have received limited attention. Ranawera (2006) said that Faculty advisors assume that either their graduate students arrive at graduate school competent in research skills or that they should discover how to conduct research through a process of self-discovery.

As a result, few library instruction services are targeted toward them. Graduate students come from various educational backgrounds and frequently have knowledge gaps about finding and using information that can impede their success as researchers. When librarians and faculty advisors assume that these students are comfortable navigating library resources or appropriately evaluating information, an opportunity is missed to help them transition from novice researchers to expert scholars. Assessment of student learning is essential and required to determine if graduate students in an institution are ready to assume a productive role in today's world. As observed, evaluations collected from first-year graduate students after the orientation indicated that students still perceived a need for more in-depth coverage of library services.

For this premise, this present study was undertaken to learn about graduate students' epistemological beliefs and information-seeking behavior in Lanao del Sur, which is facing a series of research studies. It requires students to take courses on the use of libraries and computers for gathering information, as well as compulsory courses on research methodology, to benefit and understand research. Information literacy skills essential for this audience include discovering how to complete a comprehensive literature review, evaluating sources within the context of their projects, and properly citing and including them within their theses or dissertations. To adequately address the changing information needs of academic libraries' students, they need to know more about the information that students use and value and what influences their information searching, obtaining, and use.

This paper proposed possible remedies for the deficit skills displayed by graduate students in doing their research. Since library and information science is mainly concerned with providing information to different patrons, analyzing the library users' information search processes must not be neglected. To address these questions, this study investigated the effects of the epistemological beliefs and information-seeking behavior of graduate students from different Graduate School Departments of Lanao del Sur as they pursue their research, the Internet, the academic library, and other influences. This study is essential to graduate students since their information needs and concerns are addressed and probably contribute to improving their research methods. It will serve as a guide on broadening searches and using information.

2.0 Methodology

2.1 Research Design

The study used a descriptive design, using a questionnaire to analyze and interpret the data collected regarding the participants' personal characteristics and information-seeking behavior. Descriptive design was defined by Best and Khan (2006) as a research design that attempts to find general attributes that deal with present conditions. This kind of research seeks answers to questions by analyzing variable relationships. This study described the epistemological beliefs and information-seeking behavior of graduate students. Moreover, the study will describe the characteristics of the respondents, such as sex, age, civil status, course enrolled in, number of hours spent in Internet searches, and nature of work.

2.2 Research Participants

The respondents of this study were 350 graduate students from different graduate schools in Lanao del Sur. These students can be Masters or Doctorate students. They were students who preferred to study for any degree after their bachelor's degree. Upon the ocular visit to the said graduate schools, it was found that seven hundred ninety-four (794) graduate students were enrolled for the first semester in selected graduate school departments in Lanao del Sur. These graduate students comprised master's students and doctorate students from various fields. The researcher used Slovin's formula to determine the respondents' size.

2.3 Research Instrument

The questionnaire used in this study was adapted from the study of Zhou and Tan (2020), "The Construction and Initial Application of Chinese College Students' Epistemological Beliefs Questionnaire." To understand students' information-seeking behavior, the researcher adapted the questionnaire of the Macalantong (2013) study. Both underwent validation processes and reliability tests during the study. The questionnaire was also tested for good reliability and validity.

2.4 Data Gathering Procedure

The researcher personally administered the questionnaires to the enrolled students of the different graduate schools in the province. The questionnaires were retrieved within the day of their distribution. After that, the gathered data were processed and analyzed. An informal interview was also conducted with some graduate students who returned the questionnaires to clarify and elaborate on some of their answers. The interview contained questions that were almost similar to the questions in a survey. The difference between the interview and the survey was that the former focused on questions for further explanations and verifications.

2.5 Ethical Considerations

This research study followed ethical guidelines. The respondents' participation was voluntary. They were to dismiss themselves from the study whenever they felt uncomfortable. Their participation was protected from harm: physical, social, psychological, and all other forms of harm were kept to an absolute minimum. The dignity and well-being of graduate students who responded were always protected. The research data remained confidential throughout the study, and the respondents' rights were protected, ensuring scientific and academic integrity. Furthermore, proper communication of results must be practiced to ensure that this research study is free of plagiarism or research misconduct.

3.0 Results and Discussion

3.1 Respondents' Profile

Table 1 presents the frequency and percentage distribution of the graduate students' characteristics in terms of sex, age, civil status, course enrolled in, number of hours on the Internet, and nature of work. The data revealed that in terms of sex, there are 165 (59.1%) females, while there are only 114 (40.9%) males. This means that the majority of the respondents are females. The gender ratio is revealed everywhere now because, as observed, most of the population was composed of females. This study presumes that gender influences skills in searching for information, similar to the Michala et al. (2017) study comparing the confidence gap in information literacy skills between men and women, particularly in international graduate students. It illustrated that female international business students tended to be slightly more confident than their male counterparts regarding their perceived information literacy skills.

Table 1. Descriptive statistics of the distribution of respondents according to characteristics

Characteristic	Specification	Frequency	Percentage
Sex	Male	114	40.9
	Female	165	59.1
Age	46 years old and above	21	7.5
	36 – 45 years old	109	39.1
	26 – 35 years old	97	34.8
	25 years old and below	52	18.6
Civil Status	Single	137	49.1
	Married	107	38.4
	Separated	17	6.1
	Widow	18	6.5
Course Enrolled in	Masters	168	60.2
	PhD	111	39.8
Number of Hours Spent on the Internet	5 hours and above	50	17.9
	3-4 hours	167	59.9
	2 hours and below	62	22.2
Nature of Work	Teaching	143	51.3
	Non-Teaching	136	48.7

As shown, among the graduate students, the highest frequency of 109 (39.1%) are 36-45 years old, while the weakest frequency of 21 are 46 years old and older. Most graduate students at this age are pursuing a Master's Degree or Doctorate Degree and aiming for promotion. As to civil status, the highest frequency of 137 (49.1%) is single, while the lowest frequency of 17 (6.1%) is separated. Single graduate students have more time doing research than those who are married. They can manage their time easily without thinking about other responsibilities. As to the courses enrolled in, the higher frequency is that 168 (60.2%) are taking master's, while 111 (39.8%) are taking doctorate. There are more doctorate students than master's students among the respondents in this study. According to Mohammad (2018), doctoral students performed better than master students when selecting research topics.

Regarding the number of hours spent on Internet searches, the highest frequency of 167 (59.9%) is 3-4 hours, while the lowest frequency of 50 (17.9%) is spending 5 hours and above. Accordingly, the average hour a graduate student can stand in doing an internet search is 3-4 hours because they have some other work. Staying on the internet for 5 hours and above is too long, and sometimes it causes them headaches. Hours spent on internet searches may affect the information-seeking behavior of postgraduate students, according to Soleymani et al. (2016). Internet addiction is a typical use of the internet that causes psychological, social, academic, or occupational problems for people. Students need the internet more than others due to their educational or research needs.

Lastly, in terms of the nature of work, the data revealed that the highest frequency of 143 (51.3%) are employed in a non-teaching job, while the lowest frequency of 136 (48.7%) are in teaching jobs. This is because most respondents are in other fields of master's degrees, like Master's in Public Administration, Master's in Nursing, Master's in Business Administration, and others. Only a few are in master's in education, Master's in English Language Teaching, and other teaching-related graduate courses.

3.2 Extent of Epistemological Beliefs

In terms of Certain Knowledge

There is evidence that students' epistemological beliefs impact their approaches to learning and consequent learning outcomes. Epistemological beliefs have been shown to influence students' approaches to study and problem-solving, motivation, and persistence in information-seeking. Some preliminary research findings also suggest that the structure of learning environments can influence students' epistemological beliefs. Table 2 illustrates the extent of epistemological beliefs of the graduate students considering certain knowledge. The indicators related to the variable Certain Knowledge have an overall mean of 2.79 (SD=0.85) with an interpretation to some extent. The result implies that the respondents have mostly agreed with the indicators. This means that the respondents believed in the certainty of knowledge they have come across that knowledge can be changed and modified.

Table 2. Descriptive statistics of the extent of epistemological beliefs in terms of certain knowledge

Indicator	Mean	SD	Interpretation
a. The knowledge that is considered correct today may change tomorrow.	2.62	1.04	To Some Extent
b. What you have learned now must be adjusted for time or other reasons.	3.07	0.44	To Some Extent
c. Knowledge may be modified after a certain period.	3.33	0.65	To a Great Extent
d. Knowledge is uncertain. It changes over time.	2.62	0.99	To Some Extent
e. What is true today may become false tomorrow.	2.57	1.01	To Some Extent
f. Most things worth knowing are easy to understand.	3.30	0.67	To a Great Extent
g. What is true is a matter of opinion.	2.48	0.99	Very Little Extent
h. People's intellectual potential is fixed at birth.	2.37	1.01	Very Little Extent
Overall	**2.79**	**0.85**	**To Some Extent**

Legend: 1.00-1.75 (Strongly Disagree-To a Great Extent), 1.76-2.50 (Disagree-Very Little Extent), 2.51-3.25 (Agree-To Some Extent), 3.26-4.00 (Strongly Agree-Not at All)

The data further revealed that the indicator Knowledge may be modified after a certain period, with the highest mean being 3.33 (SD=0.65) with an interpretation of To a Great Extent. The result implies that most of the respondents strongly agreed with this indicator. This means that the respondents believe that knowledge changes over time. This was proved by Watson (2020), who states that in educational research, epistemology is an area of philosophy concerned with the nature and sources of knowledge, and it is often seen as about developing or constructing new knowledge. The table also depicted that the indicator People's intellectual potential is fixed at birth obtained the lowest mean of 2.37 (SD=1.01) with an interpretation of Very Little Extent. The result implies that some of the respondents do not agree with this indicator that a person's intellectual capacity is determined at birth. They probably believe that this indicator is not necessarily accurate. Developmentally speaking, an individual's intelligence is not fixed at birth. Although rank ordering of scores tends to remain stable relative to change. Kaufman (2011) Research confirms that intelligence fluctuates considerably.

In terms of Simple Knowledge

Table 3 illustrates the extent of the graduate students' epistemological beliefs regarding simple knowledge. The indicators related to this belief have an overall mean of 2.87 (SD=0.63), with an interpretation to some extent. The result implies that most respondents agreed that each field has its own body of knowledge unrelated to the others.

Table 3. Descriptive statistics of the extent of epistemological beliefs in terms of "simple knowledge"

Indicator		Mean	SD	Interpretation
a.	The knowledge of each course is closely linked.	3.06	0.41	To Some Extent
b.	Most knowledge is broadly linked.	3.09	0.60	To Some Extent
c.	Knowledge is closely related to the real world.	3.18	0.43	To Some Extent
d.	Each discipline has its knowledge, which has little relation to each other.	2.95	0.51	To Some Extent
e.	Knowledge changes destiny.	3.13	0.57	To Some Extent
f.	Many theories just complicate things.	2.39	0.81	Very Little Extent
g.	Best ideas are often the simplest.	2.56	0.72	To Some Extent
h.	Some people are born with special talents.	2.57	1.01	To Some Extent
Overall		**2.87**	**0.63**	**To Some Extent**

Fricker (2011) shows that virtue epistemology provides a general epistemological framework in which these issues can be fruitfully and forcefully discussed. The explanations and arguments are rigorous without overly technical, and the illustrations are exciting and apt. As a result, it significantly contributes not just to epistemology but to all disciplines.

In addition, the data showed that the indicator "*Knowledge is closely related to the real world*" got the highest mean, 3.18 (SD = 0.43), with an interpretation to some extent. The result means that most respondents think knowledge is intimately connected to the real world. Probably, they believe that they have seen and experienced in the real-life situation the knowledge they acquire over learning from books and other sources. Beliefs about knowledge and knowing epistemological beliefs are individuals' representations about the nature, organization, and source of knowledge, its truth value, and the justification criteria of assertions. It means the realization of the importance of epistemology in education. The minds of higher education students progressed toward higher thought and meta-cognition. They suggested that higher education students progressed through orderly stages, from dualism or knowledge received to multiples or subjective knowledge to relativism or procedural knowledge, and finally to commitment or constructionism (Fricker, 2011).

On the other hand, the indicator "*Many theories just complicate things*" got the lowest mean of 2.39 (SD = 0.81) with an interpretation of Very Little Extent. The result indicates that most of the respondents did not agree with the indicator that declares many theories only add confusion to things. They probably believe otherwise, that is, theories are helping them understand clearly and see the importance of some concepts. With the increasingly complex and ubiquitous data available through modern technology, digital information is being utilized daily by academics and professionals of all disciplines and career paths. This combines the many theories and meta-theories that make information science relevant across different disciplines. This was emphasized by Al-Suqri & Al-Aufi (2015) in their book.

In terms of Acquisition of Knowledge

Table 4. Descriptive statistics of the extent of epistemological beliefs in terms of "acquisition of knowledge"

Indicator		Mean	SD	Interpretation
a.	The key to acquiring knowledge is to study and comprehend by oneself.	3.40	0.58	To a Great Extent
b.	How much we gain in learning depends on our initiative.	3.26	0.50	To a Great Extent
c.	The key to how much students can learn in class is their understanding of what they have learned.	3.34	0.52	To a Great Extent
d.	When learning, we should get information in our way and solve problems through our understanding.	3.23	0.65	To Some Extent
e.	Learning is to accumulate after thinking carefully.	3.15	0.43	To Some Extent
f.	Reading a book several times will have different experiences and gains.	3.12	0.53	To Some Extent
g.	When learning, we should combine our newly learned knowledge with our existing knowledge.	3.28	0.59	To a Great Extent
h.	"Learned" means understanding and making it into ours.	3.38	0.61	To a Great Extent
Overall		**3.27**	**0.55**	**To a Great Extent**

Table 4 shows the extent of the graduate students' epistemological beliefs considering acquiring knowledge. The indicators related to this variable have an overall mean of 3.27 (SD = 0.55), with an interpretation to a great extent. The result implies that the respondents have agreed on most of the indicators. It means that knowledge is handed down by omniscient authority and reasoned out through objective and subjective means. It concerns the students' beliefs about the source of knowledge and the judging standards of whether it is acquired. It is the process of absorbing and storing new information in memory, the success of which is often gauged by how the information can later be remembered and retrieved from memory. It can be improved by considering the purpose and function of the desired information.

Specifically, the data revealed that the indicator "*The key to acquiring knowledge is to study and comprehend by oneself*" got the highest mean of 3.40 (SD=0.58) with an interpretation to a great extent. The result implies that most respondents believe self-study and comprehension are the keys to acquiring knowledge. One of the places where we can gain knowledge is in the library. Daland (2015) highlighted in his study that graduate students have a higher confidence in their overview when researching and using library resources. They do not have problems contacting their librarians for help, but they do not expect the librarians to do their searching for them.

Moreover, the data also depicted that the indicator "*Reading a book several times will have different experiences and gains*" got the lowest mean of 3.12 (SD=0.53) with an interpretation to some extent. This means that in the results, only a few respondents agreed with this indicator's statement. This probably means they may explore other books to learn more rather than repeating the same book. Besides, other sources of knowledge, such as the Internet, can give them every little thing they want to learn and understand. Considering the reading of books, Superio et al. (2018) also revealed that researchers preferred the Internet to begin their search process. They preferred the combination of print and electronic formats when reading, but more closely on the Internet than reading books.

In terms of Speed of Learning

Table 5 describes the extent of the graduate students' epistemological beliefs regarding the speed of learning. The indicators related to this variable have an overall mean of 2.34 (SD=0.62) and an interpretation of Very Little Extent. The result reveals that the respondents disagree with the specific indicators of this variable. It can be noted that some of the indicators are negative statements, which are probably contrary to the respondents' own beliefs. Langcay et al. (2019) conducted a study on the epistemological beliefs of pre-service teachers in the Northern Philippines. The findings revealed that pre-service teachers tend to be sophisticated and have a complex structure and reasoning along the source of knowledge. In contrast, preservice teachers tend to be naïve in their learning speed.

Table 5. Descriptive statistics of the extent of epistemological beliefs in terms of "speed of learning"

Indicator		Mean	SD	Interpretation
a.	When I cannot learn something quickly, I will give it up.	1.80	0.53	Very Little Extent
b.	I can never solve a problem that I think cannot be solved the first time.	1.92	0.56	Very Little Extent
c.	Knowledge that cannot be understood quickly may not be understood well.	2.13	0.76	Very Little Extent
d.	It is a waste of time to delve into problems for which definite answers are impossible.	2.10	0.54	Very Little Extent
e.	It takes a long time to solve complex problems, and only brilliant people will be rewarded.	2.08	0.71	Very Little Extent
f.	Facing new things, I know whether I can learn well in the first few minutes.	2.79	0.50	To Some Extent
g.	Some people have a knack for learning, while others do not.	3.05	0.69	To Some Extent
h.	Things are more straightforward than most professors would have you believe.	2.86	0.70	To Some Extent
Overall		**2.34**	**0.62**	**Very Little Extent**

The data further revealed that the indicator "*Some people just have a knack for learning, and others don't*" obtained the highest mean of 3.05 (SD=0.69) with an interpretation to some extent. The result means that most respondents did not strongly agree with this specific indicator that some people have a natural ability to learn while others do not. They probably believe that some people can learn due to some environmental factors. Bernardo (2015) conducted confirmatory factor analyses to determine the dimensions and structure of the epistemological beliefs of Filipino preservice teachers. The results revealed two factors: simple learning and structured learning. The author discusses the results in terms of how they contribute to the growing evidence regarding the possible problems with particular multidimensional theories and quantitative measures of epistemological beliefs. The results also indicate how the specific epistemological assumptions of the Filipino preservice teachers may reflect features of the Philippine educational system and its tensions regarding pedagogy.

Morales' (2015) study critically explored the learning characteristics of Filipino physics students, which will serve as baseline data for curriculum design. It was revealed that comparing the ethnic groups (Tagalog, Bicol, and

Pangasinan) cultural dimension index and per EBAPS axes noted the similarities and differences of the learning characteristics of the different learners from a cultural perspective. Each ethnic group showed unique and distinct cultural dimensions and epistemology.

The data also revealed that the indicator *"When I cannot learn something quickly, I will give up"* got the lowest mean of 1.80 (SD=0.53) with an interpretation of Very Little Extent. Although this indicator has the lowest mean, the results indicate that the respondents do not quickly give up on learning, even if it is difficult. Correlations indicated in the Vecaldo (2017) study show that pre-service teachers have better academic performance, and regression showed that epistemological beliefs, except for quick learning, predicted the academic performance and teaching competence of pre-service teachers.

In terms of Ability to Learn

Table 6 shows the extent of epistemological beliefs of the graduate students considering the ability to learn. The indicators that measured the variable on the ability to learn have an overall mean of 2.58 (SD=0.64) with an interpretation to some extent. The result implies that the respondents disagreed with specific indicators under this variable. According to Daland (2015), there is little focus on collaboration with researchers to achieve a mutual learning outcome concerning developing research support and information literacy skills.

Table 6. Descriptive statistics of the extent of epistemological beliefs in terms of "ability to learn"

Indicator		Mean	SD	Interpretation
a.	Ability is innate; no matter how hard you try, it is difficult to change.	2.78	0.84	To Some Extent
b.	Students who learn well are naturally more intelligent.	2.45	0.69	Very Little Extent
c.	Some people are born with solid learning abilities, while others have limited ones.	2.83	0.73	To Some Extent
d.	Intelligent students will get good grades even without working hard.	2.37	0.60	Very Little Extent
e.	The potential for learning is inherent.	2.07	0.56	Very Little Extent
f.	Some people are born intelligent, while others are born retarded.	2.90	0.53	To Some Extent
g.	If two people argue, at least one must be wrong.	2.19	0.65	Very Little Extent
h.	The more you know about a topic, the more there is to know.	3.06	0.54	To Some Extent
Overall		**2.58**	**0.64**	**To Some Extent**

Moreover, Table 6 also showed that the indicator *"The more you know about a topic, the more there is to know"* obtained the highest mean of 3.06 (SD = 0.54) with an interpretation to some extent. The result indicated that most of the respondents assessed this indicator as agreeable. This means they think it is essential to widen their knowledge of a particular topic by searching further because there is much to learn about. Hence, supporting students in acquiring information literacy skills is a critical role for universities, as it improves the quality of student research and enhances their opportunities for lifelong learning. It focused on the partnership between librarians and course instructors, which has been shown to produce the most effective library instruction. However, additional research is needed concerning the collaborative approach to teaching information literacy to graduate students, according to Harrkins, Rodrigues, and Orlov (2018).

Conversely, the indicator *"The potential for learning is inherent"* got the lowest mean of 2.07 (SD=0.56) with an interpretation of Very Little Extent. The result implies that most of the respondents do not agree with this indicator stating that the ability to learn is innate. They probably believe that learning is not inherent. One should be able to develop and nurture further their abilities to learn with much exposure to the real world. Morales's (2015) study critically explored the learning characteristics of Filipino physics students. Hofstede's cultural interpretation and education perspective interpretation of cultural values and beliefs were used to deduce the significance of the cultural dimension indices of the sample ethnic groups. They all believe that learning is a continuous process of growing up.

In terms of Value of Learning

Table 7 depicts the extent of graduate students' epistemological beliefs about the value of learning. These variables have an overall mean of 2.85 (SD=0.52) and are interpreted to some extent. The result shows that most respondents assessed that the indicators under this variable are agreeable.

Table 7. Descriptive statistics of the extent of epistemological beliefs in terms of "value of learning"

Indicator		Mean	SD	Interpretation
a.	Learning is fun and enjoyable.	3.21	0.51	To Some Extent
b.	I believe that knowledge changes destiny.	3.27	0.53	Strongly Agree
c.	Learning often annoys me.	2.01	0.53	Very Little Extent
d.	Reading is a pleasant thing for me.	3.13	0.43	To Some Extent
e.	I can often feel happy in my learning.	3.15	0.54	To Some Extent
f.	I enjoy doing research.	3.07	0.42	To Some Extent
g.	I am willing to delve into things that I do not understand.	2.82	0.56	To Some Extent
h.	I think doing research and studying is boring.	2.12	0.60	Very Little Extent
Overall		**2.85**	**0.52**	**To Some Extent**

The data in Table 7 showed that the *"I believe that knowledge changes destiny"* indicator obtained the highest mean of 3.27 (SD=0.53) with an interpretation To a Great Extent. The findings indicated that most respondents agreed that learning can shape one's fate. As future professionals, graduate students must be information literate; Rempel and Davidson (2018) created literature review workshops to serve graduate students from a wide range of subject disciplines at a point of shared need. Not only did this strategy successfully reach many students from a wide range of subject disciplines, but the data gathered from the students identified some gaps in graduate students' knowledge about library services.

Meanwhile, the indicator *"Learning often annoys me"* got the lowest mean of 2.01 (SD=0.53), interpreting Very Little Extent. The result implies that some of the respondents do not agree that learning is annoying. Realizing the importance of epistemology in education and deficiencies in education programs in developing meta-cognitive thought has stimulated research interest in how to develop mature epistemological beliefs best. The minds of higher education students progressed toward higher thought and meta-cognition. Learning is an exciting process (Fricker, 2011)

Table 8. Summary distribution of the graduate students' extent of epistemological beliefs

Variables	Mean	SD	Interpretation
Certain of Knowledge	2.79	0.85	To Some Extent
Simple Knowledge	2.87	0.63	To Some Extent
Acquisition of Knowledge	3.27	0.55	To a Great Extent
Speed of Learning	2.34	0.62	Very Little Extent
Ability to Learn	2.58	0.64	To Some Extent
Value of Learning	2.85	0.52	To Some Extent
Overall	**2.78**	**0.64**	**To Some Extent**

Table 8 presents the summary distribution of the respondents' extent of epistemological beliefs in its six dimensions: certain of knowledge, superficial knowledge, acquisition of knowledge, speed of learning, ability to learn, and the value of learning. The indicators related to epistemological beliefs have an overall mean of 2.78 (SD=0.64), with an interpretation to some extent. The result implies that the respondents believed in the epistemological beliefs they have come across except for the speed of learning with an interpretation of very little extent. This means that the speed of learning needs to be developed according to the epistemological beliefs of the respondents. Specifically, the variable Acquisition of Knowledge got the highest mean of 3.27 (SD = 0.55) with an interpretation to a great extent. The result says that most of the respondents believe that as graduate students, they need to acquire knowledge. In most instances, they have class activities requiring knowledge about more advanced and complex topics.

In contrast, the variable speed of learning obtained the lowest mean of 2.34 (SD = 0.62) with an interpretation of very little extent. The result implies that most graduate students are not very concerned with their ability to learn fast. What probably matters to them is their ability to acquire knowledge, whether at a fast pace or not. This was similar to Langcay et al.'s (2019) findings on epistemological beliefs of pre-service teachers in the Northern Philippines. The findings revealed that pre-service teachers tend to be sophisticated and have a complex structure and reasoning along the source of knowledge. In contrast, preservice teachers tend to be naïve in their learning speed. It is the same with Vecaldo's (2017) findings, where the pre-service teachers have better academic performance, and regression showed that epistemological beliefs, except for quick learning, predicted the academic performance and teaching competence of pre-service teachers.

3.3 Level of Information-seeking Behavior

Information-seeking behavior involves actively seeking information to answer a specific query. It refers to how respondents perceive their need for, pursuit of, and use of information. Determining the information skills assessment of the study's participants includes the six-stage processes of initiating a research assignment, selecting a topic, exploring information, formulating a focus, collecting information, and preparing to present.

In terms of Initiating a Research Assignment

Table 9 shows the level of information-seeking behavior of graduate students when initiating a research assignment. The indicators related to this variable have an overall mean of 2.97 (SD=0.78), which has an understanding of high level. The result implies that most respondents have observed the indicators most of the time. As graduate students, they are typically required to do research for some of their classwork. This means that they cannot do away with starting themselves to do research activities. The study on graduate students' information literacy skills among graduate students in the College of Education at Kuwait University in 2018 showed that the students in the sample had only modest skills relative to their position as graduate students.

Table 9. Descriptive statistics of the level of information-seeking behavior in terms of "initiating a research assignment"

Indicator		Mean	SD	Interpretation
a.	My purpose in seeking information is to prepare for lectures.	2.24	0.76	Low Level
b.	My purpose in information-seeking is to improve personal competencies.	2.93	0.62	High Level
c.	My purpose in information-seeking is to read articles/books.	2.90	0.86	High Level
d.	My purpose in information-seeking is to converse with co-workers and other experts at institutions.	3.07	0.83	High Level
e.	I do the research all by myself.	3.11	0.87	High Level
f.	I go to our library	3.30	0.67	Very High Level
g.	I ask the librarian's assistance in conducting the research	2.98	0.77	High Level
h.	I look for other libraries	3.25	0.86	High Level
Overall		**2.97**	**0.78**	**High Level**

Legend: 1.00-1.75 (Never-Very Low), 1.76-2.50 (Sometimes-Low, 2.51-3.25 (Most of the time-High), 3.26-4.00 (At all times-Very High)

In addition, Table 9 disclosed that the indicator *"I go to our library"* got the highest mean of 3.30 (SD=0.67), which is an interpretation of a very high level. The result pointed out that most of the respondents have observed this indicator at all times. It implies that going to the library is part of their activities as graduate students. Moreover, their libraries probably offer good services that encourage the students to go to the library. This finding conforms with the study of George et al. (2016), which also revealed that libraries can influence students' information behavior by reevaluating their instructional programs and providing resources and services. They can take the lead by working with academic staff to guide students in the library.

On the contrary, the indicator *"My purpose in information-seeking is for lecture preparation"* obtained the lowest mean of 2.24 (SD = 0.76), which has an interpretation of Low Level only. The result implies that the respondents have only observed this behavior sometimes. This is understandable because graduate students do not usually conduct lectures; thus, they do not seek information in preparation for a lecture. Graduate students are usually asked to report on relevant topics in their subjects but not conduct lectures. As observed, most of the time, graduate students' purpose in information-seeking is to gather information or search with their assignments and research topics and do it for lecture preparation sometimes.

In terms of Selecting a Topic

Table 10. Descriptive statistics of the level of information-seeking behavior in terms of "selecting a topic"

Indicator		Mean	SD	Interpretation
a.	I feel confident and optimistic when given a topic.	2.94	0.55	High Level
b.	I feel anxious when given a topic	2.06	0.50	Low Level
c.	I use sources available outside the library	3.08	0.71	High Level
d.	I have a clear idea of the topic I want to research.	3.14	0.79	High Level
e.	I determine the general topic before undertaking the research process	3.06	0.74	High Level
f.	I am confused about the topic given to me	2.61	0.67	High Level
g.	Selecting a topic inspires me to begin my research	3.06	0.78	High Level
h.	I have trouble managing my time on information gathering.	2.85	0.70	High Level
Overall		**2.85**	**0.68**	**High Level**

Table 10 illustrates the level of information-seeking behavior of graduate students when selecting a topic. The indicators related to this variable got an overall mean of 2.85 (SD = 0.68), which has an interpretation of a high level. The result implies that the respondents have observed the indicators of selecting a topic most of the time only. Most had difficulty deciding where to start in selecting a topic because the information was too broad. They should be taught how to understand and deal with wide and narrow topics depending on the information they need. Mohammad (2018) explored and analyzed the information-seeking behavior of medical students and found out that it has similar senses as reported by Kuhlthau in her information search process model. It was found out that graduate students performed well in selecting their research topics.

Moreover, the data revealed that the indicator *"I have a clear idea of the topic that I want to research about"* obtained the highest mean of 3.14 (SD=0.79), which has an interpretation of high level only. The finding pointed out that most respondents have observed and experienced this indicator most of the time. It is similar to Mohammed's (2018) findings. In his findings, doctoral students performed better when selecting their research topics. Graduate students with previous experience in research activities performed better in title selection, literature exploration, and presentation stages. In other words, they have a clear idea of the topic that they want to research.

On the other hand, the indicator *"I feel anxious when given a topic"* got the lowest mean of 2.06 (SD=0.50), which has an interpretation of low level. The result implies that some respondents have observed this indicator sometimes only. It means they are somehow worried that they will be unable to find the best sources for their assigned topics. Graduate students must do their best to report to class or their professors about their topics. The findings of Madge (2021) explained how people use information, their needs, and how they satisfy them in the modern digital world. It was specified there that most researchers were comfortable and capable of doing their research topics, meaning they did not feel anxious when given a topic.

In terms of Exploring Information

Table 11 illustrates the level of the information-seeking behavior of the graduate students in terms of exploring information. The indicators related to exploring information have an overall mean of 2.93 (SD=0.79) with an interpretation of a high level. The result implies that most respondents perceived that the indicators under exploring information had only been observed most of the time. The result affirms that students know that their search for information is not limited to one source but that they can explore other sources to better understand the topic. As mentioned in the study of Daland (2015), graduate students' modest skills in exploring information are necessary. Their information literacy skills include their awareness, skills, information needs, and the college's role in supporting them.

Table 11. Descriptive statistics of the level of information-seeking behavior in terms of "exploring information"

Indicator	Mean	SD	Interpretation
a. I use printed materials in my research.	3.22	0.65	High Level
b. I use non-print (CDs/Online resources) materials in my research.	3.19	0.80	High Level
c. I spend time reading library materials (newspapers, magazines, & others)	2.81	0.74	High Level
d. I follow the format of my thesis and dissertations when doing research requirements.	2.56	0.94	High Level
e. I read research articles, reviewers, periodicals, government reports, and publications.	2.42	0.01	Low Level
f. I keep abreast of current developments in the field through print and online journals	3.10	0.73	High Level
g. I have trouble managing my time on information gathering.	2.97	0.74	High Level
h. I know how to locate the different information resources in the library.	3.16	0.68	High Level
Overall	**2.93**	**0.79**	**High Level**

Moreover, the indicator *"I use printed materials in my research"* got the highest mean of 3.22 (SD=0.65), which has an interpretation of a high level. The data revealed that most respondents had experienced this indicator most of the time. Probably, the students think that having printed materials will help them understand the topics better. They can highlight and make some margin notations on the printed materials. When George et al. (2016) explored graduate students' information behavior related to their process of inquiry and scholarly activities, the result showed that the graduate students continued using print resources in doing their research.

The data also depicted that this indicator, *"I read in research articles, reviews, periodicals, government reports, and publications,"* got the lowest mean of 2.42 (SD=1.01) with an interpretation of Low Level. The result implies that the mean score is the lowest because the respondents only experienced this indicator sometimes. This probably means some students resort to reading books rather than the periodicals. It was also concluded in George et al.'s (2016) study that sometimes they lose motivation to use printed resources when they cannot find the printed resources they need. Convenience, lack of sophistication in finding and using resources, and course requirements affect their information behavior.

In terms of Formulating a Focus

Table 12 describes the level of information-seeking behavior of graduate students when formulating a focus. The indicators related to this variable had an overall mean of 3.16 (SD=0.72) with an interpretation of high level only. The result implies that most respondents perceived that the indicators had been observed most of the time. This was pointed out in the collected essays in the book of Kornblith (2019), which elaborates on how social psychology illuminates epistemological problems, focusing on self-knowledge and the nature of human reason.

Table 12. Descriptive statistics of the level of information-seeking behavior in terms of "formulating a focus"

Indicator		Mean	SD	Interpretation
a.	I gain a focused perspective on the topic after being exposed to information.	3.13	0.65	High Level
b.	I think of other words or concepts that relate to the topic.	3.31	0.64	Very High Level
c.	I selected those important ideas from the information I have collected.	3.33	0.74	Very High Level
d.	My focus emerges gradually as constructs also become clearer.	3.23	0.70	High Level
e.	There is an indication of increased confidence and clarity in pursuing your research and formulating a focus.	2.97	0.54	High Level
f.	"Focusing and narrowing" helps me find the meaning of my research.	3.03	0.79	High Level
g.	I prepared to modify or refine the topic I have collected	3.21	0.79	High Level
h.	I find all the necessary information on a topic on my target date.	3.04	0.90	High Level
Overall		**3.16**	**0.72**	**High Level**

Specifically, the indicator *"I selected those important ideas from the information I have collected"* got the highest mean of 3.33 (SD=0.74) with an interpretation of Very High. The result means that most respondents perceived this indicator to have always been observed. This means the students can pick only relevant ideas to help them organize their research work. Atoy et al. (2020) revealed the role of prior knowledge, availability of ICT resources, and infrastructure in developing information-type skills; identifying other unexplored variables remains crucial in information science.

Meanwhile, the data also indicated increased confidence and a sense of clarity in pursuing your research in formulating a focus, obtaining the lowest mean of 2.97 (SD=0.54) with an interpretation of a high level. This implies that the respondents have experienced this variable, which is only to be observed most of the time. This was emphasized by Dompere (2009) in his book, which is special in its orientation and contribution to the current state of our understanding of the decision-choice process and knowledge production. At the level of theory of knowledge, it presents the structure and epistemic analysis of uncertainty, expectations, and risk in decision-choice actions.

In terms of Collecting Information

Table 13. Descriptive statistics of the level of information-seeking behavior in terms of "collecting information"

Indicator		Mean	SD	Interpretation
a.	I manually search for references on the library bookshelves.	3.27	0.66	Very High Level
b.	I prefer online searching whenever I need to look for some information.	2.99	0.55	High Level
c.	I can locate information from reference books, periodicals, or other documents.	3.24	0.65	High Level
d.	I visit websites and virtual libraries for additional information.	3.33	0.73	Very High Level
e.	I ask for library assistance when in need	3.17	0.70	High Level
f.	I used surveys, interviews, observations, and others to collect information	3.05	0.72	High Level
g.	I know how to record the bibliographic information of the resources I used	2.90	0.73	High Level
h.	I cite the different information resources I used	2.89	0.79	High Level
Overall		**3.11**	**0.69**	**High Level**

Table 13 shows the level of the information-seeking behavior of the graduate students in terms of collecting information. The indicators related to this variable obtained an overall mean of 3.11 (SD=0.69), which has an interpretation of a high level. The result indicates that most respondents observed the indicators only most of the time. The graduate students find that collecting information is essential in developing research works. Harrkins et al. (2018) mentioned that supporting students in acquiring information literacy skills is critical for universities, as it improves the quality of student research and enhances their opportunities for lifelong learning. It focused on the partnership between librarians and course instructors, which has been shown to produce the most effective library instruction. However, additional research is needed concerning the collaborative approach to teaching information literacy to graduate students.

In addition, the data showed that the indicator *"I visit websites and virtual libraries for additional information"* obtained the highest mean of 3.33 (SD=0.73) with an interpretation of Very High Level. The result means that most respondents agreed with this statement. With the advent of technology, almost all graduate students are using websites to explore information about their topics. As Atoy et al. (2020) revealed, digital literacy had a direct positive relationship with students' online information-searching strategies. Surprisingly, mindfulness did not moderate the relationship between digital literacy and online information-searching strategies. Further, digital literacy was a mediating factor in university students' information-searching strategies.

However, the indicator *"I cite from the different information resources I used"* got the lowest mean of 2.89 (SD=0.79), which has an interpretation of a high level. The result implies that the respondents have observed this indicator most of the time. Probably, the students are searching for information for the sake of understanding concepts. In most cases, students only cite the information resources when their professors require them to. Moreover, most graduate students were unfamiliar with the different citation standards for different formats of printed and non-printed information resources. Hence, it should be taught to them and be included in the literacy development plan.

In terms of Preparing to Present

Table 14 defines the level of the information-seeking behavior of the graduate students in terms of preparing to present. The indicators related to this variable have an overall mean of 3.17 (SD=0.65), which has an interpretation of a high level. The result implies that the variables under preparation to present have been observed most of the time only. This was emphasized by Mohammad (2018), who said that both doctoral students and master's students had no differences in other stages. Students with previous experience in research activities performed better in title selection, literature exploration, and presentation stages.

Table 14. Descriptive statistics of the level of information-seeking behavior in terms of "preparing to present"

Indicator		Mean	SD	Interpretation
a.	I get the information I need every time I research.	3.14	0.70	High Level
b.	I make a summary search after researching.	3.23	0.65	High Level
c.	I culminate the search with a personalized synthesis of the topic or problem.	2.97	0.50	High Level
d.	I succeed in my information-seeking.	3.18	0.66	High Level
e.	I am satisfied about the responsiveness of the library staff who assisted me.	3.41	0.65	Very High level
f.	I am satisfied with the information I get.	3.12	0.71	High Level
g.	I am prepared to present it after I have gathered all the information I need.	3.07	0.66	High Level
h.	The information gathered answered the research questions identified	3.23	0.66	High Level
Overall		**3.17**	**0.65**	**High Level**

In addition, the indicator "*I am satisfied with the responsiveness of library staff who assisted me"* got the highest mean of 3.41 (SD = 0.65), which has an interpretation of Very High Level. The result indicated that a high mean denoted a high level of respondents' agreement with the statement. Further, the data revealed that they appreciate how the library staff renders their services. Daland (2015) also found that doctoral students interact with their librarians and are more confident in their overview of library resources. Also, Henninger (2021), a visiting professor at the University of the Philippines School of Library and Information Studies, states that the digital age must extend to all library and information professionals and informed individuals since librarians are part of the information profession. Each is an individual, a citizen, an educator, and an information practitioner.

The data also show that the indicator *"I culminate the search with a personalized synthesis of the topic or problem"* got the lowest mean of 2.97 (SD = 0.50) with a high-level interpretation. The result implies that the respondents have observed this indicator only most of the time. Students make a synthesis of the topic being searched for only when required; thus, most graduate students do not do it. According to Rempel and Davidson (2018), researchers must emphasize this because while a focus may be formed in a sudden moment of insight, it is more likely to emerge gradually as constructs become more precise. During this time, a change in feelings is commonly noted, with indications of increased confidence and a sense of clarity. People often express an awareness of finding meaning, such as purposefully engaging in “focusing and narrowing."

Table 15. Summary distribution of the graduate students’ level of information-seeking behavior

Variables	Mean	SD	Interpretation
Initiating a Research Assignment	2.97	0.78	High Level
Selecting a Topic	2.85	0.68	High Level
Exploring Information	2.93	0.79	High Level
Formulating a Focus	3.16	0.72	High Level
Collecting Information	3.11	0.69	High Level
Preparing to Present	3.17	0.65	High Level
Overall Mean	**3.03**	**0.72**	**High Level**

Table 15 is a summary distribution of the graduate students’ level of information-seeking behavior. The table reflects the overall mean of 3.03 (SD = 0.72) with an interpretation of high level. It can be noted that all variables under information-seeking behavior are at a high level. Although the means may differ from one another a little, they have a similar interpretation, which is a high level. This means that the respondents’ information-seeking behavior needs improvement. Specifically, preparing to present obtained the highest mean of 3.17 (SD = 0.65), interpreted as high level. This means that most of the respondents find all of the information-seeking behavior equally important, which may develop the student’s ability and desire to seek out information that is essential in their research and other relevant activities.

Conversely, the variable Selecting a Topic got the lowest mean among the study variables. This implies that the respondents are probably having difficulties choosing a topic for research that might be developed into scholarly written output. This is the stage where the task is to identify and select the general topic to be investigated and the approach to be pursued. Feelings of uncertainty often give way to optimism after the selection, and there is a readiness to begin the search. Mohammad (2018) stated in his study that doctoral and master’s students had lower uncertainty. The graduate students felt uncertainty in the various stages of information search.

3.4 Comparison of the Graduate Students’ Level of Information-Seeking Behavior When Grouped According to Their Characteristics

Table 16 showed a significant difference in respondents’ level of information-seeking behavior when grouped according to their characteristics. As indicated by the t-value and probability value, it is less than 0.05, which led to the rejection of the null hypothesis. This means that there is a significant difference in respondents’ level of information-seeking behavior in terms of initiating a research assignment, selecting a topic, exploring information, formulating a focus, collecting information, and preparing to present, which has a significant difference toward the respondents' profile; this means that the null hypothesis is rejected.

Table 16. Comparison of the graduate student's level of information-seeking behavior when grouped according to their characteristics

Profile	Initiating a Research Assignment			Selecting a Topic			Exploring Information			Formulating a Focus			Collecting Information			Preparing to Present		
	t	p	I	t	p	I	t	p	I	t	p	I	t	p	I	t	p	I
Sex	-38.8	0.00	S	-33.9	0.00	S	-38.8	0.00	S	-40.8	0.00	S	-40.5	0.00	S	-41.0	0.00	S
Age	-4.96	0.00	S	-2.36	0.02	S	-8.86	0.00	S	-10.1	0.00	S	-9.58	0.00	S	-9.58	0.00	S
Civil Status	-26.3	0.00	S	-20.3	0.00	S	-26.0	0.00	S	-27.0	0.00	S	-26.6	0.00	S	-27.1	0.00	S
Course	-46.6	0.00	S	-38.7	0.00	S	-43.5	0.00	S	-45.3	0.00	S	-45.9	0.00	S	-45.6	0.00	S
Hours in Internet search	-22.2	0.00	S	-17.7	0.00	S	-21.8	0.00	S	-23.5	0.00	S	-23.6	0.00	S	-23.2	0.00	S
Nature of work	-39.0	0.00	S	-33.9	0.00	S	-36.6	0.00	S	-38.3	0.00	S	-36.8	0.00	S	-36.7	0.00	S

The data revealed a significant difference in the information-seeking behavior of the graduate students involved in the study when they were grouped according to characteristics such as sex, age, civil status, course enrolled in, number of hours spent on Internet search, and nature of work. Hence, the null hypothesis is rejected. The table shows that, as to how respondents proceed with their research, the findings show no significant difference between gender and information-seeking behavior when grouped according to gender. It was also revealed in the said table that the results of the test of differences in information-seeking behavior considering age have no significant difference in how graduate students do their information gathering.

The table also unveils the result of the test of difference in information-seeking behavior considering civil status. The data imply, then, that there is no significant difference in information-seeking behavior considering civil status. Other personal characteristics of respondents, such as course enrolled in, number of hours spent in information search, and nature of work, also have the same result as other participants' characteristics. Since the p-value is less than 0.05 level of significance, then the null hypothesis is rejected. Therefore, this study has found that there is a significant difference in the information-seeking behavior of the graduate students involved in the study when they were grouped according to characteristics such as sex, age, civil status, course enrolled in, number of hours spent in Internet search, and nature of work. Hence, the null hypothesis is rejected.

3.5 Relationship Between Extent of Epistemological Beliefs and Information-Seeking Behavior

Table 17 depicts the significant relationship between the graduate students' level of epistemological beliefs and information-seeking behavior in each of the following variables: initiating a research assignment, selecting a topic, exploring information, formulating a focus, collecting information, and preparing to present.

Table 17. Relationship Between Extent of Epistemological Beliefs and Information-Seeking Behavior

Information Seeking Behavior	Certain of Knowledge			Simple Knowledge			Acquisition of Knowledge			Speed of Learning			Ability to Learn			Value of Learning		
	r	p	I	r	P	I	r	p	I	r	p	I	r	p	I	r	p	I
Initiating A Research Assignment	-0.13*	0.01	S	-0.24**	0.00	S	-0.04	0.41	NS	-0.43**	0.01	S	-0.23**	0.00	S	-0.58**	0.00	S
Selecting A Topic	-0.16**	0.00	S	-0.07	0.19	NS	-0.02	0.69	NS	-0.46**	0.00	S	-0.10	0.06	NS	-0.12*	0.01	S
Exploring Information	0.39**	0.00	S	-0.18**	0.00	S	0.54**	0.00	S	-0.33**	0.00	S	-0.10*	0.04	NS	-0.23**	0.00	S
Formulating A Focus	0.38**	0.00	S	-0.07	0.15	NS	0.51**	0.00	S	-0.26**	0.00	S	0.00	0.94	NS	-0.22**	0.00	S
Collecting Information	0.41**	0.00	S	-0.07	0.16	NS	0.49**	0.00	S	-0.24**	0.00	S	-0.10*	0.04	S	-0.22**	0.00	S
Preparing To Present	0.38**	0.00	S	-0.07	0.16	NS	0.48**	0.00	S	-0.24**	0.00	S	-0.04	0.36	NS	-0.26**	0.00	S

The data exposed that epistemological beliefs based on simple knowledge have no significant relationship with information-seeking behavior when selecting a topic, formulating a focus, collecting information, and preparing to present since the p-value is greater than 0.05 level. In addition, knowledge acquisition has no significant relationship with information-seeking behavior when considering initiating a research assignment and selecting a topic. Moreover, the ability to learn has no significant relationship with information-seeking behavior when selecting a topic, exploring information, and preparing to present. This means that the null hypothesis is accepted. On the other hand, epistemological beliefs based on certain knowledge, speed of learning, and value of learning have a significant relationship with information-seeking behavior since the p-value is less than 0.05; therefore, the null hypothesis is rejected.

Moreover, simple knowledge is significantly related to information-seeking behavior based on initiating a research assignment and exploring information. The ability to learn also shows a significant relationship towards information-seeking behavior based on initiating a research assignment and collecting information, which means we have to reject the null hypothesis. In addition, epistemological beliefs based on certain knowledge have a positive relationship towards information-seeking behavior based on Exploring Information (r =.392**, p-value =.000), Formulating a Focus (r =.384**, p-value =.000), Collecting Information (r =.418**, p-value =.000), and Preparing to Present (r =.381**, p-value =.000). Furthermore, acquisition of knowledge has a positive relationship towards information-seeking behavior based on Exploring Information (r =.539**, p-value =.000), Formulating a Focus (r =.511**, p-value =.000), Collecting Information (r =.494**, p-value =.000), and Preparing to Present (r =.489**, p-value =.000). This means that the null hypothesis is rejected.

4.0 Conclusion

Based on the findings, this study concluded that most of the respondents have the highest extent of epistemological beliefs towards acquisition of knowledge; most of the respondents have the highest level of information-seeking behavior in terms of preparing to present; the respondents' information-seeking behavior varies according to their characteristics, which include sex, age, civil status, course enrolled in, number of hours spent in Internet search, and nature of work. Lastly, the epistemological beliefs of most of the respondents have a bearing on their information-seeking behavior.

5.0 Contributions of Authors

The author herself edited, wrote, supervised, analyzed data, encoded, and completed all the processes involved in writing this study.

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7.0 Conflict of Interests

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

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Adversity Quotient, Leadership Resilience, and Mentoring and Coaching Strategies of Instructional Leaders

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Abstract. To improve the technical assistance strategy, this study evaluated the adversity quotient, leadership resilience, and mentoring and coaching techniques of instructional leaders. Respondents of this study were the 138 public secondary instructional leaders composed of department heads and master teachers chosen randomly from the 210 total population of department heads and master teachers in SDO, Iloilo City. Ethical factors were considered to achieve this overall goal. Respondents were informed of the study's objective, benefits, and risks before being requested for consent to participate as respondents in the survey. The 2012 Data Privacy Act maintained the confidentiality of the respondent's identity. A descriptive research design with stratified random sampling examined demographic variables such as sex, designation, educational attainment, and length of service. The sample showed a notable sex disproportion, with most respondents being Master Teachers I, holding advanced degrees, and having over ten years of experience. Regarding sex, designation/position, and educational attainment of instructional leaders, there was no significant difference in the level of AQ® among respondents. However, there is a significant difference in the AQ® level of the respondents when grouped by their length of service. Additionally, AQ® analysis revealed "below average" levels for males and females, with significant differences across designations but not by educational attainment. Respondents with less experience showed "higher" resilience than those with longer tenures, while leadership resilience remained consistently high across all demographics. No significant differences were found in mentoring and coaching strategies based on the demographic profile. The findings suggest a need for targeted interventions to improve resilience among more experienced leaders and support more effective mentoring and coaching strategies. These insights inform the creation of a technical assistance plan to enhance instructional leadership.

Keywords: Instructional leaders; Adversity quotient; Leadership resilience; Mentoring; Coaching.

1.0 Introduction

The rapid and constant changes in society necessitate adaptive strategies that can foster the development of knowledge, skills, and practical applications. In response, the education sector must continually evolve to cultivate lifelong learners who can meet the demands of an ever-changing environment. Central to this adaptive process is the role of instructional leadership, which plays a crucial part in shaping teaching practices and improving educational outcomes. Instructional leadership is not merely the domain of school principals; it extends to department heads and master teachers, whose influence is equally significant in ensuring effective teaching practices and student success (Magnaye et al., 2023).

A growing body of literature underscores the pivotal role that instructional leaders play in fostering academic improvement. Dania and Andriani (in Magnaye et al., 2023) assert that instructional leadership is critical in enhancing school and student performance. While much attention has traditionally focused on school principals as the primary instructional leaders, more recent studies highlight the essential contributions of department heads and master teachers. These individuals often engage more directly with teachers, providing hands-on guidance and support that directly influences classroom instruction. San Miguel and Pascual (2021) emphasize that the educational sector relies heavily on these instructional leaders to steer their schools through challenges, particularly in times of adversity. Instructional leaders, particularly those in department head and master teacher roles, are tasked with ensuring that teachers remain effective and resilient amidst the growing pressures and responsibilities associated with modern education. These pressures have only intensified with implementing policies such as DepEd Order No. 012, s. 2020 calls for instructional leaders to prioritize their staff's safety, well-being, and adaptability.

Numerous meetings, seminars, conferences, administrative or school paperwork, community extension activities, and sports events, for example, necessitate the involvement and presence of teachers. Thus, the teachers' physical and mental health and, specifically, the quality of education are at stake and must be addressed. Their emotional and physical health is frequently compromised. However, when faced with hardship, other leaders in similar circumstances bounce back and strengthen. They have a "can do" mindset and see obstacles as possibilities. They exhibit the fortitude of a leader (Reed, 2018).

In the Philippines, the Department of Education (DepEd) has also recognized the need for resilient instructional leaders as a response to these evolving challenges. Initiatives like the MATATAG agenda aim to address long-standing issues in basic education by fostering resilience and adaptability among educators (DepEd Memorandum No. 35, s. 2016; DepEd Order No. 42, s. 2020). This directive places considerable responsibility on instructional leaders, especially department heads and master teachers, to navigate these expectations while also guiding their teachers in meeting the high standards set by the Results-Based Performance Management System - Philippine Professional Standards for Teachers (RPMS-PPST). The demands of this system, combined with other administrative and instructional responsibilities, have resulted in increased workload and stress for teachers and instructional leaders.

Regarding the current condition in the Schools Division (SDO) of Iloilo City, instructional leaders, specifically department heads and master teachers, are expected to show resilience in carrying out many of their responsibilities, one of which is assisting their teachers in achieving the high levels of proficiency demanded by the Results-Based Performance Management System- Philippine Professional Standards for Teachers (RPMS-PPST) tool of the Department of Education (DepEd).

Several studies have documented the growing burdens placed on educators. Dibbon (2004, as cited in Pacaol, 2021) highlights the extensive concealed work that teachers must manage in addition to their visible tasks, a burden that often leads to stress and overwork. Tancinco (2016, as cited in Pacaol, 2021) further elaborates on the complexities of these ancillary duties, noting that many teachers are compelled to bring their work home due to the sheer volume of tasks they must complete. The strain on teachers inevitably trickles down to the instructional leaders supporting them, further underscoring the need for resilience and effective leadership strategies in educational settings.

Furthermore, based on the author's experience as a mentor in the teaching profession, even with training, teachers may struggle to be effective if they lack needed resources such as updated teaching materials, technology, or school administration support. Additionally, the author observes that the broader culture of schools and the educational system can influence teacher effectiveness. Lack of collaboration among teachers, inadequate feedback channels, and resistance to change can all make it challenging to execute innovative strategies learned in training. Thus, mentoring programs should be vigorously implemented nationwide to strengthen teachers' instructional skills. According to Freedman (2009), as cited by Sandner (2023), mentoring programs across the country of Arizona, USA, have been considered a successful technique for improving the teaching practices of early career teachers. Current research asserted that systematic mentoring programs increased teacher self-efficacy and skill

(Wexler, 2020), as posited by Sandner (2023), explicitly using some aspects of mentoring: personal attributes, system requirements, pedagogical knowledge, modeling, and feedback.

Concerning coaching, Professional Development (PD) is frequently employed to implement teacher transformation. As a result, a substantial body of literature is devoted to improving the implementation of professional development. According to Wei et al. (2009), as mentioned by Morris (2023), one evidence-based strategy for better supporting professional learning is the use of instructional coaches, such as department heads and master teachers in this study, who facilitate a continual cycle of improvement for teachers at the school site.

Both mentoring and coaching models have historically been described as one-to-one relationships, frequently with the mentor or coach holding a position of more excellent expertise, knowledge, experience, and power (Fletcher, 2012; Mullen, 2012; and Smith, 2017); cited by (O'Doherty, 2022). However, alternative conceptualizations of both mentoring and coaching intentionally shift power dynamics and describe collective, collaborative, and co-learning. Instructional leaders, including department heads and master teachers, are responsible for coaching and mentoring teachers within the school community but must ensure they possess the necessary knowledge and qualities.

Given these challenges, there is a clear gap in the literature regarding how instructional leaders, particularly in the context of the Schools Division of Iloilo City, can be better equipped to manage their multifaceted roles. While existing studies emphasize the importance of instructional leadership in educational improvement, few have explored specific strategies that can enhance the resilience and effectiveness of department heads and master teachers. Moreover, limited research integrates concepts such as Adversity Quotient®, leadership resilience, and mentoring and coaching strategies into a comprehensive framework for improving instructional leadership in the Philippines.

To address these gaps, the present study aims to develop an enhanced technical assistance plan that empowers instructional leaders in Iloilo City. The study focuses on key areas such as adversity quotient, leadership resiliency, and mentoring and coaching strategies. It seeks to provide instructional leaders with the tools and frameworks necessary to support their teachers effectively and enhance student outcomes. The significance of this research lies in its potential to contribute to the ongoing discourse on instructional leadership by offering practical, evidence-based solutions that can be implemented at the local level. Ultimately, this research hopes to strengthen the capacity of instructional leaders to navigate the complex demands of their roles and, in doing so, foster a more resilient and effective educational system.

2.0 Methodology

2.1 Research Design

This study adopted a descriptive research design to explore and document the current conditions, relationships, and trends related to instructional leadership in public secondary schools. Descriptive research, according to Fanollera (2000) and as further cited by Salinas (2017), involves collecting data to address research questions and hypotheses regarding present circumstances. This approach allows for a systematic examination of current relationships, attitudes, processes, and implications. It seeks to answer key questions about who, what, where, and how in the context of instructional leadership, resiliency, and coaching strategies.

2.2 Research Participants

The participants in this study were 138 public secondary school instructional leaders, comprising department heads and master teachers. These respondents were randomly selected from a total population of 210 instructional leaders within the Division of Iloilo City. The sample size was determined using Cochran's formula, with a margin of error set at 0.05. A stratified random sampling technique was employed specifically the proportional allocation method. According to Deauna (2011) and Salinas (2017), stratified random sampling ensures that participants are selected proportionally from each subgroup (stratum), providing a more accurate representation of the population. Key demographic variables such as sex, designation/position, educational attainment, length of service, and school population were considered when determining the number of participants.

2.3 Research Instruments
The study utilized a combination of adapted, researcher-developed and adopted questionnaires. The survey instrument was divided into two sections. Part I collected demographic data from the respondents, including optional name disclosure, sex, educational attainment, designation/position, and length of service. Part II comprised items designed to assess two main constructs: leadership resiliency and coaching strategies. Leadership resiliency was measured across five subcategories: self-efficacy, adaptability, optimism, self-sufficiency, and persistence. Coaching strategies were measured using five subcategories adapted from the Multi-Year Guidelines on the Results-Based Performance Management System (RPMS) and the Philippine Professional Standards for Teachers (DM 008, s. 2023).

The questionnaire underwent content validation and was subsequently tested for reliability using Cronbach's alpha. A pilot test involving 30 department heads and master teachers yielded a Cronbach's alpha of 0.973 for leadership resiliency and 0.955 for mentoring and coaching strategies, indicating high reliability. According to Fraenkel & Wallen (2007), as cited in Salinas (2017), a reliability coefficient of 0.70 or higher is deemed acceptable for research instruments. Consequently, the instruments used in this study were considered highly reliable.

In addition to the questionnaire, the adversity quotient (AQ) was assessed using the AQ Profile® tool, a web-based instrument developed by Dr. Paul G. Stoltz and provided by PEAK Learning Inc. The AQ Profile® consists of an interactive questionnaire designed to measure respondents' typical responses to adverse situations. It evaluates four CORE dimensions: Control, Ownership, Reach, and Endurance, collectively constituting an individual's AQ®. Respondents rated items on a 10-point Likert scale. A formal agreement with PEAK Learning Inc. was secured to utilize the AQ Profile® tool, and a unique URL link was provided to respondents for online completion of the questionnaire.

2.4 Data Gathering Procedures
A structured schedule was followed to distribute the survey instruments and collect responses. Respondents completed the questionnaires related to demographic profiles, leadership resiliency, and coaching strategies through Microsoft Forms. Additionally, the Adversity Quotient® was measured via a unique URL link provided to respondents for the AQ Profile® tool. The data collection process was monitored to ensure compliance with the research timeline, and proper follow-up was conducted to maximize response rates.

2.5 Data Analysis
This study employed both descriptive and inferential statistical techniques. Descriptive statistics were used to summarize and interpret the data, including mean, frequency distribution, standard deviation, and percentage. For inferential statistics, tests such as the t-test, Kruskal-Wallis test, and one-way ANOVA were utilized to determine significant differences between groups and test hypotheses. These analyses were conducted using appropriate statistical software to ensure accuracy and rigor in interpreting the data.

2.6 Ethical Considerations
Ethical guidelines for research involving human participants were strictly adhered to throughout the study. Formal permission was sought from the Schools Division Superintendent, followed by written consent from school principals in the Division of Iloilo City, ensuring that institutional approval was in place before data collection. Participants were fully informed about the study's objectives, benefits, and potential risks, and informed consent was obtained before their participation. The study complied with the provisions of the Data Privacy Act of 2012, ensuring the confidentiality and anonymity of the respondents. No personally identifiable information was disclosed, and all collected data was anonymized to prevent linkage to individual participants. Access to the data was restricted to the researcher, and no external parties had access to the information. Furthermore, respondents were not provided financial compensation for their participation, ensuring participation was voluntary.

3.0 Results and Discussion
3.1 Demographic Profile of the Respondents
Table 1 summarizes the demographic profile of the respondents in terms of sex, designation/position, educational attainment, and length of service.

Table 1. Descriptives of the demographic profile of the respondents

Variable	Frequency	Percentage (%)
Sex		
Male	40	29.0
Female	98	71.0
Designation/Position		
Head Teacher I	7	5.10
Head Teacher II	1	0.70
Head Teacher III	20	14.5
Head Teacher IV	20	14.5
Head Teacher V	5	3.60
Master Teacher I	68	49.3
Master Teacher II	17	12.3
Educational Attainment		
Bachelor's Degree	43	31.2
Master's Degree	81	58.7
Doctorate Degree	14	10.1
Length of Service		
Shorter (10 Years and Below)	19	13.8
Longer (Above 10 Years)	119	86.2

As presented in Table 1, the distribution of respondents by Sex shows a notable sex disproportion, with 71.00% of the total 138 respondents being female, while males account for 29.00%. This imbalance sheds light on the representation of genders within the sample group. For designation/position, the majority of respondents hold advanced degrees, with 58.70% possessing a master's degree, followed by 31.20% holding a Bachelor's Degree and 10.10% with a Doctorate Degree. This highlights the high level of academic qualification among the respondents, indicating a potentially solid knowledge base within the sample group. The respondents perform various roles within the educational framework. Regarding educational attainment, Master Teacher I emerges as the most prevalent designation, encompassing 49.30% of the respondents, followed by Head Teachers III and IV, each comprising 14.50%. Regarding length of service, most respondents, accounting for 86.20%, have served for more than 10 years. In contrast, only 13.80% have a shorter tenure of 10 years or less. This distribution underscores the significant level of experience among the respondents, suggesting a wealth of practical knowledge and expertise accumulated over their years of service.

3.2 Level of Adversity Quotient

As presented in Table 2, the mean adversity quotient across all respondents is 120.40, with a standard deviation of 13.05. This indicates a "below average" level of AQ® within the sampled population, which ranges from 112 to 124.

Table 2. Descriptives of the level of adversity quotient

Variable	SD	M	Description
As a Whole	13.05	120.40	Below Average
Sex			
Male	16.03	120.33	Below Average
Female	11.06	120.43	Below Average
Designation/Position			
Head Teacher I	7.72	123.43	Below Average
Head Teacher II	0	140.00	Average
Head Teacher III	11.21	120.45	Below Average
Head Teacher IV	12.23	119.10	Below Average
Head Teacher V	30.77	129.20	Average
Master Teacher I	12.67	120.31	Below Average
Master Teacher II	11.66	117.24	Below Average
Educational Attainment			
Bachelor's Degree	11.46	120.60	Below Average
Master's Degree	14.11	120.64	Below Average
Doctorate Degree	11.89	118.36	Below Average
Length of Service			
Shorter (10 Years and Below)	12.37	126.31	Average
Longer (Above 10 Years)	12.96	119.45	Below Average

This suggests a tendency towards underutilizing potential and struggling with adversity, potentially leading to feelings of hopelessness and powerlessness, and escape from this state is possible by raising the AQ® (Stoltz, 2000; Okorji & Epetuku, 2019). These findings suggest that teachers face various unnecessary challenges and engage in negative, often unreasonable internal conversations that confine individuals in the psychological enclosures they unintentionally create. Because of this negative mindset, they could not take action to remedy the situation. By understanding the factors influencing resilience levels, organizations can implement strategies to cultivate a resilient workforce capable of effectively navigating challenges and achieving success in both personal and professional domains (Napire, 2019).

Transformational leadership theory suggests effective leadership involves navigating challenges and inspiring others to overcome adversity (Burns, 1978; Napire, 2019). The below-average AQ® scores among instructional leaders underscore the importance of cultivating resilience to promote effective leadership. Across all categories, instructional leaders typically possess an AQ® that falls within the below-average to average range. This suggests that they manage well when things are going smoothly. However, they may struggle more than necessary during significant setbacks or when faced with life's challenges. The result of this study is not far from the study conducted by Bińas and Siason (2023). Their analysis showed that teachers' AQs were low, ranging from 40 to 111. These findings suggest that teachers face various unnecessary challenges and engage in negative, often unreasonable internal conversations that confine individuals to the psychological enclosures they unintentionally create. Because of this negative mindset, they could not take action to remedy the situation. In contrast, those with an above-average adversity quotient demonstrate a commendable ability to persist through challenges and regularly tap into their growth potential (Stoltz, 2000; Okorji & Epetuku, 2019). The Psychological resilience theory highlights the need for individuals to develop adaptive coping strategies to thrive in challenging environments (Luthans, 2002; Moore, 2019). The findings suggest that instructional leaders may benefit from resilience-building interventions to enhance their AQ® regardless of demographic factors.

3.3 Level of Leadership Resiliency

Table 3 presents the summary of the leadership resiliency of respondents.

Table 3. Descriptives of the level of leadership resiliency

Variable	SD	M	Description
As a Whole	0.63	4.08	Very Highly Resilient
Sex			
Male	0.67	3.99	Highly Resilient
Female	0.61	4.12	Very Highly Resilient
Designation/Position			
Head Teacher I	0.62	3.57	Highly Resilient
Head Teacher II	0	4.88	Very Highly Resilient
Head Teacher III	0.63	4.31	Very Highly Resilient
Head Teacher IV	0.54	4.14	Very Highly Resilient
Head Teacher V	0.48	4.32	Very Highly Resilient
Master Teacher I	0.60	4.02	Very Highly Resilient
Master Teacher II	0.76	4.08	Very Highly Resilient
Educational Attainment			
Bachelor's Degree	0.59	4.06	Very Highly Resilient
Master's Degree	0.62	4.09	Very Highly Resilient
Doctorate Degree	0.78	4.10	Very Highly Resilient
Length of Service			
Shorter (10 Years and Below)	0.69	4.12	Very Highly Resilient
Longer (Above 10 Years)	0.62	4.08	Very Highly Resilient

The study reveals that respondents exhibit high resilience (M=4.08, SD=0.63) concerning their leadership resiliency. The findings indicate a consistently high level of leadership resiliency among respondents. It indicates that instructional leaders of SDO-Iloilo City exhibit resilience, adaptability, and determination, demonstrating skills in emotional management, empathy, risk-taking, and innovative approaches, making them inspirational and transformational leaders. Meanwhile, the relatively low standard deviation across different demographic variables suggests a uniformity in leadership resiliency levels among the sample population. This highlights the importance of fostering leadership resiliency in education, regardless of sex, designation/ position, educational attainment, or length of service, to effectively navigate challenges and promote positive outcomes within educational institutions. Leadership resiliency is a cornerstone for organizational success, as it empowers leaders to navigate dynamic environments and inspire their teams toward shared goals (Eliot, 2020).

Relative to this, the Psychological resilience theory suggests that resilience is a dynamic process influenced by individual and collective factors (Luthans, 2002; Moore, 2019). The findings suggest that leadership resiliency is not significantly influenced by demographic factors, highlighting the importance of individual attributes and coping mechanisms. Influential instructional leaders are tasked with a dual responsibility: demonstrating instructional leadership prowess while also mastering organizational management skills, thereby steering schools toward excellence (Sebastian et al., 2019). These findings underscore the importance of these qualities and affirm their critical role in driving positive outcomes within educational institutions. Transformational leadership theory emphasizes the role of leaders in fostering leadership resiliency and promoting positive outcomes within organizations (Burns, 1978; Napire, 2019). The consistently high levels of leadership resiliency among instructional leaders underscore their effectiveness in navigating challenges and promoting organizational success.

3.4 Level of Coaching Strategies

As seen in Table 4, the respondents demonstrated exemplary mentoring and coaching strategies, with a mean score of 4.20 (SD = 0.57).

Table 4. Descriptives of the level of coaching strategies

Variable	SD	M	Description
As a Whole	0.57	4.20	Exemplary Strategies
Sex			
Male	0.53	4.10	Exemplary Strategies
Female	0.59	4.24	Exemplary Strategies
Designation/Position			
Head Teacher I	0.56	3.88	Advanced Strategies
Head Teacher II	0	4.47	Exemplary Strategies
Head Teacher III	0.58	4.39	Exemplary Strategies
Head Teacher IV	0.58	4.27	Exemplary Strategies
Head Teacher V	0.32	4.28	Exemplary Strategies
Master Teacher I	0.59	4.11	Exemplary Strategies
Master Teacher II	0.54	4.29	Exemplary Strategies
Educational Attainment			
Bachelor's Degree	0.53	4.29	Exemplary Strategies
Master's Degree	0.56	4.16	Exemplary Strategies
Doctorate Degree	0.74	4.08	Exemplary Strategies
Length of Service			
Shorter (10 Years and Below)	0.68	4.16	Exemplary Strategies
Longer (Above 10 Years)	0.56	4.20	Exemplary Strategies

This indicates that SDO-Iloilo City Instructional Leaders employed advanced mentoring and coaching strategies to understand individual teacher needs and develop transformative plans. They inspire teachers to grow, innovate, and achieve exceptional results, creating a collaborative learning culture. This aligns with research indicating that mentoring and coaching provide vital support and guidance to educators throughout their careers (Cornelius et al., 2020; Yan, 2021), as cited by Masalimova et al. (2023). Mentoring stimulates personal and professional development, job satisfaction, and collaboration (Hathazi, 2020; Pandey & Sharma, 2022), as Masalimova et al. (2023) further cites.

The Psychological resilience theory suggests effective coaching and mentoring can contribute to resilience-building and professional development (Luthans, 2002; Moore, 2019). The findings underscore the universal applicability of mentoring programs in supporting educators at different career stages. Transformational leadership theory emphasizes leaders' role in supporting others' professional growth and development (Burns, 1978; Napire, 2019). The findings suggest that instructional leaders demonstrate proficiency in mentoring and coaching strategies, regardless of demographic factors.

3.5 Coaching Strategies

Table 5 highlights the respondents' mentoring and coaching strategies. As enumerated, instructional leaders implement various mentoring and coaching strategies to enhance teachers' effectiveness. Results reveal that the instructional leaders advise and guide colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives (PPST 4.5.3) (SD=0.72, M=4.29). They demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote an excellence-oriented culture (SD=0.73, M=4.29). Instructional leaders have formulated and used efficient teaching strategies to collaborate with colleagues to foster critical and creative thinking and other higher-order thinking abilities (PPST 1.5.3) (SD=0.68, M=4.28).

Table 5. Descriptives of the level of coaching strategies

Mentoring and Coaching Strategy		SD	Mean
KRA	**Statement**		
Curriculum and Planning	Advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives. (PPST 4.5.3)	0.72	4.29
Curriculum and Planning	Demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote an excellence-oriented culture.	0.73	4.29
Content Knowledge and Pedagogy	Formulated and used efficient teaching strategies to collaborate with colleagues to foster critical and creative thinking and other higher-order thinking abilities. (PPST 1.5.3)	0.68	4.28

This dedication to mentoring and coaching aligns with the literature on professional development as a strategy for teacher transformation. Wei et al. (2009), cited by Morris (2023), emphasize the importance of instructional coaches, such as department heads and master teachers, in facilitating continual improvement among teachers. They are crucial in guiding teachers through professional learning experiences, including in-service training, to enhance their expertise in specific areas. Similarly, Desimone and Pak (2017; Morris, 2023)) highlight how instructional leaders enhance teachers' progress by utilizing active learning strategies, fostering a sense-making process, and contributing to positive workplace cultures.

Research conducted by Goleman (2012) and Grant and Hartley (2014), as cited by Peláez, Zuberbuhler, and Matinez (2020), underscores the necessity for instructional leaders to possess strong coaching skills. These skills are vital for providing teachers with comprehensive feedback and modification recommendations, ultimately leading to improved instruction and student learning outcomes. In their role as coaches, instructional leaders guide teachers not only in subject matter expertise and pedagogy but also in areas such as learning development, curriculum planning, and personal and professional development, as outlined in designated duties (DM 008, s., 2023).

Grouped by Sex

Table 6. Descriptives of the level of coaching strategies when grouped by sex

Mentoring and Coaching Strategy		SD	Mean
KRA	**Statement**		
Males			
Personal Growth & Professional Development	Advised and guided colleagues in various related works/activities contributing to teaching-learning.	0.67	4.25
Learning Development & Diversity of Learners	Demonstrated with colleagues the efficient methods for creating learning environments that value fairness, respect, and care.	0.55	4.18
Learning Development & Diversity of Learners	Collaborated with colleagues to share effective methods for maintaining nurturing learning environments, encouraging students to participate, cooperate with, and contribute to ongoing learning.	0.59	4.18
Females			
Curriculum and Planning	Advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives. (PPST 4.5.3).	0.70	4.37
Curriculum and Planning	Collaborated with colleagues in developing and applying effective strategies in the planning and managing developmentally sequenced teaching and learning processes to meet the curriculum requirements and varied teaching contexts. (PPST 4.1.3)	0.75	4.34
Content Knowledge and Pedagogy	Modeled with colleagues the effective integration of subject-matter expertise throughout the curriculum's teaching domains. PPST 1.1.3)	0.67	4.33

As seen in Table 6 in terms of sex, the mentoring and coaching strategies employed by both male and female respondents in educational leadership roles are robust. Male instructional leaders advise and guide colleagues in various related works/activities contributing to the teaching-learning process (SD=0.67, M=4.25). The relatively low standard deviation suggests considerable consistency among male instructional leaders in this aspect of educational leadership. Female instructional leaders showcase their expertise in mentoring and coaching strategies by advising and guiding colleagues in the selection, organization, development, and use of suitable teaching and learning resources, including ICT, to address specific learning objectives (PPST 4.5.3) (SD=0.70, M=4.37). This suggests a high level of proficiency and consistency in this area among female leaders. The relatively low standard deviations across various strategies for both male and female instructional leaders suggest uniformity in their approaches, underscoring the importance of these strategies in promoting professional growth and enhancing the teaching-learning process within educational institutions (Morris, 2023). These findings emphasize the significance of effective mentoring and coaching strategies in educational leadership, highlighting the need for consistent implementation to achieve positive outcomes.

Grouped by Designation

Concerning designation, as seen in Table 7, fourteen (14) mentoring and coaching strategies of the Head Teacher I respondents, with a mean of 4.00, were found to have been applied as instructional leaders. The proficiency demonstrated by Head Teacher I respondents in various mentoring and coaching strategies across multiple domains, including content knowledge and pedagogy, learning development, diversity of learners, curriculum planning, and personal growth and professional development, underscores the pivotal role of Head Teacher I positions in providing comprehensive support to teachers (Morris, 2023). As instructional leaders, Head Teacher I roles extend beyond curriculum oversight to encompass effective coaching and mentoring, aligning with the concept that instructional leaders play a crucial role in facilitating continuous teacher improvement through ongoing professional learning cycles (Wei et al., 2009; Desimone & Pak, 2017) as cited by Morris (2023).

Table 7. Descriptives of the level of coaching strategies when grouped by designation

KRA	Mentoring and Coaching Strategy Statement	SD	Mean
Head Teacher I			
Content Knowledge and Pedagogy	Assessed with colleagues the efficiency of instructional strategies that encourage literacy and numeracy learning. (PPST 1.4.3.	0.58	4.00
Content Knowledge and Pedagogy	Demonstrated with colleagues a wide range of effective verbal and nonverbal communication strategies in the classroom to encourage student learning, participation, engagement, and success.	0.58	4.00
Content Knowledge and Pedagogy	Formulated and used efficient teaching strategies to collaborate with colleagues to foster critical and creative thinking and other higher-order thinking abilities. (PPST 1.5.3)	0.58	4.00
Learning Development & Diversity of Learners	Modeled effective approaches for giving quick, precise, and helpful feedback to colleagues to motivate each student to evaluate and enhance diverse learning.	0.58	4.00
Learning Development & Diversity of Learners	Demonstrated with colleagues the efficient methods for creating learning environments that value fairness, respect, and care.	0.58	4.00
Learning Development & Diversity of Learners	Exemplified excellent strategies and assisted colleagues in promoting learning environments that effectively encourage students to work productively by taking ownership of their learning.	0.58	4.00
Curriculum and Planning	Advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives. (PPST 4.5.3).	0.82	4.00
Curriculum and Planning	Demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote an excellence-oriented culture.	0.82	4.00
Personal Growth & Professional Development	Guided and encouraged colleagues to improve connections with parents, guardians, and the larger school community to increase their participation in the educational process.	1.00	4.00
Personal Growth & Professional Development	Advised and guided colleagues in various related works/activities contributing to the teaching-learning process.	0.58	4.00
Personal Growth & Professional Development	Assisted and supported learning opportunities with colleagues and started professional reflections to enhance practice.	0.58	4.00

Personal Growth & Professional Development	Demonstrated a learner-centered teaching philosophy in several practice-related areas. Assisted colleagues in developing their learner-centered teaching philosophies. (PPST 7.1.3)	0.58	4.00
Personal Growth & Professional Development	Planned professional development goals and offered guidance and support to colleagues in setting and accomplishing their goals by reflecting on the Philippine Professional Standards for Teachers. (PPST 7.5.3).	0.58	4.00
Personal Growth & Professional Development	Guide and encourage colleagues to regularly review the current codes, laws, and rules pertaining to the teaching profession and their obligations under the Code of Ethics for Professional Teachers. (PPST 6.3.4).	0.58	4.00
Head Teacher II			
	The respondents employed all mentoring and coaching strategies.	0	4.00
Head Teacher III			
Personal Growth & Professional Development	Assisted and supported learning opportunities with colleagues and started professional reflections to enhance practice.	0.58	4.68
Curriculum and Planning	Demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote an excellence-oriented culture.	0.59	4.65
Curriculum and Planning	Collaborated with colleagues in developing and applying effective strategies in the planning and managing developmentally sequenced teaching and learning processes to meet the curriculum requirements and varied teaching contexts. (PPST 4.1.3).	0.68	4.60
Personal Growth & Professional Development	Advised and guided colleagues in various related works/activities contributing to the teaching-learning process.	0.68	4.60
Head Teacher IV			
Curriculum and Planning	Collaborated with colleagues in developing and applying effective strategies in the planning and managing developmentally sequenced teaching and learning processes to meet the curriculum requirements and varied teaching contexts. (PPST 4.1.3).	0.51	4.55
Curriculum and Planning	Advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives. (PPST 4.5.3).	0.51	4.50
Learning Development & Diversity of Learners	Collaborated with colleagues to share effective methods for maintaining nurturing learning environments encouraging students to participate, cooperate with, and contribute to ongoing learning.	0.51	4.45
Curriculum and Planning	Reviewed feedback from colleagues, teachers, and learners' feedback to plan, facilitate, and enrich teaching practice. (PPST 4.4.3).	0.60	4.45
Curriculum and Planning	Demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote an excellence-oriented culture.	0.60	4.45
Head Teacher V			
Curriculum and Planning	Advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives. (PPST 4.5.3).	0.55	4.60
Personal Growth & Professional Development	Advised and guided colleagues in various related works/activities contributing to the teaching-learning process.	0.55	4.60
Learning Development & Diversity of Learners	Provide strategy among colleagues and create a learner-centered teaching environment that promotes achievement by adapting instruction to students' linguistic, cultural, socioeconomic, and religious backgrounds.	0.55	4.40
Learning Development & Diversity of Learners	Showed colleagues how to consistently execute policies, guidelines, and procedures to create a secure and safe learning environment that will improve diverse learning.	0.55	4.40
Curriculum and Planning	Reviewed feedback from colleagues, teachers, and learners' feedback to plan, facilitate, and enrich teaching practice. (PPST 4.4.3).	0.89	4.40
Curriculum and Planning	Demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote an excellence-oriented culture.	0.55	4.40

Assessment and Reporting	Monitoring and assessment of attainment data were collectively evaluated with colleagues to help in the development and success of learners. (PPST 5.2.3).	0.55	4.40
Personal Growth & Professional Development	Guided and encouraged colleagues to improve connections with parents, guardians, and the larger school community to increase their participation in the educational process.	0.55	4.40
Personal Growth & Professional Development	Assisted and supported learning opportunities with colleagues and started professional reflections to enhance practice.	0.55	4.40
Personal Growth & Professional Development	Demonstrated a learner-centered teaching philosophy in several practice-related areas. Assisted colleagues in developing their learner-centered teaching philosophies. (PPST 7.1.3).	0.55	4.40
Personal Growth & Professional Development	Guide and encourage colleagues to regularly review the current codes, laws, and rules pertaining to the teaching profession and their obligations under the Code of Ethics for Professional Teachers. (PPST 6.3.4).	0.55	4.40
Master Teacher I			
Content Knowledge and Pedagogy	Assessed with colleagues the efficiency of instructional strategies that encourage literacy and numeracy learning. (PPST 1.4.3).	0.64	4.22
Content Knowledge and Pedagogy	Demonstrated with colleagues a wide range of effective verbal and nonverbal communication strategies in the classroom to encourage student learning, participation, engagement, and success.	0.69	4.22
Personal Growth and Professional Development	Advised and guided colleagues in various related works/activities contributing to the teaching-learning process.	0.70	4.21
Master Teacher II			
Personal Growth & Professional Development	Assisted and supported learning opportunities with colleagues and started professional reflections to enhance practice.	0.51	4.47
Curriculum and Planning	Advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives. (PPST 4.5.3).	0.71	4.41
Personal Growth & Professional Development	Actively engaged in professional networks within and between institutions to advance practice and knowledge.	0.51	4.41
Personal Growth & Professional Development	Advised and guided colleagues in various related works/activities contributing to the teaching-learning process.	0.62	4.41
Personal Growth & Professional Development	Demonstrated a learner-centered teaching philosophy in several practice-related areas. Assisted colleagues in developing their learner-centered teaching philosophies. (PPST 7.1.3).	0.62	4.41
Personal Growth & Professional Development	Planned professional development goals and offered guidance and support to colleagues in setting and accomplishing their goals by reflecting on the Philippine Professional Standards for Teachers. (PPST 7.5.3).	0.62	4.41

The Head Teacher II respondents have exhibited notable consistency in considering all mentoring and coaching strategies, as evidenced by their uniform ratings of 4.00 with a standard deviation of 0. This consistency across various strategies indicates a high level of competency and a thorough application of these approaches (Morris, 2023). Such uniformity in ratings suggests that those in Head Teacher II positions effectively execute their duties as instructional leaders, offering consistent support and guidance to teachers. This consistency is instrumental in creating and maintaining a positive learning environment conducive to student success (Garbacz et al., 2015).

Head Teacher III respondents excelled in mentoring and coaching strategies related to personal growth and professional development, curriculum planning, and collaborative Planning (Morris, 2023). These findings highlight the importance of Head Teacher III's roles in providing targeted support for teacher development and curriculum implementation, crucial for enhancing teacher effectiveness and student learning outcomes (Goleman, 2012; Grant et al., 2014) as cited by Peláez et al., (2020).

Head Teacher IV respondents demonstrated proficiency in mentoring and coaching strategies related to curriculum planning, resource utilization, collaborative planning, and feedback (Morris, 2023). It implies that those Head Teacher IV positions are critical in promoting instructional excellence and supporting teachers in addressing diverse learning needs, thereby contributing to overall school improvement (Louis et al., 2010; Moore, 2015).

Head Teacher V respondents exhibited expertise in mentoring and coaching strategies related to curriculum planning, resource utilization, personal growth and professional development, and feedback (Morris, 2023). These findings underscore the significance of Head Teacher V's roles in promoting instructional innovation and improving student learning outcomes, which are essential for school effectiveness and teacher professional growth (O'Keefe, 2017; Morris, 2023).

Master Teacher I respondents displayed proficiency in mentoring and coaching strategies related to content knowledge and pedagogy, as well as personal growth and professional development (Morris, 2023). It implies that those in Master Teacher I positions are crucial in providing subject-specific support and fostering teacher growth, contributing to overall school improvement and teacher effectiveness (Ellinger et al., 2011; Stehlik et al., 2014).

Master teacher II respondents demonstrated expertise in mentoring and coaching strategies related to personal growth and professional development, curriculum planning, resource utilization, and collaboration (Morris, 2023). These findings suggest that those in Master Teacher II positions support teacher growth and promote instructional innovation through effective coaching and mentoring (Smith Jr., 2015; Peláez et al., 2020).

Grouped by Educational Attainment

Table 8. Descriptives of the level of coaching strategies when grouped by educational attainment

Mentoring and Coaching Strategy		SD	Mean
KRA	**Statement**		
Bachelor's Degree			
Curriculum and Planning	Advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives. (PPST 4.5.3).	0.67	4.44
Learning Development and Diversity of Learners	Applied positive and non-violent punishment to maintain learning-focused environments by demonstrating competent and constructive behavior management abilities among colleagues. (PPST 2.6.3).	0.58	4.40
Curriculum and Planning	Demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote an excellence-oriented culture.	0.73	4.40
Personal Growth and Professional Development	Advised and guided colleagues in various related works/activities contributing to teaching-learning.	0.62	4.40
Master's Degree			
Personal Growth & Professional Development	Advised and guided colleagues in various related works/activities contributing to teaching-learning.	0.85	4.28
Content Knowledge and Pedagogy	Demonstrated with colleagues a wide range of effective verbal and nonverbal communication strategies in the classroom to encourage student learning, participation, engagement, and success.	0.71	4.27
Content Knowledge and Pedagogy	Formulated and used efficient teaching strategies to collaborate with colleagues to foster critical and creative thinking and other higher-order thinking abilities. (PPST 1.5.3).	0.63	4.26
Curriculum and Planning	Advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives. (PPST 4.5.3).	0.69	4.26
Doctorate Degree			
Learning Development and Diversity of Learners	Collaborated with colleagues to share effective methods for maintaining nurturing learning environments, encouraging students to participate, cooperate with, and contribute to ongoing learning.	0.71	4.21
Personal Growth & Professional Development	Assisted and supported learning opportunities with colleagues and started professional reflections to enhance practice.	0.80	4.21
Personal Growth & Professional Development	Assisted and supported learning opportunities with colleagues and started professional reflections to enhance practice.	0.80	4.21

Regarding Educational Attainment, as seen in Table 8, respondents who are Bachelor's Degree holders have agreed to the following mentoring and coaching strategies: (1) advised and guided colleagues in the selection, organization, development, and use of suitable teaching and learning resources, including ICT, to address specific learning objectives(SD=0.67, M=4.44); (2) applied positive and non-violent punishment to maintain learning-focused environments by demonstrating competent and constructive behavior management abilities among colleagues(SD=0.58, M=4.40); (3) demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote an excellence-oriented culture (SD=0.73, M=4.40); and (4) advised and guided colleagues in various related works/activities contributing to the teaching-learning process (SD=0.62, M=4.40). Bachelor's Degree holders demonstrated proficiency in mentoring and coaching strategies related to resource selection, behavior management, setting attainable learning objectives, and contributing to teaching-learning (Morris, 2023). This indicates a strong foundation in instructional support and collaboration among teachers with undergraduate qualifications.

Respondents who are Master's Degree holders agreed to implement the following mentoring and coaching strategies: (1) advised and guided colleagues in performing various related works/activities that contribute to the teaching-learning process (SD=0.85, M=4.28); (2) demonstrated with colleagues a wide range of effective verbal and nonverbal communication strategies in the classroom to encourage student learning, participation, engagement, and success (SD=0.71, M=4.27); (3) formulated and used efficient teaching strategies to collaborate with colleagues to foster critical and creative thinking, as well as other higher-order thinking abilities (SD=0.63, M=4.26); (4) advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives(SD=0.69, M=4.26). Master's Degree holders exhibited competence in mentoring and coaching strategies encompassing communication techniques, collaborative teaching strategies, and resource utilization (Morris, 2023). Their advanced qualifications are reflected in their ability to support colleagues across various aspects of teaching and learning.

Doctorate Degree holders implement the following mentoring and coaching strategies: (1) collaborated with colleagues to share practical methods for maintaining nurturing learning environments, encouraging students to participate in, cooperate with, and contribute to ongoing learning (SD=0.71, M=4.21); (2) assisted and supported learning opportunities with colleagues and started professional reflections to enhance practice (SD=0.80, M=4.21); (3) assisted and supported learning opportunities with colleagues and started professional reflections to enhance practice (SD=0.80, M=4.21). Doctorate Degree holders emphasize collaboration, support for learning opportunities, and professional reflection as key mentoring and coaching strategies (Morris, 2023). Their doctoral-level expertise positions them as valuable resources for guiding educational research and innovation colleagues.

The results suggest the importance of designing professional development programs that address the diverse needs of teachers based on their educational backgrounds. Instructional leaders should prioritize providing tailored support and guidance to teachers at different stages of their careers, fostering a culture of continuous improvement and enhancing overall teaching quality. Additionally, ongoing professional development opportunities should be offered to instructional leaders themselves to strengthen their coaching skills and leadership capabilities, ultimately benefiting the entire school community (Garbacz et al., 2015; O'Keefe, 2017).

Grouped by Length of Service

About the Length of Service of respondents, as seen in Table 9, instructional leaders with shorter experience with below 10 years of tenure have implemented the following mentoring and coaching strategies: (1) demonstrated with colleagues the efficient methods for creating learning environments that value fairness, respect, and care (SD=0.75, M=4.42); (2) modeled with colleagues the practical approaches for giving quick, precise, and helpful feedback to motivate each student to evaluate and enhance diverse learning (M=0.67, M=4.32; (3) showed colleagues how to execute policies, guidelines, and procedures consistently to create a secure and safe learning environment that will improve diverse learning (SD=0.75, M=4.32); and (4) collaborated with colleagues to share practical methods for maintaining nurturing learning environments that encourage students to take part in, cooperate with, and contribute to ongoing learning (SD=0.58, M=4.32).

Instructional leaders with shorter experience demonstrated proficiency in creating inclusive learning environments, providing effective feedback, ensuring consistency in policy implementation, and fostering collaboration among colleagues (Morris, 2023). These strategies emphasize the importance of establishing a supportive and conducive atmosphere for teaching and learning. Instructional leaders with more extended experience as instructional leaders with 10 years and above of tenure have implemented the following mentoring and coaching strategies: (1) advised and guided colleagues in performing various related works/activities that contribute to the teaching-learning process (SD=0.80, M=4.30); (2) advised and guided colleagues in the selection, organization, development, and use of suitable teaching and learning resources, including ICT, to address specific learning objectives(SD=0.72, M=4.29); and (3) demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote excellence-oriented culture (SD=0.73, M=4.29).

Table 9. Descriptives of the level of coaching strategies when grouped by length of service

Mentoring and Coaching Strategy		SD	Mean
KRA	**Statement**		
Shorter (Below 10 years)			
Learning Development & Diversity of Learners	Demonstrated with colleagues the efficient methods for creating learning environments that value fairness, respect, and care.	0.75	4.42
Learning Development & Diversity of Learners	Modeled effective approaches for giving quick, precise, and helpful feedback to colleagues to motivate each student to evaluate and enhance diverse learning.	0.67	4.32
Learning Development & Diversity of Learners	Showed colleagues how to consistently execute policies, guidelines, and procedures to create a secure and safe learning environment that will improve diverse learning.	0.75	4.32
Learning Development & Diversity of Learners	Collaborated with colleagues to share effective methods for maintaining nurturing learning environments, encouraging students to participate, cooperate with, and contribute to ongoing learning.	0.58	4.32
Longer (10 Years & Above)			
Personal Growth & Professional Development	Advised and guided colleagues in various related works/activities contributing to teaching-learning.	0.80	4.30
Curriculum and Planning	Advised and guided colleagues in selecting, organizing, developing, and using suitable teaching and learning resources, including ICT, to address specific learning objectives. (PPST 4.5.3).	0.72	4.29
Curriculum and Planning	Demonstrated to colleagues how to create learning objectives that are both hard and attainable and that are in line with learning abilities to promote an excellence-oriented culture.	0.73	4.29

Instructional leaders with extended experience exhibited proficiency in guiding colleagues in various teaching-learning activities, selecting appropriate resources, and setting challenging yet attainable learning objectives (Morris, 2023). Their expertise lies in providing comprehensive support and guidance to teachers across different aspects of instruction. Garbacz et al. (2015), as cited by Morris (2023), advocate for instructional leaders to introduce new strategies before engaging in coaching cycles, allowing teachers sufficient time for practice and reflection. While the duration of coaching interactions may vary (O'Keefe, 2017; Morris, 2023), it suggests that more time is generally preferable to less, emphasizing the importance of sustained support and assistance for teachers in their journey toward becoming highly proficient teachers.

The requirement for classroom observations, as outlined in DM No.008, s.2023, provides instructional leaders with opportunities to identify areas for improvement in teachers' performance. By observing both proficient and highly proficient teachers, instructional leaders can tailor their coaching strategies to address specific needs and gaps in instructional practices, ultimately contributing to continuous teachers' improvement and enhanced student learning experiences. These findings underscore the importance of arming instructional leaders with adept coaching skills and establishing continuous support and feedback mechanisms to foster teacher growth and development within the educational sphere. They illuminate the pivotal role of professional development in catalyzing teacher transformations, particularly accentuating the shift of professional development towards professional learning. This evolution is emphasized by Wei et al. (2009), as cited by Morris (2023).

3.6 Difference in the Level of Adversity Quotient When Grouped According to Profile

Table 10 indicates that the p-value obtained from comparing the adversity quotient by sex groups was significantly higher than the alpha value set at 0.05 (t=-0.04, p=0.97, α=0.05). Consequently, the null hypothesis was accepted.

Table 10. Independent t-test result of the level of adversity quotient when grouped by sex

Variable	t-value	p-value	Decision
Sex	-0.04	0.97	Accept Null Hypothesis

The statistical analysis indicates no significant difference when grouped by sex. The results of this study supported those of studies by Priya (2016) and Boroa (2015), which indicated no significant differences in AQ® between males and females. The study states that a teacher's sex will not impact their capacity to handle challenging circumstances (Baog & Cagape, 2022). Regardless of sex, individuals exhibit similar levels of resilience and ability to overcome challenges (Stoltz & Weihenmayer, as cited by Amparo, 2015). This understanding is crucial for instructional leaders as they work with diverse groups of teachers and students, recognizing that everyone may respond differently to adversity.

Table 11. Kruskal-Wallis test result of the level of adversity quotient when grouped by designation

Variable	H-value	p-value	Decision
Designation/Position	5.70	0.46	Accept the Null Hypothesis

Regarding the respondents' designation, Table 11 indicates that the p-value exceeds the predetermined alpha level of 0.05, indicating no statistical significance. Utilizing the H-test, the decision was made to accept the null hypothesis when examining the adversity quotient of respondents grouped by their designation or position (H=5.70, p=0.46, α=0.05). Thus, there is no significant difference in the respondents' Adversity Quotient level when grouped by designation/position. This supported the study's findings that teachers' Adversity Quotient® was unaffected by their designation/ position at the institution. This suggests that a teacher's designation/position does not necessarily indicate how well-equipped they will be to handle challenging situations in their personal lives (Banog & Cagape, 2022).

Moreover, these findings aligned with adversity as a universal experience that individuals encounter regardless of their roles or positions in life. As Stoltz and Weihenmayer (cited in Amparo, 2015) describe Adversity as a potent force that shapes individuals' personalities and determines their responses to life's challenges. Adversity is pervasive in both personal and professional domains. Napire (2019) notes that workplace challenges, such as internal conflicts and resource constraints, can contribute to the adversity of instructional leaders. These challenges may hinder their ability to perform their duties and provide high-quality education effectively. DepEd must prioritize strategies that support individuals in developing resilience and coping mechanisms to thrive in dynamic and challenging environments (Stoltz & Weihenmayer, as cited by Amparo, 2015).

Meanwhile, Table 12 shows the ANOVA F-Test result of the respondents' level of adversity quotient when grouped by educational attainment. The quotient was compared across different educational attainment levels, namely bachelor, master, and doctorate degrees.

Table 12. ANOVA F-Test result of the level of adversity quotient when grouped by educational attainment

Variable	F-value	p-value	Decision
Educational Attainment	0.19	0.83	Accept the null Hypothesis

As regards Educational Attainment, the calculated F-value through analysis of variance (ANOVA) has a p-value of 0.83, greater than the alpha value (α=0.05). This indicates a lack of statistical significance. The decision was made to accept the null hypothesis (F=0.19), suggesting that there is no significant difference in the level of adversity quotient among respondents when grouped and compared by their educational attainment. This finding was corroborated by Priya (2016) and Shen and Ven (2014) as cited by Priya (2016). Their study findings on Educational Attainment showed no significant difference in the total adversity quotient among graduate teachers, post-graduate teachers, and teachers with PhD. This result confirms the study findings of Bińas & Season (2023) that teachers' Adversity Quotient® is not affected by their length of service and educational attainment; instead, these factors may operate as a stabilizing force as they navigate various challenges.

These findings underscore that adversity is pervasive in individuals' lives, shaping their personalities and influencing their paths. As discussed by Stoltz and Weihenmayer (as cited in Amparo, 2015), the (AQ) plays a crucial role in determining whether individuals succumb to adversity or emerge resilient. While instructional leaders' educational attainment may vary, the findings suggest that their AQ remains consistent across different academic levels. Understanding and addressing adversity within the academic context is crucial for fostering resilience and enhancing leadership effectiveness.

Finally, Table 13 reveals the independent t-test result of the respondents' level of adversity quotient when grouped by length of service.

Table 13. Independent t-test result of the level of adversity quotient when grouped by length of service

Variable	t-value	p-value	Decision
Length of Service	2.16	0.03*	Reject Null Hypothesis

For the Length of Service, Table 13 presents the p-value less than the alpha value ($p=0.03$, $\alpha=0.05$). Consequently, the decision was made to reject the null hypothesis. The AQ of the respondents was measured and compared by their length of service through inferential analysis using an independent sample T-test ($t=2.16$). Thus, there is a significant difference in the respondents' adversity quotient level when grouped by their length of service. This finding was confirmed by the study of Priya (2016); however, it was denied by study findings of R. Olila (2012, quoted by Rafols, 2015), Bautista (2015), and Boroa (2015).

The significant difference in adversity quotient based on length of service underscores the dynamic nature of individuals' responses to adversity. This affirmed Stoltz and Weihenmayer's notion (as cited in Amparo, 2015) that adversity catalyzes growth and resilience, prompting individuals to adapt and thrive in the face of challenges. Understanding and addressing adversity within the educational context is crucial for promoting resilience and enhancing leadership effectiveness. Napire (2019) added that embracing adversity and cultivating resilience is essential for navigating the evolving landscape of education.

3.7 Difference in the Level of Leadership Resiliency When Grouped According to Profile

Table 14. Independent t-test result of the level of leadership resiliency when grouped by sex

Variable	t-value	p-value	Decision
Sex	-1.16	0.25	Accept Null Hypothesis

Concerning the respondents' sex, the p-value exceeds the alpha value ($p=0.25$, $\alpha=0.05$). The leadership resiliency of the respondents was measured and compared by their sex. The comparison was conducted using an independent sample T-test ($t=-1.16$). Thus, there is no significant difference in the respondents' leadership resiliency level when grouped by sex. This finding affirmed the research findings by Reed (2018), which was contrary to that of Marzo et al. (2022) and found a significant difference in resilience across healthcare personnel who were males and females.

These results also aligned with the literature's definition of leadership resiliency. Reed (2018) asserts that under challenging circumstances, leaders who face hardship can demonstrate resilience by resisting giving in to pressure or growing stronger instead. According to Reed et al. (2009, quoted by Reed, 2018), resilient leaders can overcome adversity and see it as a chance for personal development. Leadership resiliency is not contingent on sex but rather on individual and collective attributes (Widya et al., 2022). Resilient leaders can effectively manage resources, maintain facilities, and navigate complex challenges in educational settings (Sebastian et al., 2019; Atasoy, 2020).

Table 15. Kruskal-Wallis test result of the level of leadership resiliency when grouped by designation

Variable	X^2	p-value	Decision
Designation/Position	10.71	0.06	Accept the Null Hypothesis

Meanwhile, regarding the Designation/Position, as seen in Table 15, the calculated X^2 value of the Kruskal Wallis H-Test has a p-value of 0.06, more significant than the alpha value ($\alpha=0.05$). The comparison of leadership resiliency among respondents based on their designation/ position, including Head Teachers I, II, III, IV, and Master Teachers I and II, revealed no significant difference. Therefore, the decision was not to reject the null hypothesis, indicating no significant difference in the respondents' leadership resiliency level when grouped and compared by their designation/position. While the study did not find significant differences in leadership resiliency based on designation/position, the implications for educational leadership are far-reaching. By leveraging these findings to inform targeted support initiatives, leadership development programs, and organizational practices, academic institutions can cultivate a resilient leadership culture that promotes success and well-being across the board (Northouse, 2016).

Table 16. ANOVA F-Test result of the level of leadership resiliency when grouped by educational attainment

Variable	F-value	p-value	Decision
Educational Attainment	0.03	0.97	Accept the null Hypothesis

As seen in Table 16 on the Educational Attainment of respondents, the calculated F-value through analysis of variance (ANOVA) with a p-value of 0.97 was more significant than the alpha value (α=0.05). The respondents' leadership resiliency level was compared by their educational attainment: bachelor's, master's, and doctorate degrees. The decision was to accept the null hypothesis (F=0.03). Thus, there is no significant difference in the respondents ' leadership resiliency level when grouped and compared by their educational attainment.

This finding confirmed the result of the study conducted by Marzo et al. (2021) that there was no statistically significant difference between the educational attainment or level of education among healthcare workers. Furthermore, the affirmation of Northouse's (2016) concept of leadership, which defines it as the ability to persuade a group of individuals to collaborate towards a shared goal, underscores the importance of cohesive teamwork in achieving organizational objectives. While the statistical analysis did not reveal significant variations in leadership resiliency linked to educational attainment, it highlights the universality of resilience as a crucial trait for effective leadership across all educational positions (Northouse, 2016). Despite the lack of statistical differentiation, institutions can play a pivotal role in nurturing resilient leaders capable of navigating complexities and fostering positive transformations within their organizations (Kotok et al., 2021; Darling-Hammond & DePaoli, 2020).

Table 17. Independent t-test result of the level of leadership resiliency when grouped by length of service

Variable	t-value	p-value	Decision
Sex	0.32	0.75	Accept Null Hypothesis

Regarding the Length of Service, as seen in Table 17, the p-value is greater than the alpha value (p=0.25, α=0.05). The respondents' leadership resiliency was measured and compared by their length of service through inferential analysis using an independent sample T-test (t=-1.16). Thus, there is no significant difference in the respondents' leadership resiliency when grouped by their length of service. The findings of this study contribute to the understanding of leadership resiliency, indicating that length of service only significantly influences the level of resilience among educational leaders. Instructional leaders play a crucial role in fostering resilience within their organizations. By demonstrating resilience, instructional leaders inspire and motivate their colleagues to navigate challenges effectively (Eliot, 2020). Self-efficacy, adaptability, optimism, self-sufficiency, and perseverance are essential factors in developing and enhancing resilience among leaders (Batey, 1999; Sharma & Marwaha, 2020; Napire, 2019; Wahyuni et al., 2019).

3.8 Difference in Coaching Strategies When Grouped According to Profile

Table 18. Independent t-test result of the level of coaching strategies when grouped by sex

Variable	t-value	p-value	Decision
Sex	-1.29	0.20	Accept Null Hypothesis

Table 18 shows the independent sample t-test result for mentoring and coaching strategies when grouped by sex. Concerning respondents' sex, the p-value is greater than the alpha value (p=0.20, α=0.05). The mentoring and coaching strategies of the respondents were measured and compared by their sex. The comparison was conducted using an independent sample T-test (t=-1.29). Thus, there is no significant difference in the coaching and mentoring strategies of the respondents when grouped by their sex. This implies that both sexes have almost similar coaching and mentoring strategies. An Instructional leader engages in various pieces of training to prepare them as instructional coaches who cascade what they have learned to their fellow teachers without gender division. Desimone and Pak (2017; Morris, 2023) stated that instructional coaches enhance teacher progress by utilizing active learning strategies and fostering a sense-making process. Training and programs to improve instructional leaders' skills are inclusive and undivided. However, this finding contrasted with the findings of Laureano H. B.'s (2023) investigation. The respondents who are master teachers' levels of coaching and mentoring differed according to sex.

Table 19. Kruskal-Wallis test result of the level of coaching strategies when grouped by designation

Variable	X^2	p-value	Decision
Designation/Position	7.72	0.17	Accept the Null Hypothesis

In addition, the comparison of mentoring and coaching strategies among respondents based on their designation or position, including Head Teacher I, II, III, IV, V, and Master Teacher I and II, was also computed. As seen in Table 19 regarding the Designation/ Position of respondents, the calculated X^2 The Kruskal Wallis H-Test's p-value is 0.17, greater than the alpha value (α=0.05). The findings revealed no significant difference. Therefore, the null hypothesis was accepted, indicating no significant difference in the respondents' coaching and mentoring strategies when grouped and compared by their educational attainment.

This implies that the SDO-Iloilo City has encouraged equal opportunity for all. Instructional leaders with any designation or position have been given equal opportunity to attend seminars and training and improve to make significant changes as professionals. Desimone and Pak (2017; Morris, 2023) state that instructional coaches enhance teacher progress by utilizing active learning strategies and fostering a sense-making process

Table 20 shows the calculated F-value for the respondents' educational attainment through analysis of variance (ANOVA). The table shows a p-value of 0.36 was more significant than the alpha value (α=0.05). The coaching and mentoring strategies of the respondents were compared by their educational attainment: bachelor's, master's, and doctorate degrees. The decision was not to reject the null hypothesis (F=1.04). Thus, there is no significant difference in the mentoring and coaching strategies of the respondents when grouped and compared by their educational attainment.

Table 20. ANOVA F-Test result of the level of coaching strategies when grouped by educational attainment

Variable	F-value	p-value	Decision
Educational Attainment	1.04	0.36	Accept the null Hypothesis

The findings imply that the instructional leaders' mean mentoring and coaching strategy levels were almost identical. Bachelor's degree holders actively engage as master's degree and doctorate holders instructional leaders. They were all competent in the same phase. According to Goleman (2012) and Grant and Hartley (2014), quoted by Peláez, Zuberbuhler, and Matinez (2020), research increasingly demonstrates that being an effective instructional leader also requires being an excellent coach. As Peláez et al. (2020) proceeded to cite Ellinger et al. (2011) and Stehlik et al. (2014), successful leadership and positive workplace cultures are thus becoming increasingly dependent on having strong coaching skills.

Finally, Table 21 presents the independent sample t-test result for mentoring and coaching strategies when grouped by length of service.

Table 21. Independent t-test result of the level of coaching strategies when grouped by length of service

Variable	t-value	p-value	Decision
Sex	-0.28	0.78	Accept Null Hypothesis

As seen in Table 21, when the respondents are grouped according to their length of service, the p-value is greater than the alpha value (p=0.78, α=0.05). The coaching and mentoring strategy of the respondents was measured and compared by their length of service through inferential analysis using an independent sample T-test (t=0.28). Thus, there is no significant difference in the respondents' level of coaching and mentoring strategy when grouped by their length of service. Consequently, the decision was made not to reject the null hypothesis. The findings imply that instructional leaders with shorter or longer experiences yield the same coaching and mentoring strategy. It should be noted that instructional leaders should introduce new strategies before going through a coaching cycle to provide the teacher time to practice and reflect (Garbacz et al., 2015), as cited by Morris (2023). Morris quoted O'Keefe (2017) and stated that while there is no standard amount of time a coach should spend with a teacher, most would concur that more time is preferable to less. The important thing is that the teacher gets assistance throughout time to enable change in practice and becomes a highly proficient teacher.

4.0 Conclusion

The study revealed key insights into the demographic and professional composition of the sample, with a significant sex disproportion and a predominance of Master Teachers I, who hold advanced degrees and possess over a decade of experience. The adversity quotient analysis highlighted "below average" resilience levels for both males and females, with significant differences noted based on designation but not on educational attainment. Interestingly, those with less experience demonstrated higher resilience compared to more experienced counterparts, although leadership resilience was consistently high across all groups. Despite these resilience patterns, there were no notable differences in mentoring and coaching strategies across the demographic profile, suggesting a uniform approach. However, the findings emphasize the need for targeted interventions to bolster resilience among more experienced leaders and refine mentoring and coaching practices.

5.0 Contribution of Authors

The author indicates the only contribution to each section. The finished product was examined and approved by the author.

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Dancing Through Time: Unveiling the Cultural Evolution of Cagayan de Oro's Oro Higalaay Festival

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Abstract. This study investigates the historical background and cultural significance of the Higalaay Street Dancing, a central feature of the Higalaay Festival in Cagayan de Oro City, Philippines. Despite its importance as a cultural celebration, the festival, particularly the street dancing aspect, remains underexplored in existing scholarly literature. This research aims to fill that gap by focusing on the evolution of the Oro Higalaay Street Dance, tracing its transformation from its origins in the Kagayha-an Festival up to the 2023 Oro Higalaay Festival. The festival has grown to emphasize key historical, social, economic, and religious milestones, all honored through its vibrant street dancing tradition. Particularly, the festival pays tribute to St. Augustine, the patron saint of Cagayan de Oro, adding a significant religious dimension to the celebration. The research highlights how the festival has come to symbolize the city's rich cultural and historical values, making it an important avenue for cultural preservation. The study employs a phenomenological research design within a qualitative framework, relying on in-depth interviews, audio recordings, and the transcription of local experiences to gain a deeper understanding of the festival's impact. Through this approach, the study uncovers the role of street dancing not just as a form of entertainment but as a medium for preserving local traditions and fostering cultural pride among the people of Cagayan de Oro and its neighboring communities. The latest version of the street dance features a combination of religious and cultural elements in its choreography, music, attire, and thematic presentations. These elements allow audiences to connect more deeply with the city's heritage while the dance becomes a powerful storytelling vehicle. Ultimately, this research enhances the understanding of the festival's role in sustaining cultural identity and preserving traditions through the dynamic medium of dance.

Keywords: Street dancing; Tableau presentation; Higalaay, Cagayan de Oro.

1.0 Introduction

Culture plays a vital role in society. It is one of the things that make a society unique and special. Culture "refers to the way of life of members of society or groups within a society. It includes how they dress, marriage customs, language, family life, work patterns, religious ceremonies, and leisure pursuits (Giddens, 2001). In addition, it is a form of self-expression that is liberating and empowering. Whether through art, music, fashion, cuisine, or dance, culture allows one to show the world who the members of a society are (Carizal, 2023). How do people maintain their culture? One way is to pass on traditions from generation to generation. According to Carizal (2023), culture is preserved through storytelling, songs, dances, and other forms of traditional expression that form or constitute a society's cultural heritage. People today go back to their cultural heritage to appreciate the past and know how the past has influenced the present (Merriman, 2016).

One way of preserving this is by holding festivals that can be religious, cultural, or both. These festivals play a crucial role in fostering a sense of community, making everyone feel connected and part of a larger whole. There are occasions when the community comes together to express gratitude for benefits received, particularly those related to good health, bountiful harvest, and other positive aspects of life. Festivals are only complete with dancing and other rituals. Dancing at festivals or participating in dance activities encourages social interaction and bonding among family members and the community. It fosters a sense of belonging and unity as people come together to celebrate and share their cultural heritage. According to Olokodana–James (2022), festival dances draw people's culture by portraying the people's way of life through movements, costumes, music, chants, and implements inherent to their place of origin. They may include competitions for individual dances or teams or serve as a cultural event focused on dance. They were anchored on phenomenology as a framework to capture the development of a festival as individuals experience it. The researcher aims to describe the phenomena as they appear to the subject and explore the meaning and significance of these experiences. Furthermore, the Multiculturalism and Salad Bowl Theory highlight how the festival has evolved and is shaped by the blend of cultures in the region. The street dances symbolize the diverse ethnic groups and foreign influences that have inhabited Cagayan de Oro, a city where different communities have coexisted peacefully. This harmony supports this study's application of multiculturalism and the salad bowl theory.

In Cagayan de Oro City, one such festival is the Higalaay Festival, held every last week of August, culminating on August 28, the city fiesta, in honor of the city's patron saint, St. Augustine or Señor San Augustine. The weeklong celebration attracts people from various sectors—businesses, tourists, students, and devotees of St. Augustine— from across Northern Mindanao and different parts of the Philippines. Participants gather to observe or partake in simultaneous events, such as the Garden Show and Agri-Fair, Kumbira Culinary Show, Higalas Parade of Floats and Icons, and the Higalaay Festival Parade, highlighted by the city's street dancing competition, where local barangays compete. This cultural celebration mirrors similar religious festivals worldwide, such as those in India and Turkey, which promote national culture and heritage. As highlighted in the book 'The Importance of Religious Festivals to Promote Cultural Heritage in Turkey and India,' such festivals play a vital role in preserving cultural identity while fostering communal unity, underscoring their significance in local and global contexts.

The Oro Higalaay Festival's street dancing is the main highlight of the fiesta, and it brings the city of Cagayan de Oro to life with colorful performances, upbeat music, and vibrant costumes; these presentations showcase diverse narratives. Held on the eve of the fiesta, the street dancing is a grand spectacle that showcases the rich culture and history of the city. These performances are broadcast on local TV channels, allowing live and remote audiences to enjoy the event. In the past, street dancing was more open-ended. Schools and barangays were free to choose any dance style—whether traditional, modern, or cultural. There was not a specific theme that participants had to follow, so they had the freedom to express themselves in various ways. However, in 2023, the festival Committee decided to bring more structure and meaning to the event. The objective was to explore the city's history, focusing on its original ethnic groups and the foreign rulers who once controlled the region. They introduced a theme that focused on the history of Cagayan de Oro, aiming to teach people about the city's roots through dance. The dances now reflect the diverse groups that have shaped Cagayan de Oro, showing how different cultures have come together and lived in unity. This idea is similar to the "salad bowl" theory of multiculturalism, where various cultures coexist while maintaining their unique traditions, specifically Longley's "salad bowl theory." By doing this, the festival not only entertains but also educates the audience, helping them appreciate the cultural heritage of Cagayan de Oro through the dances that tell the story of its past.

As a native of Cagayan de Oro City, the researcher aims to explore the history and significance of the street dances in the Oro Higalaay Festival, a topic with limited existing literature, particularly on street dancing and tableau presentations. In addition to the points mentioned, there are not enough curated and documented resources. The researcher believes that through the street dance presentation, the people of Cagayan de Oro and its neighboring Municipalities and Cities will come to appreciate their past and cultural heritage, and that the dances of their history or origin will fill in the gap in the history and tradition of the city. In addition, the experiences of the diverse participants – the organizers, the dancers themselves, the choreographers, and all those involved in the activity will also be captured. A study of these dances in terms of theme, expression, dance steps, music, costumes, cultural materials, and choreography will contribute to the upkeep of these dances for the future generation to appreciate and connect/relate these to some cultural change. Thus, this study sought to answer the following questions: "What is the historical background and significance of the Oro Higalaay Festival?" and "What are the cultural and religious elements integrated into the interpretation of the dances in terms of the following theme, expression, and dance steps, music, attire and cultural materials, and choreography (sequence, arrangement, execution, style)?"

2.0 Methodology

2.1 Research Design

This study employed a phenomenological design, a type of qualitative research, to gather information from participants about their lived experiences of the phenomenon. The researcher collected stories from participants to understand their emotions, thoughts, and interpretations of their experiences. The focus was on the street dancing competition of the Oro Higalaay Festival, as experienced by various stakeholders, including consultants, coordinators, musicians, judges, choreographers, and the dancers themselves. Participants were selected through purposive sampling, targeting individuals directly involved in the street dancing competition. Thematic analysis theory was used to identify, analyze, and report patterns (themes) within the data. The information gathered on the dances was categorized based on themes such as expression and dance steps, music, attire and cultural materials, and choreography (sequence, arrangement, execution, and storyline).

2.2 Research Locale

The research was conducted in Cagayan de Oro City, a highly urbanized, first-class city in the Northern Mindanao region of the Philippines. Although geographically situated in Misamis Oriental province, the city operates administratively independently of the provincial government. According to the 2020 census, the city had a population of 728,402, making it the 10th most populous city in the country. Ethnically, around 44% of Cagayan de Oro's household population is of mixed descent, with 22.15% Cebuano, 48% Boholano, and 28.07% from various other ethnic groups, including indigenous peoples from nearby towns and provinces. Additionally, ten selected barangays actively participate in the annual Higalaay Festival street dancing, contributing experiences deeply tied to the city's cultural identity.

The importance of such festivals, as explored by Villones (2020) in the case of the Negros Panaad Festival, reveals how cultural events often reflect the deep religiosity of a community. Much like the Panaad Festival, which is celebrated to give thanks to Divine Providence and prominently features images of saints, the Oro Higalaay Festival in Cagayan de Oro similarly incorporates religious elements, honoring St. Augustine through its street dancing competitions and performances. This interplay of religion and culture in festivals is further emphasized by studies like those of Picard and Robinson (2006) in "Festivals, Tourism and Social Change: Remaking Worlds," highlighting how festivals globally act as platforms for showcasing spiritual devotion and cultural heritage. Picard and Robinson's work provides a broader comparative framework to understand better how festivals like Higalaay celebrate local identity and align with global traditions that fuse religious practices with cultural expression.

In both cases, these festivals become a conduit for community cohesion, fostering unity among diverse ethnic groups while drawing from a shared religious foundation. This broader context highlights the significance of the Higalaay Festival not only as a local event but also as part of a global tradition of festivals that intertwine religious observance with cultural heritage, as supported by scholarly literature across different regions.

2.3 Research Participants

Cagayan de Oro City and some selected barangays were the location of the research. Ten (10) barangays joined the street festival dancing every year and had acquired experiences with the same phenomenon. Individuals selected to participate in the study were expected to have significant and meaningful experiences of the phenomenon being investigated (Cresswell, 2007; Moustakas, 1994). The researcher selected the participants who could provide the best information to achieve the answer to the study and actively participated in street dancing for at least one year. Three Consultants were the facilitators for the conceptualization of the Oro Higalaay Street Dancing; Three of the Coordinators were organizers committee of the street dancing; Four Choreographers who conceptualized the art of dance movement; Two Musicians who played indigenous musical instruments; Costume designers also choreographers who created costumes for the dancers that are relevant to the theme. Two Performers are members of a certain barangay's contingent, and one qualified Judge is knowledgeable about cultural significance, theme interpretation, and consistent criteria application and can also provide constructive feedback.

2.4 Research Instrument

Using a semistructured questionnaire, this study encouraged participants to openly discuss their thoughts, feelings, and experiences. To ensure significant findings, the researcher collected relevant data. The researcher developed the interview guide questions, underwent pilot testing, and were reviewed and modified by the researcher. Additionally, an external validator, a member of the NCCA-speaker bureau in street dancing and assisted by a city tourism operation officer, verified the questions. Different open-ended questions were tailored for the various groups of participants. For example, consultants were asked, "Why does Fiesta matter so much to the culture, traditions, and community life of Cagayan de Oro?" as coordinators and event heads were asked, "How do organizers assess the success and impact of the street dancing and tableau presentation as the festival highlight?"

2.5 Data Analysis

To fully comprehend the data, the researcher followed the six phases of thematic analysis by Braun and Clarke in 2006. I rigorously reviewed it multiple times, took comprehensive notes, and employed coding to highlight crucial features. They have proactively identified emerging patterns by grouping similar data points and organizing codes into a coherent framework. After thorough verification, the themes were clearly defined and labeled the themes, adding precision to the final report. The report seamlessly integrated the analysis narrative with concrete data examples for a robust discussion.

2.6 Data Gathering Procedure

For this study, the primary data collection method was through in-depth interviews with the three key informants and other twelve participants who played a role in the street dancing. Before data gathering, the researcher applied for research ethics at Xavier University-Ateneo de Cagayan. The purpose of these interviews was to gain an understanding of the shared meaning that individuals attributed to the phenomenon. Participants selected for this study had significant experiences related to the phenomenon. The researcher arranged interviews with each participant. When the participant could not attend the scheduled interview, he/she had the option to reschedule them. Permission was granted to record the interviews and to take notes during the interview. Data were collected from in-depth interviews, audio recordings, and transcribing. Codes were assigned to participants to maintain confidentiality.

2.7 Ethical Considerations

There was no possibility of infringing on the participants' privacy, as measures were in place to guarantee and uphold confidentiality as mandated by the university's ethical regulations. There was no conflict of interest, and the ethical standards of the institutional committee ensured that ethics remained a priority throughout the study. Confidentiality, privacy, and anonymity were rigorously maintained throughout collecting, storing, and publishing research materials. The participants were kept anonymous, and their inclusion in this study was strictly voluntary. Participants were allowed to withdraw from the study at any point in time.

3.0 Results and Discussion

3.1 Historical Background and Significance of Oro Higalaay Festival

Table 1 illustrates the development of the Oro Higalaay Festival. The festival and street dance are integral parts of the respective communities' cultural heritage. This dance is significant as it reflects the region's history and culture. The current Oro Higalaay Festival in Cagayan de Oro has evolved through the years in terms of theme: from Kagayha-an Festival: Cultural presentation (1995 and 1996); Kagay-an Festival: Cultural open competition (1997); KaroTawo Festival: Dancers with Hand props; Higalaay Kagay-an Festival: Carnival Street Parade (2014-2022); Oro Higalaay Festival: Showdown of the street Dance Competition (2023-present). Higalaay is the center of the Various Dance Themes, outlining the central message, concept, or narrative that dance performance seeks to convey. It often reflects the dance's cultural, historical, or artistic significance.

Table 1. Thematic analysis of the historical background and significance of the current Oro Higalaay Festival

Theme	Description	Quotations	Significance
Kagayha-an Festival: Cultural Presentation	This refers to the City Fiesta celebration in Honor of the Patron Saint, started in 1995	"The Indigenous people reacted on the meaning of the festival which means shame" CN003	Revealed that they were uncomfortable with Kagayha-an festival name
Kagay-an Festival: Cultural Open Competition	Kagay is a local term for the sound of the ripples of water in the river, which started in 1997.	"It does not give any identity of the locality of the city." CN002	The event honors the Cagayan de Oro River, underscoring its importance to the community and its enduring bond with nature.
Karo-Tawo Festival: Dancers with hand props	It entails forming a float with hand props, symbolizing the icons of Cagayan de Oro; started in 2008	"Instead of making a float, dancers act as a float in forming the different icons" CN001	Depicts Cagayan de Oro's legends, myths, and history.
Higalaay Festival: Carnival Street Parade	This refers to a festival of merrymaking that started in 2014 before Lent.	"not a copycat from Kaamulan, just to have merry-making in the streets of Divisoria." CN001	No specific theme; created a logo but no connection to the celebration of Cagayan de Oro Fiesta.
Oro Higalaay Festival: Showdown of the Street Dance Competition	This festival focuses on the city's rich history and current dynamics, including its social, economic, and religious achievements, expressing gratitude and appreciation for these milestones. This was started in 2023	"Oro Higalaay because of the golden friendship" CD005	Emphasizes the historical and cultural values of the city. A much more organized Festival.

Kagayha-an Festival: Cultural Presentation

The Kagayha-an Festival, originally held in honor of St. Augustine, featured cultural presentations reflecting the region's heritage, using tableau performances to express emotions and cultural motifs in street dancing. Over time, the event evolved to emphasize choreographed movements portraying cultural themes. However, in the mid1990s, members of the Indigenous people community expressed discomfort with the festival's name, as "Kagayhaan" was interpreted as meaning "shame," prompting calls for a name change. Here is some feedback

'*Kagayha-an means shame or ashamed, Kagaya-an is the source of shame).*' (CN001)
'*A big shame on our part to continue a festival with that name.*'(CN004)

Furthermore, the festival's name was changed to promote a more respectful and inclusive environment for everyone involved. This decision highlighted the value of community feedback in shaping the event. By embracing this input, the festival has remained a platform for celebrating and preserving the diverse cultural heritage of Cagayan de Oro and its neighboring areas. The festival's theme also changed in 1997.

Kagay-an Festival Cultural Open Competition

An open competition featured a variety of dance styles, allowing for free interpretation of the concept of merrymaking to honor and express gratitude to God through St. Augustine. The festival's new name and theme drew inspiration from Carnival, with the dancers' graceful arm movements and the harmonious sounds of the instruments compared to "*the sound of a river, much like fallen spoons and forks on the ground*" (*CN002*). However, this approach was short-lived, as many individuals and organizations raised concerns about using Carnival as an inspiration. Carnival, a festive period celebrated in many Roman Catholic countries just before Lent, did not align with the traditional purpose of the event, which honors St. Augustine on August 28th. Due to these objections, the festival faced criticism for being associated with Carnival. The following are some statements of the following pieces of information:

'*It is important to change the name of the festivals; Our City fiesta falls in August.*' (CN003)
'*The celebration must be rooted with faith and religious connections integral to the community.*' (CD006)

The revised festival continues to honor the patron saint while preserving its cultural significance. It includes a tribute to the Cagayan de Oro River, symbolizing the community's lasting bond with its environment. This time, the festival committee decided to develop a new theme. They asked the organizers to make the dancers/participants form a human float (Karo) as they dance in the streets.

Karo-Tawo Festival: Dancers with hand props
This street dance features groups of dancers who come together to form a float while performing. Using hand props, they create icons representing Cagayan de Oro's history, legends, and myths. Among these are symbols like the mythical Goldfish and formations depicting transportation methods, such as the motorela, invented by a Kagayanon and still used today. Other representations include the MacArthur cap in Macabalan, the American period, and the Nawasa Tank from the Spanish era. Additionally, props like fish traps highlight traditional livelihoods. More details on the City Dance Festival's performance can be found in the quotes below.

"Karo means float; instead of creating a float, dancers act as a float in forming the different icons of CDO, which is unique to this festival." CN003
"The performers were given specific counting to form variations of formations on the suggested city icons." (CN001)

The Karo Tawo festival was open to all without guidelines, creating a "free for all" atmosphere. One participant noted,

"*As a freelance choreographer, I will be recreating their dance routine from a previous street dance competition I have attended.*" (CC0012)

This highlights how the lack of clear festival themes impacts the authenticity and diversity of performances. Over the years, administrative shifts have also changed the city's festival identity, with the Karo-Tawo being renamed the Higalaay Kagay-an Festival.

Higalaay Festival: Carnival Street Parade
The Cagayan de Oro Carnival Parade is a street dancing competition where city barangays compete for the Best Carnival Parade title, aiming to create a festive and joyful atmosphere. While there are no strict dance guidelines, performances must promote peace and economic growth. The organizing committee has shifted the theme to make it more vibrant and uplifting for everyone. Additionally, the Carnival of Cultures celebrates the creativity of artists, giving fresh meaning to folk arts. Participants expressed their excitement for the event and its cultural significance. Interviewees highlighted the city's branding as the "City of Golden Friendship," with "Higalaay" symbolizing friendship. Although some felt the performances lacked clear direction, they were enjoyed for their carefree spirit. The committee's goal was to use the festival to bring happiness to people from all walks of life. To develop a bigger, better, and more meaningful fiesta celebration, the 2023 Fiesta Committee dubbed the fiesta celebration Higalaay 2023.

Oro Higalaay Street Dance Festival and Competition
A key aspect of the event is to center the dance and festival concept around Cagayan de Oro's rich history, highlighting its social, economic, religious, and historical milestones, with a special focus on honoring Saint Augustine, the city's patron saint, for his continued protection of the Cagayanons and visitors. The proposed structure of the Higalaay Festival traces Cagayan de Oro's history across different eras, including the Higaonon, Maranao, Spanish, and American-Japanese periods. The feedback below reflects its historical significance, cultural representation, and important milestones.

"Non-negotiable is to venerate St. Augustine and the chanting for the patron Saint." CN002
"From what I had known and read in a history book when the Spaniards came, they found rich deposits in Sitio Munigi and Pigtao and also in the sand beds of the river. Because of this, the conquerors consequently named it Cagayan de Oro." CN003

Furthermore, performances follow a storyline from the city's origins to the establishment of the Oro Higalaay Street Dance, emphasizing the spread of Christianity and the shaping of the city's identity. The festival is evaluated on three key aspects, as seen in the following feedback.

"Cultural-first inhabitant community in Himologan were, the Higaonon then the milestone- now it is CDO in progress." CN003
"Unlike previous street dancing competitions, this one failed to showcase cultural identities. The Carnival theme did not represent the Cagayanons." CD004

Hence, these festivals are not just gatherings; they are celebrations deeply rooted in the city's rich heritage and history. They pay tribute to the patron saint, St.Augustine, and Our Lady of the Fortress, who defended the village from Moro raids in the 1600s. These events showcase the fundamental values of faith, unity, and friendship that bind the community together. This is supported by Eddy (2016), who mentions that dance can also be used to find a solution to conflict and enhance tolerance and connections, aiding in peace and harmony. The following feedback emphasizes friendship because of Higalaay:

"We included the Our Lady of the Fortress apparition as part of our dance routine." CC003
"There is a storyline you need to hit, specifically the nine steps that should be executed during the performances." PF0011

3.2 Cultural and Religious Elements Integrated in the Interpretation of the Dances

Table 2. Thematic analysis of the cultural and religious elements integrated into the interpretation of the dances

Elements	Cultural elements	Quotations	Religious elements	Quotations
Theme	First settlers, Himologan Golden Fish or the Mythical fish	"Higaunon inhabitants, headed by Datu Salangsang" CN001 "A Goldfish that stays at the bottom of the river near the Cathedral church. The mineral deposit on the scales turned out to be gold." CN002	Our Lady of the Fortress apparition Celebrating the feast day of St. Augustine, patron saint of the city	"Aid in the freedom from attack/raids ." PF0011 "The festival pays homage to the city's patron saint. CN003
Expression Dance steps	Facial, body language, and gestures physical gestures in the articulation of the nine(9) steps in the major streets of Cagayan de Oro.	" handshaking as a gesture of friendliness" CN002 "Riding a Motorela steps"CN004	Friend/Handshaking Veneration to the Patron	"it manifested the friendship gesture. CN002 "It truly captures the essence of praising St. Augustine"PF0010
Music	Cultural instruments use traditional instruments.	"Do not forget to listen to the music that serves as the festival's heartbeat."MC007	Still developing	"I haven't focused on the religious meaning of the dance, only focused on the music."MC008
Attire and cultural Materials	The dominant color of the costume and other materials should be gold	"Not allowed to follow the diamond design; the acceptable design is a triangle for attires."CC0014	The crucifix is used for adornment	"Headdress of the performers was inspired by the hat of St. Augustine."CD006
Choreography	The art of creating dance routine for a certain dance genre.	"The sequence of dances should have a historical basis for the performance."CC001 5	The historical context from Our Lady of the Fortress and Veneration of St. Augustine	"Non-negotiable requirement is the resemblance to St. Augustine, not a statue as a sign of adoration." CC003

Higalaay is the Center of the Various Dance Themes

Themes in street dancing often intertwine cultural and religious elements, enriching the interpretation of the dances. This fusion showcases the diversity of traditions and serves as a means of cultural expression and celebration. By incorporating cultural and religious symbols, street dances become powerful vehicles for conveying deeper meanings and connecting performers and audiences to their heritage and beliefs. Gabao (2007) mentions how dance forms mirror the period's culture and reflect the society's political, social, intellectual, and religious nature. One such example is the acknowledgment of Cagayan de Oro's River as a source of gold:

"*The Gold panning step, a traditional Kagay-anon method of gathering gold, remains integral to sustaining communities, symbolizing the river's profound influence on their livelihood and significance in their lives.*" (CC0013)

Dance Steps Reflecting the Past and Present

Cultural street dance performances convey a sense of identity, pride, and storytelling (Ehrenreich, 2007). In dance, expression utilizes body, facial expressions, and gestures to communicate, while dance steps are the physical gestures employed (Camurri et al., 2004). Their integration creates captivating performances with potential audience impact and personal connection to the dance and its cultural context. In the 2023 Oro Higalaay Street Dance Festival and Competitions, the organizing committee came up with rules that were to be followed by the participating groups in their dance presentations: The performers have to articulate nine (9) basic steps as they pass through the major streets of Cagayan de Oro during the date of the competition, from the Rotunda down to the Pelaez Sports Center, the final venue for the tableau presentation. The steps were to serve as icons of the city's dance festival. They must be incorporated into the street and tableau presentations to give substance to the event's purpose and educate the Kagay-anons and guests on the richness of the culture, history, the city's unprecedented progress and development, and the representation of the Cagayan River.

The nine basic steps include: 1.) Kagay steps. They represent the ripples of the Cagayan de Oro River/small but bouncing waters. They represent the events created by the history of people's struggles, heroism, and contributions to a better CDO. 2.) Suba or Kagay Steps. They are a combination of small and big waves of change rushing to the mainstream of the riverbed, especially during the rainy season. The future is always flowing (significance of the river to Kagay-anons). 3.) Kugtong Step. It is a slow but graceful imitation of the movements of the mythical golden fish that played a vital role in the history of the river with the following variations: Pangisda and panarap (fish trap) - livelihood and River activity such as swimming/fishing/communing with nature community and its relationship with nature, a call and need for sustainable development. 4.) Lukso sa Bato ug Lusong sa sulog sa tubig. It is a playful movement of the fisher folks, especially when crossing the river and adjusting to the natural landscape of the riverbed. Thus, balance is necessary, and jumping from one rock to another is inevitable. It speaks about the resiliency of the Kagay-anons. 5.) Dulang sa Bulawan or Gold Panning. This is a very prominent and traditional Kagay-anon way of gathering gold that played a significant role in sustaining the lives of its people. Today, it is still being practiced in the upper river barangays to manifest how the river has nurtured them and made their lives more meaningful. It is a mirror of the local's sense of entrepreneurship and resourcefulness. 6.) Bugsay sa Kagay. It is the pride of the city: The One Town, One Product of Cagayan de Oro that has given life to its popularity as one of the country's tourism highways for adventure activities and, most of all, being declared as the White-Water Rafting Capital of the Philippines. The River Tourism program shapes the City's identity. 7.) Sakay sa Rela. It is a unique and important icon of the city that exemplifies the artistry, innovativeness, and skills of the Kagay-anon people (invented by Mr Rafel Diaz Floirendo). Motorela, or Rela, is a familiar figure traversing the city streets, making people's lives easy and convenient. Cagayan de Oro has a high sense of artistry and creativity and a drive to move forward. 8.) Higala/Amigo Kumusta. This is a gesture of friendliness extended to anyone visiting the city with a ready, helping hand and a genuine smile, thus substantiating the city's claim as the City of Golden Friendship. 9.) Viva Sr. San Augustine. These movements depict thanksgiving and veneration to the Patron Saint of the City, Saint Augustine, for embracing and protecting the people throughout these years with all those challenges, including natural calamities that have wreaked havoc on the entire community. This is also to thank Him for his constant guidance and inspiration to the Kagay-anons, especially in sustaining the Christian Faith. It symbolizes the gratitude to the patron Saint Augustine.

In connection with the nine steps articulated in the Oro Higalaay Street Dance Competition presentation, the cultural elements symbolize language, as the performers deliver chants as a way of praising and protection. These signify that cultural elements and the nine steps are intangible, while cultural materials are tangible, represented by props and accessories. Religious elements in street dancing can profoundly influence the expression and meaning conveyed through the dance (Gaston & Gaston, 2014). Incorporating religious motifs, symbols, or narratives into choreography adds layers of significance and depth to the performance. For dancers who share the same religious beliefs, these elements may serve as a spiritual expression, allowing them to connect more deeply with the dance and its message. In essence, religious elements in street dancing matter because they enrich the expression of the dance, imbuing it with deeper meaning, cultural resonance, and emotional power.

Finding a Unique Sound

Integrating music into religious street dancing is essential in enhancing the participants' spiritual journey, fostering community unity, and preserving cultural heritage. During the composition process for the Higalaay

Festival, a significant emphasis was placed on the intricate relationship between music and dance, and through consultations and workshops organized by the Department of Tourism Region 10, renowned experts, including festival directors and musicians, gathered to explore the fusion of traditional instruments such as dabakan, agong, gong, kulintang, kawayan, bamboo flute, and kubing. This is made apparent in one of the responses,

"Historical references were based on the existing traditions; we then enhanced it. For example, we used kulintag, agong for the Moro dances, and dabakan for the Higaonon dances." (MC007)

These instruments were meticulously arranged according to their respective rhythmic patterns, drawing inspiration from the Higaonon style of music. Throughout this collaborative endeavor, various comments surfaced, reflecting the dedication and creativity required in crafting a unique musical arrangement that resonates with the essence of the festival. For instance, one musician mentioned,

"If the choreographers create dance steps that mimic the waves of the river, then we look for an instrument that would make wave sounds., another added, "We use a rainmaker indigenous instrument to create sound waves." (MC008)

In indigenous dance, the music is very important because it reflects the community's culture and traditions (Kaeppler, 2000). They use traditional instruments and rhythms that have existed for a long time. This music is not just background noise—it helps tell stories and make the dance more emotionally laden. For indigenous people, music is a big part of their lives—how they communicate, keep their culture alive, and express their spirituality (Diamond et al., 1994). Their instruments, like drums or flutes, depend on their specific customs and history. The music often sounds like nature, with rhythms and melodies that remind them of the forests, rivers, or animals. So, when one watches indigenous dance, the music is like a window into their culture and connection to the land. It makes the performance look real and meaningful.

Meaningful Attire and Use of Cultural Materials
Street dance competitions allow dancers to showcase their skills and creativity. However, not just the dance moves make a performance stand out. The clothing and accessories worn by dancers can be instrumental in telling their story and reflecting their cultural background. For instance, an interviewee mentions

Attires get inspiration from Higaonons by using some accents, patterns, and colors like red, white, yellow, and black. These colors are the basis for the transition of dances to transform these colors to gold." (CC0015)

In these competitions, most dancers often wear attire that holds deep religious or cultural significance. For example, they may adorn themselves with beads, crosses, shells, or other religious symbols to express their faith. The clothing they choose, including the colors and patterns, can also represent their cultural heritage and convey a sense of pride in their identity. Dancers also often incorporate props or objects significant to the cultural or religious traditions in their performances (Dibia & Ballinger, 2012). For instance, one costume designer mentioned the use of hand props – a golden 'Oro' fish and a headdress, which was inspired by the bishop's hat worn by St. Augustine (CC0013). These items, such as traditional handicrafts or scarves, reflect the community and environment of the performers and add authenticity to their performance. This also allows viewers to gain insight into the cultural background of the dances.

There are also allusions made to Cagayan de Oro's rich history. One pertains to how the first settlers lived in a village along the bank of the Taguanaw River, eight kilometers south of Cagayan. They later moved to the bank of the Kalambagohan River, where Cagayan now stands, and named their settlement Kalambagohan after the lambago trees that grew abundantly on the riverbanks. Therefore, Cagayan's first name was Kalambagohan. A participant mentioned how they *"…use accents of gold inspired by Lambago trees as backdrop and props."* (CC0015)

But not just the Lambago trees make the 'City of Golden Friendship' golden (Villa, 2020). Gold deposits have previously been found in the Cagayan de Oro River (Almaden, 2014), and several of the contingents use this history as inspiration as they *"…. used chairs to create stones, a flat round-shaped rice winnower for gold panning."* (CC006)

Some props also allude to the conversion of Cagayan de Oro's Indigenous population, as one participant mentioned how they
"…brought a big crucifix to signify the Christianization of the Indigenous people." (CC0013)

Aside from Christianity, Cagayan de Oro was also fraught with encounters from their neighboring Moro warriors. These also inspired some costume and props designers to *"…use traditional materials as shields and spears in the fighting scene between the Higaonon and the Moros."* (CC0014)

As a trading center, Cagayan de Oro has also hosted various businessmen of diverse nationalities (Satur, 2018). Some of the most influential business figures in the city are Chinese, and their ties to the city go back decades. Their influence is also apparent in some participants' choice of costume, as one contingent *"…brought pineapples as props to symbolize luck and loyalty."* (CC0014)

However, there are also instances when the attire is not uniquely Kagay-anon,

"Some attire/ costumes were borrowed or rented from other festivals. They just made some innovations in some details, renovating the costumes just to suit the celebration of the street dance." (JD0013)

After careful consideration, it is evident that the clothing and accessories used by street dance competitors are not simply superficial decorations. Rather, they serve as a mode of self-expression, allowing the performers to display their individuality and cultural heritage (Jaimangal-Jones et al., 2015). By integrating traditional materials into their performances as props, dancers imbue their routines with a greater sense of significance and authenticity, which resonates with their audience on a deeper level.

Integrating Culture into Routines
Street dance festivals have evolved to creatively integrate historical and religious elements, cultural narratives, rituals, and symbolism into their routines. This adds depth and meaning to performances, connecting dances with their heritage while captivating audiences with powerful storytelling through movement. Incorporating nine steps can guide the storyline of the dance routine of the story of Cagayan de Oro, and it should follow the three communities framed from the storyboard. Several participants have mentioned how these nine steps are essential in the presentation, alongside the water rafting site, OTOP, and a way to paddle the river in the water rafting. Each presentation should be relevant to the story and have a connection to the city. As one participant mentioned,

"Before rehearsal, our choreographer oriented the whole team on each figure and its connection to our city's history." (PF0010)

Often, this takes a lot of time and effort on the participating troupe's end, as *"…there is the presence of dynamism in the way we move; it took us three weeks to grasp and internalize the proper movements."* (CC0014)

During the presentation, some presenters used modernized chants to tell stories in an organized and structured manner. They also included a traditional music piece for the Higaonon tribe, using a standard music pattern. A jingle for contemporary dance was also included to add creativity and a modern touch. Basic figures for the Higaonun steps, such as 'basic steps from Higaonon, are also incorporated. The performance can begin with the community, war, or struggle/conflict movement and follow the historical storyline. It can incorporate dance depicting the three major cultures—Higaonon, Maranao, and Bisaya. The sequence of the three communities can be started with a variation of dances, and then the storyline can follow. As with the costume, Cagayan de Oro's historical context is also considered in the choreography; as one participant mentioned,

"All storylines should adhere to the given storyboard as their frame of what is happening the first exposition of the tribe until the Spaniards came and spread Christianity." (CN001)

Aside from the Spanish colonization, there is also the mention of the myth of the Oro fish, *"It felt so good to know the story of Cagayan de Oro, how it started, and its progress; the challenging part is the connection of the goldfish to the term Oro. Anyway, it is a legend and mythical."* (CC0013)

Alternatively, the sequence can be switched depending on how the concept of the choreography is delivered. The challenge for choreographers is to be adaptive; as a choreographer mentions,

"As a traveler choreographer in different places, in May, when I joined the competition, I realized there was a need to adopt another style (festival); it is also trending with the hope that we will win in the competition." (CC0015)

Adaptability also calls for research and creativity (Meneely & Portillo, 2005). As another choreographer mentioned,

"Do not just rely on the workshop but research, add more knowledge, go deeper into the original roots, get more information through oral traditions in some places to enhance the dance routine and knowledge." (CC0012)

While a lot of the choreographers insist that they have incorporated Kagay-anon steps and choreography, those more critical also recognize how *"…some of the choreography does not portray Kagay-anon; they take inspiration from different festivals."* (JD0013)

4.0 Conclusion

The primary goal of this study is to investigate the historical background and cultural importance of the Higalaay Festival's street dancing, including the tableau presentation. Due to the scarcity of resources and documentation on this particular aspect of the festival, the study seeks to emphasize how these performances can enrich the understanding of Cagayan de Oro's history and cultural heritage while filling gaps in the city's documented traditions and historical accounts. This study will fill the gap in the existing literature by illustrating how the Higalaay street dances serve as a medium to reflect and communicate the city's cultural evolution. By portraying the different eras—under the Indigenous people (Higaonon, Muslims), Spaniards, Japanese, and Americans—through dance, this research will provide a deeper understanding of how these historical influences have shaped Cagayan de Oro's identity. This approach will offer new insights into how performance art, particularly dance, can be used to bridge the gaps in documenting and preserving the city's rich, yet underrepresented, cultural history.

Cultural and religious elements have been integrated into the interpretation of the dances included in street dancing. These are theme; expression and dance steps; music; attire and cultural materials; and choreography which includes sequence, arrangements, execution, and style. Themes in street dancing often intertwine cultural and religious elements, thus enriching the interpretation of dances. Another element integrated into the interpretation of dances is the expression and dance steps. In dance, expression makes use of body, facial expressions, and gestures to communicate, while dance steps refer to the use of physical gestures. In the 2023 Oro Higalaay Street Dance, the organizing committee declared that the performers had to articulate nine (9) basic steps as they danced through the city streets. Music is another element considered in the interpretation of dances. Integrating music into street dancing making use of the traditional elements, is essential in enhancing the spiritual journey, fostering community unity, and preserving cultural heritage. Attire and cultural materials compose another element. The clothing and accessories worn by dancers are instrumental in telling their stories and in reflecting their cultural background. The fifth element integrated into the interpretation of the dancers is choreography, which includes sequence, arrangement, execution, and style. Choreography adds depth and meaning to performances, connecting dances with their heritage while captivating audiences with powerful storytelling through movement. Street dancing does not only improve the dancers' personality but, at the same time, reflects the history and culture of the city. The public will understand and appreciate the evolution of the culture of the city that was once under a community of Indigenous people, the Muslims, the Spaniards, the Japanese, and the Americans through the dances that portray the different eras. Through street dancing, local tradition, culture, and expression can be preserved.

The study is anchored on the theory of Multiculturalism, specifically the salad bowl theory. The salad bowl theory deals with a heterogeneous society in which people coexist but retain at least some of the unique characteristics of their traditional culture. Different cultures are brought together but retain their distinct flavors. In this study, multiculturalism is represented through the street dances that showcase those that have been attributed to the different ethnic tribes and foreign conquerors that once inhabited Cagayan de Oro. Cagayan de Oro represents a multicultural community. It has been inhabited by different ethnic groups/tribes and some foreign "conquerors" who have managed to live harmoniously. Thus, the salad bowl theory of multiculturalism is confirmed in this study.

Some limitations in this study warrant further research. The CDO Higalaay Festival Committee is encouraged to orient participants in street dancing on the history, origin, and cultural significance of the dances they will perform, ensuring a deeper understanding of their contribution to the local heritage. Additionally, Physical Education (PE) departments in colleges and universities should consider offering street dancing alongside traditional sports to broaden students' appreciation of cultural expression. It is also recommended that the local government enact an ordinance to sustain the Oro Higalaay Street Dance, preserving its cultural relevance. Future researchers may replicate this study in other contexts by examining other Philippine festivals that integrate historical and cultural themes in their street performances. This allows for a comparative analysis of how history is represented through dance.

5.0 Contributions of Authors

The authors confirm their contribution to the paper as follows: Artazo, A -study conception, data collection, analysis and interpretation of the result, draft manuscript preparation. Tolod, L – initial conceptualization, advising, and research direction. Manaois, J -editing, writing, supervising.

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The authors declare no conflict of interest with the publication of this paper.

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Quality Management System Practices among Higher Education Institutions in Region XII, Philippines

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Abstract. Quality Management System (QMS) is a structured framework or set of processes and procedures an organization implements to consistently deliver educational services and administrative processes that meet or exceed established quality standards. This study examined the QMS practices among Higher Education Institutions (HEIs) in Region XII, Philippines. Using an embedded mixed-method research design, data were collected through surveys and interviews with deans, faculty, students, and quality assurance directors. Descriptive and inferential statistics were used to treat the quantitative data, while thematic analysis was employed to analyze the qualitative data. The quantitative results initially indicated that the private and public HEIs mostly practice the implementation substantially and consistently, indicating that the majority of instances or situations involve the application of the practice, demonstrating a commendable level of adherence. Qualitative probes elaborated on various QMS practices employed by private and public HEIs related to leading, planning, engaging, empowering, cultivating, and governing. Moreover, the quantitative results revealed that the QMS practices are the same across HEIs regardless of categories and groups of respondents. With this result, typical features of QMS practices employed by private and public HEIs uncovered in the qualitative results encompass leadership and governance support, policy development, implementation, academic support, academic environment, and data quality management. The overall outcomes of this research are the proposed policy recommendations to enhance QMS practices in HEIs, highlighting components related to communication, performance monitoring and analysis, stakeholder engagement and feedback, transparency and accountability, benchmarking and competitive analysis, professional development, and well-being. The research findings imply that by adopting and enhancing QMS practices, HEIs can significantly improve educational outcomes, stakeholder satisfaction, and institutional reputation, ultimately fostering a culture of continuous improvement and accountability within the academic environment.

Keywords: Educational management; Quality management system practices; Embedded mixed-method research design; Philippines.

1.0 Introduction

The Sustainable Development Plan for 2030 prioritizes inclusive, high-quality education globally, aiming for universal access to primary, secondary, and higher education. The pursuit of quality education is a pressing issue in the Philippines, where the rapid expansion of higher education institutions (HEIs) has led to increased competition and varying standards of educational quality. Despite establishing the Commission on Higher Education (CHED) through the Higher Education Act of 1994, which aims to enhance educational standards, many institutions still struggle to implement effective Quality Management Systems (QMS) that ensure compliance with international standards. Quality education is crucial for individual student success and national development, as it directly impacts workforce readiness and economic growth.

Previous studies have explored various aspects of QMS in higher education, such as the role of leadership in fostering a culture of quality (Bryson et al., 2018) and the importance of systematic policy development (Weldeslassie, 2021). However, these studies often overlook the perspectives of key stakeholders, including students, faculty, and administrators, which are essential for a comprehensive understanding of QMS practices. Furthermore, while some research has focused on specific institutions or regions, there is a lack of comparative studies that examine QMS practices across diverse HEIs in the Philippines, particularly in Region XII.

This study aims to bridge these gaps by providing a detailed analysis of current QMS practices in selected HEIs in Region XII, highlighting these institutions' unique challenges and opportunities. By integrating quantitative and qualitative data, this research offers a nuanced understanding of how QMS can be effectively implemented to enhance educational quality. The significance of this research lies in its potential to inform policy recommendations that can lead to improved QMS practices, ultimately contributing to the overall enhancement of educational outcomes and institutional reputation in the region.

2.0 Methodology

2.1 Research Design

The study employed an embedded mixed-method research design, concurrently integrating quantitative and qualitative data, with the quantitative method taking precedence. This approach, as highlighted by Creswell (2021), leverages the strengths of both methods to provide a comprehensive understanding of research questions. The study innovated upon traditional correlation and experimental models by introducing a comparative design, embedding qualitative interview insights into the primary quantitative framework (Cahapay, 2020).

Quantitative data was collected via surveys administered to students, faculty, and deans, capturing perceptions of QMS practices in HEIs. This provided a numerical overview, highlighting significant differences in perceptions across various groups. Concurrently, qualitative data from key informant interviews with faculty, deans, students, and QA/QMS directors offered deeper insights into QMS practices.

Quantitative and qualitative data integration occurred during the interpretation and discussion stages, leading to a comprehensive synthesis of findings. This embedded-comparative approach enriched the study with diverse perspectives, ensuring a thorough exploration of the research question. The combined analysis generated robust policy recommendations by offering a nuanced understanding of the challenges and opportunities within QMS practices among HEIs in Region XII.

2.2 Research Locale

The study strategically focused on four HEIs in Region XII (SOCSKSARGEN Region) to capture the diversity in QMS practices across various localities and cultural settings. The selected institutions were the University of Southern Mindanao (USM) in Kabacan, Cotabato; Sultan Kudarat State University (SKSU) in Tacurong City, Sultan Kudarat; St. Alexius College (SAC) in Koronadal City; and Holy Trinity College (HTC) in General Santos City. The inclusion criteria required HEIs to have achieved at least Level II in SUC Levelling/ISO 9001:2015 certification or held PAASCU accreditation, ensuring a high standard of quality and compliance.

2.3 Research Participants

The study involved 674 respondents for the quantitative phase, which included randomly selected faculty with at least five years of tenure, deans with a minimum of two years of service, QA/QMS directors, and graduating students from four HEIs in Region XII using Cochran's Formula and Stratified Proportional Allocation Sampling Technique. A 5% precision level, 95% confidence level, and 5% estimated proportion were employed. Due to their limited numbers, QA/QMS directors and deans were selected via total enumeration.

For the qualitative phase, 16 key informants were selected for interviews, ensuring a diverse representation of perspectives. This included one QA/QMS director, faculty regent or association president, dean responsible for accredited programs, and student regent from each institution. This method ensured a comprehensive understanding of QA/QMS practices across the institutions.

2.4 Research Instrument

The study aimed to evaluate QMS practices within four HEIs in Region XII using a meticulously crafted survey questionnaire based on the Malcolm Baldrige Award Application Guidelines and insights from Naanep (2021). The questionnaire was validated by a research adviser, a panel of experts, and five test construction specialists, who provided feedback to enhance its quality. An expert assessment affirmed the instrument's validity, while a pilot test at Central Mindanao University, Bukidnon, yielded a Cronbach's alpha of 0.98, indicating excellent reliability. The questionnaire employed a five-point Likert scale to measure respondents' ratings on the seven Baldrige Education Criteria for Performance Excellence across three sections, capturing comprehensive data on QMS practices. Additionally, for the qualitative phase, the research utilized the researcher-made interview guide questions to gather in-depth insights from the selected key informants, further enriching the study's findings.

2.5 Data Gathering Procedure

The data-gathering phase was conducted face-to-face (f2f) and online to ensure comprehensive coverage and accessibility for all participants. For the quantitative phase, the survey questionnaires were distributed in person at the selected HEIs, with the assistance of the Human Resource Management Office and Student Services offices, to facilitate effective administration. This approach allowed for immediate clarification of any questions and ensured a higher response rate.

The quantitative survey was conducted over two weeks, during which respondents were given ample time to complete the questionnaires at their convenience. To complement this, an online version of the survey was also made available to accommodate participants who preferred digital access or could not attend in person.

For the qualitative phase, the interviews with the 16 key informants were conducted face-to-face, allowing for a more engaging and interactive discussion. Each interview lasted approximately 30 to 45 minutes, providing sufficient time to explore the participants' insights and experiences regarding QMS practices in their respective institutions. The interviews were scheduled at times convenient for the participants, ensuring their comfort and willingness to share valuable information. All gathered data were treated with the utmost confidentiality and were utilized solely for research purposes by the Data Privacy Act of 2012.

2.6 Ethical Considerations

Ethical considerations played a paramount role when undertaking research, particularly in the context of this study. First and foremost, the researcher obtained informed consent from participants, ensuring that the researcher clearly articulated the research purpose, potential risks, and benefits to university administrators, staff, or students, ensuring that they participated willingly and with full awareness. Maintaining confidentiality was equally critical. The researcher anonymized participant data and securely stored it to prevent unauthorized access, safeguarding their privacy and protecting sensitive information.

Voluntary participation was guaranteed, granting participants the freedom to withdraw from the study at any point without facing adverse consequences. The researcher implemented measures to minimize any potential risks, ensuring that the research did not cause harm, both physically and emotionally, to those involved. Upholding bias and fairness was non-negotiable. The researcher conducted the research without biases or discriminatory practices that could skew results. Transparency permeated the research process, with documented methodologies, data collection procedures, and analysis techniques to ensure transparency and reproducibility.

To maintain integrity, the researcher disclosed any potential conflicts of interest that could influence the objectivity of their research. The researcher also respected intellectual property by appropriately citing and crediting the work of others, guarding against plagiarism.

Ethical approval from the Mindanao State University-Institutional Evaluation and Review Committee was diligently sought from the institution before commencing the research. The beneficence principle emphasized that the research should offer potential benefits to the participating universities and colleges in Region XII, aiming to improve QMS and institutional performance. Honesty and integrity were unwavering throughout the research, from data collection to analysis and reporting. Finally, ethical considerations were the bedrock of responsible research, and adhering to these principles ensured that the highest ethical standards were maintained throughout the research.

3.0 Results and Discussion

3.1 Level of Quality Management System Practice of HEIs in Region XII

Table 1 summarizes the extent to which QMS is practiced among HEIs in Region XII as perceived by deans, faculty, and students.

Table 1. Summary on Extent of Practice of QMS among Private and Public HEIs as perceived by Deans, Faculty, and Students

Quality Management System Dimensions	Private HEI				Public HEI (SUC)			
	Dean	Faculty	Student	Mean	Dean	Faculty	Student	Mean
1. Leadership	4.18 (GE)	4.26 (GE)	4.52 (VGE)	4.32 (GE)	4.70 (VGE)	4.37 (GE)	4.36 (GE)	4.48 (GE)
2. Strategic Planning	4.09 (GE)	4.16 (GE)	4.49 (GE)	4.25 (GE)	4.63 (VGE)	4.32 (GE)	4.31 (GE)	4.42 (GE)
3. Customer Focus	4.08 (GE)	4.11 (GE)	4.44 (GE)	4.21 (GE)	4.58 (VGE)	4.28 (GE)	4.30 (GE)	4.39 (GE)
4. Measurement, Analysis, and Knowledge Management	4.09 (GE)	4.15 (GE)	4.45 (GE)	4.23 (GE)	4.55 (VGE)	4.26 (GE)	4.30 (GE)	4.37 (GE)
5. Workforce Focus	4.06 (GE)	4.15 (GE)	4.44 (GE)	4.22 (GE)	4.55 (VGE)	4.29 (GE)	4.34 (GE)	4.39 (GE)
6. Operations Focus	4.03 (GE)	4.13 (GE)	4.47 (GE)	4.21 (GE)	4.58 (VGE)	4.26 (GE)	4.32 (GE)	4.39 (GE)
7. Organizational Performance Results	4.06 (GE)	4.08 (GE)	4.46 (GE)	4.20 (GE)	4.53 (VGE)	4.27 (GE)	4.33 (GE)	4.38 (GE)
OVERALL MEAN	4.08 (GE)	4.15 (GE)	4.47 (GE)	4.23 (GE)	4.59 (VGE)	4.29 (GE)	4.32 (GE)	4.40 (GE)

Legend: 4.50-5.00-Very Great Extent (VGE) 3.50-4.49-Great Extent (GE) 2.50-3.49-Moderate Extent (ME) 1.50-2.49-Less Extent (LE) 1.00-1.49-Least Extent (LTE)

Leadership

The overall mean scores of 4.32 for private HEIs and 4.48 for public HEIs in the Leadership dimension, described as "Great Extent," indicate substantial implementation of quality management systems (QMS) in leadership practices across both sectors. This suggests consistent and significant adherence to effective leadership in private and public HEIs, with public institutions showing slightly stronger leadership practices. This difference may result from larger resource allocation, greater accountability, or different institutional priorities. Supporting this, Ahmad et al. (2021) found that public universities have more formalized leadership structures and processes, leading to higher perceived effectiveness. Conversely, Smith et al. (2018) reported no significant difference in leadership effectiveness between private and public universities, implying that factors beyond institutional type may influence leadership practices. In conclusion, while private and public HEIs demonstrate a strong commitment to QMS in leadership, public HEIs tend to exhibit marginally stronger practices due to potentially greater resources and formalized structures. Nonetheless, effective leadership practices are commendably adhered to in both sectors.

Strategic Planning

The overall mean scores of 4.25 for private HEIs and 4.42 for public HEIs in the Strategic Planning dimension, both described as "Great Extent," indicate a high level of implementation of quality management systems (QMS) related to strategic planning practices in both sectors. This suggests strong adherence to strategic planning practices and a commitment to effective strategic planning within private and public HEIs. Public HEIs, with a mean score of 4.42 compared to 4.25 for private HEIs, appear to emphasize or implement strategic planning practices more robustly. This could be attributed to stricter regulatory requirements, greater resources allocated to strategic planning, and the complexity of their organizational structures. Bryson (2018) supports this by noting that public institutions typically have more formalized and rigorous strategic planning processes, potentially leading to higher effectiveness. However, conflicting findings suggest that effective strategic planning can be equally present in public and private institutions, depending on leadership and institutional culture. In summary, private and public HEIs adhere to strategic planning practices within their QMS. While public HEIs show slightly stronger scores, possibly due to regulatory and resource advantages, effective strategic planning is robustly implemented across both sectors.

Customer Focus

In private HEIs, the overall mean score for customer focus is 4.21; in public HEIs, it is 4.39, indicating "Great Extent" implementation of quality management practices related to customer focus. This suggests a high level of adherence to ensuring student and stakeholder satisfaction through consistent implementation of customer-focused QMS. Public HEIs show a slightly higher mean score (4.39) than private HEIs (4.21), suggesting a more robust emphasis on customer-focused practices. This may be influenced by rigorous accountability measures, public scrutiny, and the broader mandate of public institutions to serve diverse populations. Research by Seale (2015) supports this, noting that public institutions often prioritize student retention and satisfaction due to public accountability, aligning with higher customer focus ratings. However, Jasti (2022) suggests that competitive pressures can strongly lead private institutions to emphasize customer focus. Both private and public HEIs demonstrate commendable adherence to customer-focused QMS, ensuring substantial and consistent practices to meet student and stakeholder needs. Public HEIs exhibit slightly stronger scores, potentially due to regulatory frameworks and broader mandates, but both types of institutions are committed to quality management in Customer Focus.

Measurement, Analysis, and Knowledge Management

Private HEIs have an overall mean score of 4.23, while public HEIs score 4.37 in Measurement, Analysis, and Knowledge Management, both described as "Great Extent." This indicates a high level of commitment and effectiveness in implementing practices related to these areas across both types of institutions. Public HEIs, with a slightly higher mean score of 4.37 compared to 4.23 for private HEIs, may employ a more rigorous or systematic approach to measurement, analysis, and knowledge management. Factors contributing to this could include stricter regulatory requirements, more resources allocated to data analysis and knowledge management, and institutional priorities focused on transparency and accountability. Research by Hazelkorn et al. (2018) supports this, highlighting that public institutions often implement comprehensive QMS due to stringent accountability standards. Conversely, Hong et al. (2019) argue that private institutions, driven by competition and innovation, can also excel in these areas, challenging the notion of inherent superiority in public HEIs. Both private and public HEIs demonstrate a strong commitment to measurement, analysis, and knowledge management practices, reflected in their high ratings. While public HEIs show slightly higher scores, both institutions consistently implement these practices effectively, ensuring continuous improvement and institutional effectiveness in Measurement, Analysis, and Knowledge Management.

Workforce focus

In private HEIs, the overall mean score for workforce focus is 4.22; in public HEIs, it is 4.39, both falling within the "Great Extent" range. This suggests high commitment and effectiveness in implementing practices prioritizing workforce development, satisfaction, and performance in both institutions. Public HEIs, with a slightly higher mean score of 4.39 compared to 4.22 for private HEIs, may have a more rigorous or systematic approach to workforce focus. This could be due to better incentives for professional development, greater resources for training and benefits, and enhanced job security typically associated with public sector employment. Research by Solomon (2023) supports this, highlighting structured and well-funded workforce development programs in public institutions supported by government policies. Conversely, Shevchenko (2021) suggests that private institutions, driven by competition, can also excel in workforce focus, challenging assumptions about public HEIs' inherent superiority. Both private and public HEIs demonstrate a strong commitment to workforce-focused practices, reflected in their "Great Extent" ratings. While public HEIs show slightly higher scores, institutions consistently implement initiatives to enhance workforce development, satisfaction, and performance. This commitment ensures the effective nurturing of their workforce, contributing to overall institutional effectiveness and success.

Operation Focus

Private HEIs have an overall mean score of 4.21, while public HEIs score 4.39 in Operation Focus, falling within the "Great Extent" range. This indicates a strong commitment to operation-focused practices in both institutions, with substantial and consistent implementation across various contexts. Public HEIs, with a slightly higher mean score of 4.39 compared to 4.21 for private HEIs, demonstrate a tendency towards a more rigorous and systematic approach to operational management. This can be attributed to larger financial allocations from government sources, enabling comprehensive investment in operational infrastructure and technology. Also, heightened accountability measures drive public HEIs to adopt transparent and compliant operational practices, effectively meeting regulatory standards and stakeholder expectations. Research by Hazelkorn (2018) supports this, emphasizing that public institutions, due to their scale and accountability, implement rigorous operational standards to ensure efficiency and effectiveness in serving diverse stakeholders. In conclusion, both private and public HEIs show strong adherence to operation-focused practices, reflected in their ratings. Public HEIs may exhibit slightly higher scores due to financial support, accountability measures, and the complexity of managing larger operations. Nonetheless, both institutions prioritize operational efficiency and effectiveness, contributing to their success and reputation in delivering quality education and support services.

Organizational Performance Results

Private HEIs have an overall mean score of 4.20, while public HEIs score 4.38 in Organizational Performance Results, both categorized as "Great Extent." This indicates strong implementation of organizational performance measures in both institutions, with effective practices applied consistently. Public HEIs, with a slightly higher mean score of 4.38 compared to 4.20 for private HEIs, often achieve better performance results due to advantages such as substantial government funding. This financial support allows public institutions to invest in infrastructure, faculty development, research capabilities, and student support services at a larger scale. Additionally, the larger organizational scale of public HEIs enables them to leverage economies of scale and implement more comprehensive quality management systems. This includes robust mechanisms for monitoring and improving performance metrics across teaching quality, research output, student outcomes, and overall institutional effectiveness. While private HEIs can excel in areas like agility and innovation, they may face challenges such as funding constraints and differing priorities in resource allocation. In conclusion, private and public HEIs strongly adhere to achieving high organizational performance results. Public HEIs' slightly higher mean score reflects their advantage in resources and scale, contributing to their ability to maintain rigorous standards and measurable outcomes. Nonetheless, both types of institutions consistently implement practices that enhance organizational performance, ensuring the delivery of quality education and services.

Overall, both public and private higher education institutions demonstrate a widespread and substantial implementation of Quality Management Systems (QMS) across dimensions such as leadership, strategic planning, customer focus, measurement, analysis, knowledge management, workforce focus, operations focus, and organizational performance results, as perceived by deans, faculty, and students. This indicates a consistent and commendable adherence to QMS practices, which are applied effectively in most instances or situations. Research, such as that by Pires et al. (2020), supports the effectiveness of QMS in enhancing organizational efficiency, accountability, and overall performance in universities. Integrating QMS frameworks in various institutional functions ensures that universities meet stakeholder needs while upholding high quality and performance standards in academic and administrative realms. This proactive adoption of QMS underscores a commitment to operational excellence, promoting a conducive environment for learning, research, and institutional advancement. Figure 1 shows the word cloud QMS practice employed by private and public HEIs in Region XII, unveiling key improvement areas. These areas, encompassing leadership, strategic planning, customer focus, measurement analysis, knowledge management, workforce focus, operation focus, and organization performance results, signify critical aspects for enhancing educational quality.

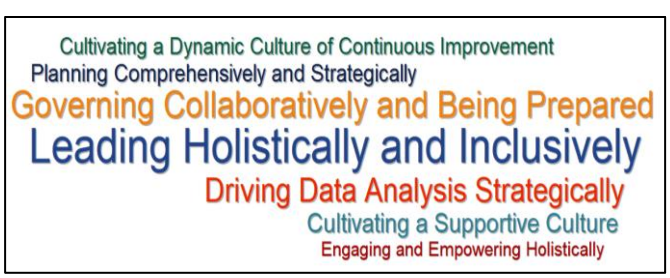

Figure 1. Word cloud of the QMS practice employed by private and public HEIs

The emergence of seven distinct themes in Quality Management System (QMS) practices across private and public Higher Education Institutions (HEIs) underscores institutions' varied approaches to ensure operational excellence and continuous improvement. These themes encapsulate comprehensive strategies aimed at enhancing organizational effectiveness and meeting the diverse needs of stakeholders. Effective leadership involves holistic and inclusive approaches to guiding institutional policies and fostering a culture of quality throughout the organization (Oakland, 2014). Strategic planning emphasizes the importance of aligning institutional goals with QMS objectives and allocating resources strategically to achieve desired outcomes (Bryson et al., 2018). Employee engagement and empowerment are supported by research showing that engaged employees contribute significantly to organizational success through their commitment and innovative contributions (Oluoch, 2014). Data-driven decision-making underscores the critical role of strategic data analysis in monitoring performance and driving improvements (Bousdekis et al., 2021). Cultivating a supportive culture focuses on fostering an organizational environment that promotes collaboration, trust, and mutual support among stakeholders, essential for sustaining quality initiatives (Galpin et al., 2015). Collaborative governance and preparedness highlight the importance of inclusive decision-making processes and readiness to address challenges effectively, aspects crucial for institutional resilience and responsiveness (Shmueli et al., 2021). Lastly, cultivating a dynamic culture of continuous improvement underscores the ongoing commitment of HEIs to assess, adapt, and innovate in response to evolving educational demands and external pressures (Oakland, 2014). By integrating these QMS practices, institutions can enhance their operational efficiency, foster stakeholder confidence, and effectively navigate the complexities of the higher education landscape, ensuring sustained institutional success and excellence. These themes reflect practices in quality management and provide a comprehensive framework for HEIs to optimize their educational delivery and institutional governance, thereby supporting their mission of providing high-quality education and preparing students for future challenges.

3.2 Comparison of QMS Practices between Private and Public HEIs in Region XII

Table 2 shows no statistically significant difference in QMS practices between private and public HEIs in Region XII, with a p-value of 0.2387. This suggests that the mean scores of quality management practices (Private HEIs: M = 4.36, Public HEIs: M = 4.32) do not differ significantly.

Table 2. The difference in the QMS Practices between Private and Public HEIs in Region XII

HEI Category	Mean	Mean Ranks	U-value	p-value	Remark	Decision
Private	4.36	49705.5	39694.5	0.2387	Not Significant	Accept null hypothesis
Public	4.32	175079.5				

*Tested at 0.05 level of significance

This finding aligns with existing literature highlighting both institutions' shared commitment to quality education despite operational differences. Private HEIs leverage autonomy to align strategies with institutional missions, while public HEIs navigate regulatory constraints and funding challenges. Both prioritize stakeholder expectations and continuous improvement to enhance educational outcomes and institutional reputation. This underscores the importance of tailored QMS strategies while fostering collaboration to elevate overall quality standards in higher education.

Table 3. Difference in QMS Practices among HEIs in Region XII as perceived by Deans, Faculty and Students

Groups	Mean	Mean Ranks	H-value	p-value	Remark	Decision
Deans	4.39	359.54	3.3100	0.1911	Not Significant	Accept Null Hypothesis
Faculty	4.28	319.93				
Students	4.36	345.13				

*Tested at 0.05 level of significance

Table 3 indicates no statistically significant difference in quality management practices among Higher Education Institutions (HEIs) in Region XII as perceived by deans, faculty, and students, with a p-value of 0.1911. Despite slight variations in mean scores (Deans: M=4.39, Faculty: M=4.28, Students: M=4.36), these differences are not considered significant. This finding suggests that perceptions of quality management practices may not vary significantly among different stakeholders within HEIs. Deans, faculty, and students likely have distinct perspectives influenced by their roles and experiences within the institution. Deans, as leaders, may view quality management practices more positively, reflecting their strategic oversight. Faculty and students involved in academic and administrative processes may perceive these practices differently based on their interactions and expectations. The implication for quality management system (QMS) practices is the importance of incorporating diverse stakeholder perspectives in assessing and improving quality standards. HEIs should establish robust feedback mechanisms to solicit input from all stakeholders, ensuring that QMS initiatives effectively address their needs and expectations. This inclusive approach fosters transparency, collaboration, and alignment towards shared quality goals, ultimately enhancing institutional effectiveness and stakeholder satisfaction.

As shown in Figure 2, Four themes of common QMS practices emerged. These themes depict 1) Efficient and Compliant Data Quality Management, 2) Strong Leadership and Governance Support, 3) a Collaborative and Communicative Academic Environment, and 4) Systematic Policy Development, Implementation, and Academic Support. This implies typical features of QMS practices employed by private and public HEIs. This uniformity fosters easier collaboration and benchmarking across institutions, facilitating shared best practices and continuous improvement. Additionally, common features help streamline processes and reduce complexities, making implementing and maintaining quality standards across the region simpler.

Figure 2. Word Cloud for common features that elaborate no difference in QMS practices across categories and groups of respondents

Literature supports the importance of these themes in higher education management. Strong leadership is vital for setting strategic directions, fostering a quality culture, and ensuring alignment of institutional goals with QMS objectives (Bryson et al., 2018). Systematic policy development and implementation are crucial for establishing clear guidelines, procedures, and standards that support academic and administrative functions (Weldeslassie, (2021). A collaborative academic environment enhances communication, teamwork, and shared decision-making among stakeholders, contributing to a positive institutional culture (Galpin et al., 2015). Efficient data quality management through digital systems not only improves information accuracy and accessibility but also supports evidence-based decision-making and regulatory compliance (Bendermacher, 2017). By adopting these common QMS practices, HEIs can streamline operations, promote transparency, and facilitate continuous improvement efforts. Moreover, fostering easier collaboration and benchmarking across institutions enables sharing best practices and lessons learned, ultimately enhancing the region's educational outcomes and institutional reputation.

3.3 Policy Recommendations to Enhance QMS Practices among HEIs

Based on the analysis of significant results of the study, the following policy components as a result of meta-analysis can be proposed as input to policy recommendations to enhance QMS Practices among HEIs:

Inclusive Communication Policy

Continuous and open communication with staff and faculty is essential for the success of Higher Education Institutions (HEIs) in Region XII. However, there are significant gaps that need urgent attention. Although leadership recognizes the importance of communication with faculty, there is a notable shortfall in ensuring open communication with all personnel, including utility staff. This exclusion means that valuable insights from utility staff are often overlooked, undermining the inclusivity of the planning process. True alignment with the institution's vision necessitates the active participation of all community members, yet current practices fall short by not fully including utility staff in these critical discussions.

Table 4. Summary of Quantitative and Qualitative Results as Input to Policy Recommendations to Enhance QMS Practices among HEIs

Gap	Objective	Policy Component
1. Practice continuous and open communication with staff and faculty.-4.06	1.1. To foster an environment of open and inclusive communication within the institution 1.2 To enhance stakeholder engagement by ensuring that planning processes involve representatives from all levels of the organization 1.3. To regularly assess communication strategies, identify areas for improvement, and ensure alignment with Quality Management System (QMS) principles,	**Inclusive Communication Policy**
2.1. The school management undertakes the strategic development process, taking into account the school's competitors, weaknesses, and strengths.-3.94 2.2. The school management conducts performance analysis that includes examining trends.-4.00	2.1. To develop a systematic approach to analyze competitors and identify strengths and weaknesses to enhance the school's competitiveness. 2. To integrate SWOT analyses into the school's strategic planning process to inform decision-making and prioritize areas for improvement and growth. 3. To cultivate a culture of ongoing enhancement, actively engage stakeholders in the strategic development process.	**Performance Monitoring and Analysis Policy (Futures and Foresights Thinking)**
3. The school management has created a climate conducive to learning. -3.94	3.1. To conduct regular assessments of the school's physical infrastructure to ensure optimal learning environments. 3.2. To establish and uphold policies and practices that foster a safe, inclusive, and supportive environment for all school community members. 3.3. To establish robust feedback mechanisms to gather input from students, teachers, and parents about the learning environment and overall school experience.	**School Climate Policy**
4. The school management uses feedback from our stakeholders to assess our programs and offerings.-3.94	4.1. To establish and maintain effective mechanisms for collecting feedback from stakeholders to improve school programs and offerings. 4.2. To facilitate in-depth discussions and qualitative feedback gathering through focus groups and forums. 4.3. To apply the Plan-Do-Check-Act (PDCA) cycle to continuously improve the learning environment based on stakeholder feedback and assessments.	**Stakeholder Engagement and Feedback Policy**
5.1. The school management sustains high trust of the stakeholders.-3.94 5.2. The school performance results reveal that the stakeholders highly trust the organization.-3.94	5.1. To enhance transparency and keep stakeholders informed by regularly updating school initiatives, performance, and changes. 5.2. To foster transparency and encourage stakeholder engagement by maintaining open and accessible communication channels. 5.3. To promote transparency and accountability by regularly collecting stakeholder feedback and demonstrating responsiveness through visible changes and improvements.	**Transparency and Accountability Policy**
6. The school management obtains data and information by benchmarking and seeking competitive comparisons.-4.00	6.1. To integrate benchmarking and competitive comparison practices into data acquisition processes to identify areas for improvement and best practices.	**Benchmarking and Competitive Analysis Policy**
7.1 The school management ensures that people keep current with changing educational needs and directions.4.00 7.2.The school provides many opportunities for employees' professional development, services, and benefits-3.88 7.3. The school ensures that the faculty members properly	7.1. To promote a culture of continuous learning and innovation by recognizing and rewarding staff members' engagement in professional development activities. 7.2. To develop specialized training programs aligned with organizational goals to enhance staff members' skills and competencies. 7.3. Regular needs assessments and gap analyses should be conducted to identify staff skill gaps and training needs, leading to targeted professional development initiatives.	**Professional Development and Well-being Policy**

prepared to deliver the Learning-centered process.-3.88	

From a QMS perspective, these gaps present serious challenges. QMS principles emphasize the importance of involving all stakeholders in decision-making processes to meet quality objectives (Alonderiene and Majauskaite, 2016 and Tran et al., 2019). The exclusion of some staff from communication channels hinders the effectiveness of QMS initiatives, as their valuable contributions are not considered. Furthermore, open communication is vital for continuous improvement, a fundamental tenet of QMS. The current gaps in communication practices suggest significant barriers to identifying areas for improvement and implementing necessary changes, which ultimately impacts the overall quality and effectiveness of HEIs in Region XII. As an action, a component of inclusive communication policy is a necessary feature in the proposed policy recommendation in this study.

Performance Monitoring and Analysis Policy Using Futures and Foresights Thinking

The strategic development process and performance analysis are crucial components within the framework of QMS to ensure the effectiveness of a school's management. However, recent assessments indicate significant gaps in both areas, highlighting potential challenges that may impede the school's ability to achieve its objectives and maintain quality standards. Firstly, the strategic development process, with a mean score of 3.94, suggests a lack of comprehensive analysis and utilization of critical factors such as competitors, weaknesses, and strengths. In the context of QMS, understanding competitors is essential for benchmarking and establishing performance standards (Bush, 2021). The identified gap indicates a potential deficiency in competitive analysis, which limits the school's ability to identify best practices and areas for improvement. Similarly, failing to identify weaknesses and leverage strengths implies a missed opportunity for continuous improvement and optimization of educational offerings and operational efficiencies (Walter & Helman, 2020). Consequently, without a robust strategic development process, the school may struggle to set realistic goals, recognize necessary improvements, and capitalize on its strengths, ultimately leading to suboptimal performance and stagnation.

Secondly, performance analysis, particularly in examining trends, is identified as a significant weakness with a mean score of 4.00. Trend analysis is critical within the QMS framework to understand performance over time, identify patterns, and predict future performance (Tambare et al., 2021). However, the identified gap suggests that school management may not effectively analyze performance data to inform decision-making. This deficiency in data-driven decision-making can result in decisions based on incomplete or inaccurate information, undermining the effectiveness of improvement initiatives (Tambare et al., 2021). Without examining trends, the school cannot effectively implement continuous improvement processes, which are core principles of QMS. Consequently, inadequate performance analysis can lead to missed opportunities for improvement, declining performance, and an inability to meet stakeholder expectations.

Therefore, addressing these gaps through proposed policy recommendations in this research is paramount to enhance the school's management effectiveness and maintain quality standards. By implementing robust processes for competitive analysis, identifying weaknesses, leveraging strengths, and conducting thorough performance analysis, the school can foster a culture of continuous improvement and ensure its ability to meet the evolving needs of its stakeholders.

School Climate Policy

Creating a conducive learning environment is important for educational excellence. However, a mean score of 3.94 shows significant gaps in this area. The school management lacks strategies to foster a conducive learning environment, as seen in various areas such as physical infrastructure, emotional safety, teacher-student relationships, and overall school culture. These gaps indicate a disconnect in aligning with principles of stakeholder engagement, continuous improvement, and support system implementation. Without proactive measures, the school risks impacting student performance, teacher morale, and reputation in the community.

These gaps have an impact beyond academics. Poor student performance can lead to higher dropout rates and hinder academic success. Teacher well-being may suffer, resulting in burnout and decreased effectiveness, especially when professional development opportunities are limited. Additionally, the school's reputation and standing in the community may be negatively affected, affecting enrollment rates and stakeholder trust.

Addressing these gaps through a QMS-aligned approach is crucial for creating a nurturing learning environment for student success and organizational growth. Therefore, the proposed policy recommendation in this study includes a relevant component on this matter.

Stakeholder Engagement and Feedback Policy

The significant gap in utilizing stakeholder feedback, highlighted by a mean score of 3.94, reveals a critical deficiency in the school's approach to assessing and improving its programs and offerings. This gap may stem from various factors, including inadequate mechanisms for collecting feedback, insufficient analysis processes, or a lack of action upon receiving feedback (Carpentier & Mageau, 2016). In connection with QMS, effective stakeholder engagement is paramount for understanding and meeting the needs and expectations of the school community; without robust feedback mechanisms aligned with QMS principles, the school risks missing valuable insights that could inform continuous improvement efforts.

The impact of this gap extends across multiple dimensions of the school's operations and relationships. Programs and offerings may suffer from decreased relevance and quality, as feedback incorporation is essential for identifying areas of improvement and innovation. Moreover, stakeholders may experience decreased satisfaction and trust in the school management, leading to reduced engagement and support (Zepke, 2018). This lack of stakeholder satisfaction can negatively affect overall school performance and outcomes, as missed insights from feedback may hinder the implementation of effective teaching methods, curriculum adjustments, and resource allocation strategies (Hassan, 2024). In connection, confronting this gap in the proposed policy recommendation in this research is essential for the school to enhance program effectiveness, stakeholder satisfaction, and overall organizational success.

Transparency and Accountability Policy

The significant gap in maintaining high trust among stakeholders, as indicated by a mean score of 3.94, poses a critical challenge for school management in fostering positive relationships and ensuring overall organizational success. This deficit could be attributed to various factors, including deficiencies in communication, transparency, responsiveness, and consistency in actions. Trust, intricately linked to stakeholder satisfaction within Quality Management Systems (QMS) frameworks (Freeman, 2022), plays a vital role. Stakeholders are unlikely to be satisfied with the school's services without trust, underscoring the importance of addressing this gap to uphold stakeholder trust and satisfaction (Johnson & Johnson, 2022).

The impact of this gap extends to multiple aspects of the school's operations and relationships. Low levels of trust can lead to decreased engagement from parents, students, and teachers, negatively impacting school initiatives and community support. Furthermore, a lack of trust can damage the school's reputation, resulting in lower enrollment rates and difficulties attracting high-quality staff (Rodriguez et al., 2018). This erosion of trust can also harm student morale and motivation, consequently affecting academic performance and overall outcomes (Dyson et al., 2016). Additionally, teachers and staff may feel undervalued or unsupported in an environment lacking trust, potentially reducing job satisfaction and performance (El-Moussa, 2023; Silva et al., 2016). Therefore, the school must address these trust issues in the policy recommendations outlined in this study to enhance stakeholder engagement, improve its reputation, and enhance overall organizational performance.

Benchmarking and Competitive Analysis Policy

The significant gap in effectively obtaining data and information through benchmarking and competitive comparisons, as indicated by a mean score of 4.00, highlights a critical deficiency in the school's strategic management and continuous improvement processes. This gap suggests that the school may not systematically compare its performance with other schools or industry standards nor leverage these comparisons to drive improvements effectively. Within the framework of QMS, benchmarking serves as a cornerstone for measuring performance against best practices or industry standards, identifying gaps, and fostering a culture of continuous improvement (Jain & Gautam, 2016).

Moreover, competitive analysis is essential for understanding the school's relative performance and maintaining a competitive edge in the education sector (Iqbal, 2021). Without leveraging benchmarking data for data-driven decision-making, the school risks missing opportunities for improvement and innovation, ultimately leading to suboptimal performance and stagnation. The impact of this gap extends across various facets of the school's operations and relationships. Firstly, without benchmarking, the school may lack a clear understanding of its relative performance, hindering its ability to identify and implement best practices that drive performance improvement. Secondly, inadequate competitive analysis can result in strategic plans not aligned with market realities, impeding the school's ability to effectively achieve its goals (Paliulis & Labanauskis, 2015). Furthermore, stakeholders may lose confidence in the school's ability to remain competitive if they perceive a lack of proactive engagement in seeking and implementing best practices. This loss of confidence can significantly impact student enrollment, staff recruitment, and overall community support (Paliulis & Labanauskis, 2015). Addressing these gaps in benchmarking and competitive analysis is essential for the school to enhance performance, strategic planning effectiveness, and stakeholder confidence, ultimately driving continuous improvement and organizational success. Hence, a component responsive to such a need is covered in the proposed policy recommendation of this study.

Professional Development and Well-being Policy

The school management's efforts to keep staff members updated with evolving educational needs and directions, as evidenced by a mean score of 4.00, are commendable. However, it is important to note that potential gaps may exist if systematic mechanisms for identifying and addressing changing educational needs are lacking. Without structured processes, the school struggles to anticipate and adapt to emerging trends, methodologies, and technologies effectively (Papanthymou & Darra, 2017). Additionally, while professional development opportunities may be available, they might not be tailored to individual staff members' specific needs or aligned with strategic objectives. This could result in inefficiencies and missed opportunities for enhancing educational quality and organizational goals (Tambare et al., 2021).

On the other hand, the mean score of 3.88 regarding opportunities for employees' professional development, services, and benefits suggests significant gaps in the school's support for its workforce. Despite emphasizing investing in employees' growth and well-being within QMS principles, shortcomings could hinder organizational effectiveness and sustainability. Insufficient access to training programs, inadequate support for career advancement, or below-standard benefits packages may decrease employee morale, productivity, and retention (Solomon et al., 2023). Addressing these gaps and aligning employee development initiatives with QMS principles are crucial for enhancing workforce satisfaction, performance, and overall organizational success.

Similarly, the mean score of 3.88, highlighting potential gaps in ensuring faculty members are adequately prepared to deliver learning-centered processes, underscores the importance of addressing deficiencies in training and support. Despite the emphasis on competency and capability development within QMS principles, shortcomings may persist in providing necessary resources and alignment with educational objectives. Insufficient training or support for implementing learning-centered teaching methodologies, outdated instructional materials, or a lack of alignment between faculty development initiatives and educational goals could hinder faculty members' ability to support student success effectively (Dung et al., 2019). Therefore, addressing these gaps incorporated into the components of the proposed policy recommendation in this research is essential for enhancing the capacity of faculty to deliver high-quality education, ultimately contributing to the school's overall effectiveness and alignment with QMS principles (Hakanen et al., 2019).

The proposed policy recommendations aim to enhance the QMS among Higher Education Institutions (HEIs) in Region XII by addressing key gaps identified in leadership, strategic planning, customer focus, measurement, analysis, knowledge management, workforce focus, and operational focus. By implementing these recommendations, HEIs can foster inclusive communication, strengthen stakeholder engagement, improve strategic planning processes, enhance customer satisfaction, optimize data analysis practices, develop the workforce, and ensure operational readiness, ultimately driving organizational success and stakeholder satisfaction in Region XII.

4.0 Conclusion

The findings of this study have significant implications for policy, practice, education, and future research on Quality Management Systems (QMS) within higher education institutions (HEIs) in the Philippines, particularly in Region XII. The study highlights the necessity for policymakers to develop and implement comprehensive QMS frameworks tailored to the unique challenges HEIs face. By establishing clear guidelines and support mechanisms, policymakers can facilitate the adoption of best practices in quality management, ensuring that institutions meet accreditation standards and foster a culture of continuous improvement. The proposed policy recommendations, such as enhancing stakeholder engagement and establishing transparency and accountability measures, are crucial for building trust and collaboration among all educational stakeholders.

The quantitative and qualitative data insights underscore the importance of integrating stakeholder feedback into QMS practices. Institutions should prioritize establishing robust feedback mechanisms that allow for the continuous assessment and enhancement of educational programs. Additionally, training and professional development opportunities for faculty and staff should be emphasized to equip them with the necessary skills to implement effective QMS practices. This focus on practice will ultimately lead to improved educational outcomes and institutional performance. The findings suggest that a strong QMS can significantly enhance the quality of education provided by HEIs. By aligning educational practices with QMS principles, institutions can create a more supportive and effective learning environment for students. This alignment not only improves student satisfaction and success rates but also enhances the institution's overall reputation within the community and among potential students.

Finally, this study opens avenues for future research to explore the long-term impacts of QMS implementation on educational quality and institutional effectiveness. Further studies could investigate the specific challenges faced by different types of HEIs in adopting QMS practices and the role of leadership in driving these initiatives. Additionally, comparative studies across various regions could provide deeper insights into the effectiveness of different QMS approaches in diverse educational contexts.

5.0 Contributions of Authors

Author 1 was responsible for editing, writing, encoding, and conducting the data analysis for this project. Author 2 provided invaluable guidance and supervision throughout the data analysis process.

6.0 Funding

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7.0 Conflict of Interests

There is no conflict of interest associated with this research.

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Leadership Styles, Motivation, and Work Performance of Librarians in Davao Region, Philippines

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Abstract. This study assessed the impact of leadership styles and librarians' motivation on work performance in the Davao Region. This study adopted a non-experimental quantitative design with a descriptive-correlation technique. The study employed modified questionnaires tailored to align with its objectives, with 321 librarians participating by complete enumeration. Mean and Pearson's correlation coefficient are statistical instruments utilized for data analysis and interpretation. The researcher directly supervised and delivered the questionnaire to respondents using face-to-face interactions and Google Forms surveys to ensure precision and mitigate ambiguity. The results indicated that librarians exhibit significant leadership styles alongside notable motivation and work performance levels. Furthermore, a substantial correlation between leadership styles and work performance, as well as librarians' motivation and work performance, was determined in the study. This highlights the significance of leadership styles and motivation in enhancing the performance of librarians to guarantee the accomplishment of organizational goals and objectives.

Keywords: Leadership styles; Librarian; Information science; Motivation; Work performance; Philippines.

1.0 Introduction

Libraries are vital elements of any educational institution. However, they are underutilized. The underutilization of libraries and the disinterest of library patrons are ascribed to inadequate librarian performance (Rodrigues & Mandrekar, 2020). Consequently, there exists a prevalent perception within academic circles that librarians do their responsibilities lethargically (Posigha & Barr, 2021). Thus, performance is a critical element that must be comprehended and conveyed to relevant stakeholders to evaluate the extent to which a company realizes its vision and to discern the merits and drawbacks of operational decisions (Berliana et al., 2018). Tertiary institutions in Nigeria face significant dangers due to deteriorating staff performance levels, necessitating an urgent resolution (Inuwa, 2016).

Therefore, supervisors must oversee people to enhance their performance levels (Budiansyah et al., 2021). Performance refers to what an individual or group achieves (Amri et al., 2021) with their talents, abilities, knowledge, and expertise about a service or product within a defined period and context. Specific conditions are necessary for managers to optimize an organization's human resources for success and efficacy (Forson et al., 2021). The pandemic has rendered leadership increasingly challenging. Consequently, it is essential to possess committed, accountable, and innovative leaders to address unforeseen negative occurrences and strive for favorable productivity outcomes. Transformational leadership regularly exerts the most substantial influence on employee performance (Beauty & Aigbogun, 2022). Al Khajeh (2018) states, "Managers who focus on transformational leadership prioritize the comprehensive development of employees' value systems, moral growth, skill enhancement, and motivational levels." This indicates that the transformational qualities of leaders enhance employee performance (Beauty & Aigbugon, 2022).

Nigerian public university librarians employed democratic leadership strategies (Saliu et al., 2018). They did not exhibit leadership styles such as autocratic or laissez-faire. Librarians and library administrators were encouraged to incorporate both democratic and autocratic leadership styles in their management to improve work performance. Librarians should refrain from utilizing laissez-faire leadership styles, as they are unlikely to improve employee performance. Additionally, five academic libraries in Nigeria were analyzed to evaluate the correlation between leadership styles and the work performance of 94 library staff (Orewa, 2019). The study discovered multiple leadership styles among library managers in the area, highlighting four primary types. The leadership styles encompass democratic, transformational, autocratic, and laissez-faire. Democratic and transformational leadership styles significantly affect participants' work performance, exhibiting considerable influence when evaluated objectively. Effective leadership, interpersonal relations, communication, and transparency promote a dynamic, high-performance organizational culture. Leaders must adopt effective communication tactics to build passion and cultivate trust inside the library (Orewa, 2019).

Furthermore, inadequate employee performance is attributed to a deficiency in motivation (Pramudena et al., 2021). Enhanced employee motivation and morale diminish the likelihood of losing valued individuals and facilitate the attraction of new talent. Motivation enhances employee satisfaction, augmenting performance and productivity (Kuranchie-Mensah & Amponsah-Tawiah, 2016). Consequently, employee work performance is essential for organizational development and success. Over the past thirty years, empirical studies have emphasized the significance of motivation in business success. A notable positive association has been identified between the work performance and motivation levels of 153 employees from university libraries in South Nigeria. The positive benefits of motivation on organizational performance encompass enhancing staff productivity, facilitating goal attainment, and fostering growth (Posigha & Barr, 2021).

Contrarily, a study in Nigeria revealed no association between motivation and job performance among local government personnel (Ajayi et al., 2018). This leads to low job dedication and significant absenteeism. Local government workers are underpaid and underappreciated, and management ignores their welfare. Despite a raise, this employee-motivating method fails. Employee needs and feelings must be acknowledged by management to maintain workplace peace. Numerous factors affecting job performance were evaluated, including employee motivation, but no significant association was found (Hassan et al., 2020). The findings contradict the idea that management should improve working conditions and inspire employees to reduce turnover and retain productive people. Management was advised to create an employee assistance portal. Organizations should create many reward systems to motivate workers.

In this sense, the relationship between leadership styles, motivation, and work performance in Davao region has not received scholarly attention, especially in the context of librarianship. Hence, there is a gap in the existing literature. The researcher examines whether motivation and leadership styles directly influence work performance among librarians in the Davao Region, as these factors are crucial to the profession.

Initially, this study focuses on assessing the various leadership types, including transformational, transactional, democratic, and laissez-faire leadership. The intrinsic and extrinsic motivations of librarians will also be determined. Third, the degree of work performance, including task performance, contextual performance, and counterproductive work behavior, must be ascertained. Finally, this study aims to determine the substantial correlation between leadership styles and work performance, as well as librarians' motivation and their work performance.

2.0 Methodology

2.1 Research Design

This research utilized a descriptive-correlation methodology and a non-experimental quantitative design to gather data, concepts, facts, and relevant information. Descriptive research does not seek to establish the effects of a treatment; it is characterized as non-experimental. Additionally, research that investigates situations, conditions, or other issues is described as descriptive research, with findings presented in a research report. A correlation study is a research method that involves examining pre-existing data to assess the degree of correlation between two or more variables without any alterations, additions, or manipulations (Rasema, 2018). The descriptive-correlation technique is suitable for this study, as it seeks to identify a positive connection between leadership styles, librarians' motivation, and work performance.

2.2 Research Locale

The study is conducted in the Davao Region, designated as Region XI, located in the southeastern part of Mindanao, Philippines. This constitutes the five provinces: Davao de Oro (Compostela Valley), Davao del Norte, Davao del Sur, Davao Occidental, and Davao Oriental, along with one highly urbanized city. Davao City serves as the regional center. The borders include Northern Mindanao, Caraga, the Philippine Sea, the Davao Gulf, the Celebes Sea, SOCCSKSARGEN, and the Davao Region, arranged in a clockwise direction starting from the north (PhilAtlas, 2023).

2.3 Research Participants

This study targeted librarians in public and private libraries around the Davao Region. The total number of librarians in the Davao Region is 379. Due to the restricted quantity of participants, this study employs the complete enumeration survey approach. In a comprehensive enumeration, data will be collected from every population member. There were 321 replies from 379. Enumeration, or census, is a complete population count. Censuses collect data on each demographic sampling unit (Shalabh, 2023). Nonresponse is unavoidable, and y-values can be inaccurate due to respondents supplying incorrect information, especially when they relate to sensitive criteria like age and wealth. Besides sampling error, "nonsampling error" refers to the errors that prohibit a survey from producing the exact parameter value. A nonsampling error also includes survey inaccuracies caused by nonresponse or erroneous y-value measurement. Comprehensive enumeration or sample surveys can provide precise attribute values. Survey data problems lead to inaccurate population parameter estimates (Arnab, 2017).

2.4 Research Instrument

Survey questions from several researchers were altered and refined for the study. The questionnaire comprises three sections: Librarians' Motivation, Leadership Styles, and Work Performance. This study adapted and modified the Employee Motivation Scale, utilizing a 20-item survey questionnaire developed by Saliu et al. (2018); the Leadership Styles Scale, consisting of a 28-item survey questionnaire from Voung et al. (2019); and the Work Performance Scale, which includes a 27-item questionnaire created by Koopmans et al. (2014). The survey questionnaire was distributed to specialists for further feedback and validation. The researcher performed a pilot test to verify the reliability of the questionnaires intended for the study's respondents, yielding a Cronbach's Alpha of 0.907 for the librarians' motivation questionnaire, 0.937 for the leadership styles questionnaire, and 0.806 for the work performance questionnaire.

2.5 Data Gathering Procedure

The researcher collected study data using the methods described above. Starting with the updated questionnaires, all validation procedures were done. After receiving the necessary information, adjustments and modifications to the surveys helped modify the questions. The researcher sent all essential contacts to the University of Mindanao Graduate School authorities for survey questionnaire distribution. In the fourth phase, the researcher obtained permission from the respondents' offices. After submitting the permission and endorsement form, the researcher asked survey participants for approval and informed them of the study's goals. As numerous institutions use online surveys, the researcher administers the instruments in person and via Google Forms in the sixth phase with respondents' consent. The researcher gathered survey questionnaires one week later in the final phase. After combining all respondents' answers, the researcher documented and statistically analyzed the study's final data.

All information collected for this study is safeguarded to ensure anonymity, particularly during transmission. Names and other personally identifiable information obtained from study responses will be stored separately from identifying information, secured in a closed filing cabinet for physical records. The digital copy of the material is saved in a cloud space, and access to the computer necessitates a password. Furthermore, the careful use and confidentiality of collected information will be paramount. Access to all acquired information shall be restricted to designated authorized personnel per the Data Privacy Act of 2012. If not, the information will be employed, but personal identities and other contextual identifiers will be removed. Ultimately, paper documents will be obliterated in a manner that precludes information retrieval, such as incineration or shredding. Responses were compiled and encoded in an Excel file and sent to the statistician for further analysis using scientifically validated statistical procedures.

2.6 Ethical Considerations

Under Protocol Number 2024-109, this work was presented to the University of Mindanao Research and Ethics Committee (UMERC) for evaluation. This was done to ensure that the quality of the work is dependent on the researcher's ability to provide readers with clear arguments while also impartially presenting data. The verification technique utilized by the Committee ensures that the work is reliable, accurate, and fair, in addition to ensuring that the authorship is ethical and accountable. When truthful, the possibility of making fraudulent allegations, particularly those concerning authorship, is eliminated. It is important to differentiate error or inaccuracy from deceptive assertions. When the authors have tried to remove any prejudice from examining the factual data offered to the readers, this indicates that the authors are trustworthy. Because the study outcomes were meant to be kept strictly confidential, the researcher ensured that the participants were suitably anonymized. After that, the researcher followed the suggestions or guidance issued by the UMERC during their research.

3.0 Results and Discussion

3.1. Perceived Leadership Styles of Librarians

Table 1 presents the data regarding the leadership styles of librarians in the Davao Region.

Table 1. Descriptive statistics of leadership styles of librarians in Davao Region

Indicators	Mean	SD	Interpretation
Transactional Leadership	4.10	0.512	High
Transformational Leadership	4.11	0.581	High
Democratic Leadership	4.11	0.517	High
Laissez-faire Leadership	4.03	0.523	High
Overall	**4.09**	**0.464**	**High**

The table indicates that leadership styles received a total mean of 4.09, with a standard deviation of 0.464, categorized as high. Transformational and democratic leadership received the highest mean score of 4.11, indicating a significant prevalence of these leadership styles among librarians in the Davao Region. Laissez-faire leadership received the lowest mean score of 4.03, indicating a high frequency of manifestation among librarians. Consequently, the findings show that the leadership styles exhibited by librarians in the Davao Region are frequently observed. This indicates that librarians utilize a range of leadership styles and employ various qualities, characteristics, and actions to oversee their subordinates. This supports Orewa's (2019) investigation into the impact of leadership styles on employee motivation and work performance. Library leaders in Nigeria exhibit a range of leadership styles, including democratic, transformational, autocratic, and laissez-faire. The prevalence of these leadership styles may be attributed to the regular organization and participation of these librarians in training sessions and conferences. The manifestation of these leadership styles may stem from recent insights regarding the importance of involving subordinates in corporate governance and decision-making processes.

3.2. Perceived Motivation of Librarians

Table 2 depicts the motivation levels of librarians in Davao Region. A mean of 4.21 and a standard deviation 0.530 is classified as high. The data indicates that the extrinsic motivation indicator achieved the highest mean of 4.26, which is classified as very high, demonstrating that extrinsic motivation is continuously present. In contrast, the measure of intrinsic motivation attained the lowest mean score of 4.16, which is classified as high, signifying that intrinsic motivation is often demonstrated.

Table 2. Descriptive statistics of motivation of Librarians in Davao Region

Indicators	Mean	SD	Interpretation
Intrinsic Motivation	4.16	0.594	High
Extrinsic Motivation	4.26	0.552	Very High
Overall	**4.21**	**0.530**	**Very High**

The overall findings indicate that librarians' motivation is consistently present. This affirms that intrinsic and extrinsic motivational factors significantly enhance employee performance. Extrinsic motivation pertains to external elements such as remuneration, benefits, a favorable work environment, acknowledgment, and professional progression. Conversely, intrinsic motivation originates inside and is propelled by an employee's interest in the role, encompassing happiness and fulfillment (Posigha & Barr, 2021). The outcome further corroborates Vroom's Expectancy Theory (1964), which posits that employees may be motivated when personal objectives are achieved via rewards. Furthermore, certain employees focus on internal goals, while others prioritize extrinsic outcomes. Additionally, the assertion that motivational elements, including salary packages, job design, and work environment, forecast employee performance is corroborated (Vroom, 1964). In summary, excellent performance is derived from people who are motivated both internally and extrinsically (Forson et al., 2021).

3.3. Work Performance of Librarians in Davao Region

Table 3 illustrates the work performance levels of librarians. The third table reveals a mean of 3.65 with a standard deviation of 0.351, categorized as high. The chart reveals that the indication of contextual performance got the highest mean score of 4.13. In contrast, task performance got a mean score of 4.12, both categorized as high, signifying that librarians frequently exhibit this performance in their jobs. Conversely, the indicator of counterproductive work conduct received the lowest mean score of 2.70, categorized as modest, indicating that such behavior rarely occurs.

Table 3. Descriptive statistics of work performance of Librarians in Davao Region

Indicators	Mean	SD	Interpretation
Task Performance	4.12	0.490	High
Contextual Performance	4.13	0.514	High
Counterproductive Work Behaviour	2.70	0.528	Moderate
Overall	**3.65**	**0.351**	**High**

The findings indicate that librarians exhibit high work performance, which indicates that the indicators are frequently evident. This suggests that librarians exhibit strong job performance, can complete tasks, initiate new tasks upon completion, and infrequently display inefficient work behavior. This supports the assertion that enhancing an employee's willingness and openness to explore new initiatives at work can lead to improved performance and increased productivity. Addressing employee motivation, job satisfaction, and overall well-being is crucial for enhancing work effectiveness and performance (Said et al., 2015). The study corroborates findings regarding high work performance, indicating that elevated job performance reflects an employee's capabilities. The overall performance of an organization depends on the effectiveness of employee performance. For sustained growth, employees must achieve improved outcomes and maintain high productivity (Obiekwe, 2016). Berliana et al. (2018) noted that employee performance can be assessed through innovation, initiative, quantity, and quality factors.

3.4. Relationship Between Librarians' Motivation, Leadership Styles, and Work Performance

Table 4 presents the results concerning the relationship between motivation, leadership styles, and the work performance of librarians in the Davao Region.

Table 4. Correlation analysis between librarians' motivation, leadership styles, and work performance

Variables	Pearson r	Interpretation	p-value	Decision on Ho
Leadership Styles and Work Performance	0.728	Strongly Correlated	-0.020	Reject
Librarians' Motivation and Work Performance	0.659	Moderately Correlated	0.025	Reject

The analysis reveals the findings regarding the relationship between leadership styles and work performance, as presented in the table. Leadership styles exhibit a moderate correlation with the work performance of librarians in the Davao Region, indicated by an R-value of .659 and a probability value of less than 0.05. Values ranging from 0.3 to 0.7 suggest a moderate linear relationship (Ratner, 2009). Thus, the null hypothesis asserting that "there is no significant relationship between leadership styles and work performance" is rejected. Furthermore, leaders employ effective communication strategies to inspire enthusiasm and foster confidence inside the library (Orewa, 2019). These findings correspond with those of Segun-Adeniran (2015), who determined that library leaders' leadership and leadership styles affect the productivity and overall performance of library staff members. It was suggested that various leadership styles should be utilized with balance and discernment. Furthermore, library directors must implement a leadership strategy that cultivates a strong sense of accountability among their staff, thereby improving productivity, efficiency, and competitiveness.

In addition, the investigation showed that the correlation between the job performance of librarians and the motivation of librarians created a correlation coefficient of .728. Ratner (2009) observed that values that fall within the range of 0.7 to 1.0 indicate a strong positive connection. The fact that this is the case suggests a strong and significant association between the motivation of librarians and their work performance. Hence, a higher level of motivation ultimately leads to improved work performance, which implies that librarians place a large amount of weight on their motivation when working.

This outcome is based on Maslow's Theory of Human Needs (1943), which posits that fulfilling motivational needs encourages individuals to excel in their present roles. Employees exhibit enhanced efficiency when motivated. Moreover, it affects their effort levels and significantly influences their work performance, enhancing the firm's overall performance. Furthermore, the findings indicate a substantial positive correlation between employee motivation and job performance (Forson et al., 2021; Posigha & Barr, 2021; Pramudena et al., 2021). This indicates that motivated individuals are more prone to experience happiness and increased energy at work, rendering motivation crucial. Accessible staff training and development programs, favorable service regulations, and equitable compensation packages may contribute to this conclusion.

Furthermore, this study's findings contradict those of a recent investigation by Ajayi et al. (2018), which revealed no association between employee motivation and performance. Consequently, low dedication and a significant absenteeism rate are apparent. Despite implementing measures like pay increases, this approach was regarded as ineffectual. In comparison to the outcomes of this study, employees may exhibit elevated production levels when motivation is actively fostered.

4.0 Conclusion

The study found that librarians in the Davao Region have strong motivation, high external motivation, intrinsic motivation, and adequate compensation. They also demonstrate excellent job performance, engaging in work-related discussions and problem-solving activities. Notably, librarians rarely engage in counterproductive work conduct, indicating loyalty and dedication to their careers. Leadership styles such as transactional, transformational, democratic, and laissez-faire are prevalent, with transformational and democratic leaders prioritizing the advancement of their subordinates. These leaders ensure accountability and autonomy while acknowledging the importance of soft skills complementing qualifications. Upon conducting the correlation analysis, the data indicates a significant correlation between leadership styles and work performance and librarians' motivation and work performance, with most indicators exhibiting high descriptions.

With the ongoing findings, library directors ought to institute frequent staff training and educational efforts to enhance the preparedness and efficacy of library personnel. This can promote favorable engagement, enhance morale, and boost productivity. Transformational and democratic leadership styles help cultivate a conducive workplace environment. The motivation of librarians is robust, and library administrators ought to commend and acknowledge their contributions. Implementing learning and development activities helps improve interpersonal skills, including communication, teamwork, problem-solving, and flexibility. Library managers must set aspirational goals and link skill levels with positions to enhance employee success. Additionally, leaders must know that acknowledgment and gratitude are paramount to improving the work environment and the overall well-being of the employees.

Furthermore, the findings influence the librarianship profession and can aid in developing programs and initiatives to enhance employee motivation and work performance. Moreover, minimizing staff turnover and preventing detrimental work habits, such as low engagement and frequent absenteeism, are essential for sustaining a healthy work environment. This may serve as a channel for librarians to communicate their sentiments and interests to upper management while striving to provide great service in return for just treatment and reasonable compensation for their commendable work. This study may prove beneficial for future researchers examining the larger phenomena associated with the impact of leadership styles and librarians' motivation on work performance within librarianship.

5.0 Contributions of Authors

The authors contributed equally to the completion of this study. Both authors wrote, revised, and analyzed the data. They also prepared and modified the study questionnaires and designed the study arrangements. Author 1 wrote the initial draft of the manuscript, while author 2 assisted in the revisions and editing of the paper. The authors also provided input on the approval for publication.

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Exploring the Impact of Modern Rice Farming Technologies on Small-Scale Rice Farmers in Tanauan, Leyte, Philippines

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Abstract. The use of modern rice farming technologies in modern agriculture plays a big role in developing countries like the Philippines in terms of food security and farmers' earnings. Hence, it has undoubtedly brought advantages to rice farmers. However, it also brought disadvantages to them. This phenomenological research aimed to understand the lived experiences of small-scale rice farmers using modern rice farming technologies. Fifteen (15) farmers from Brgy. Sta. Elena, Tanauan, Leyte were purposively selected as the study participants. The data were collected using open-ended questions and semi-structured interviews and were analyzed using Braun and Clarke's method of data analysis. Based on the findings, the results of modern rice farming technologies were categorized into positive and negative impacts. Moreover, farmers have also experienced problems with new technologies, which they find financially challenging because new farming technologies are costly and require high maintenance. Farmers also encountered the ineffectiveness of Agri-systems and programs, such as inadequate government backing and the insufficient implementation of farm-to-market options, which the farmers are looking into to attain sustainability. The researcher implicates the collaboration of Civil Organizations, the partnership between private sectors and Local Government Unit (LGU), a continuous training session covering topics involving new methods from the Department of Agriculture (DA), and the increase and sustainable supply of hybrid seed varieties, fertilizers, and pesticides in order for the small-scale rice farmers to have a sustainable livelihood.

Keywords: Department of Agriculture; Modern rice farming technologies; Rice farmers; Technology Impacts.

1.0 Introduction

Farming has always been done using conventional techniques until the introduction of modern rice farming technologies across the world (Folnovic, 2016). According to Bhattacharya and Ali (2015), in many countries in Asia, rice is still harvested by hand sickle. In contrast, combined harvesting is more common in industrialized countries with large farm holdings and expensive labor. On the other hand, manual harvesting can be a difficult, time-consuming, labor-intensive, and expensive process at times. As a result, several Asian rice-producing countries have made significant efforts to adopt modern rice farming technologies suitable for the current situation (Alizadeh & Allameh, 2013).

In the Philippines, modern farming technologies played an important role in the development of the rice industry (Villano et al., 2014). Modern-day rice farming technologies are being created and made on hand to farmers through Research and Development (Villano et al., 2014). Using these techniques provides a wide variety of potential benefits for customers, farmers, and the country's economy. One of the key motives rice yields have accelerated in the Philippines is the usage of high-yielding seeds. Using more advanced technology by rice growers may increase agricultural output (Villano et al., 2014). According to the Department of Agriculture (2020), its National Rice Program (NRP) offers assistance to elevate farm production and increase income as farmers struggle to deliver these technologies.

Although the adoption of rice farming technology in the Philippines is extensive, a few regions still exercise the traditional approaches to rice farming, like Tuguegarao City (Gallibu & Tindowen, 2015). Itawes rice farmers still cultivate and harvest rice grains with traditional tools and machinery. The farmers practice their traditional animistic beliefs for thanksgiving and good luck (Gallibu & Tindowen, 2015). At the recent Project Rebound webinar, panelists noted that Filipino farmers are already aging and not as open to learning, much less adopting, new technologies. (Boledo, 2021). According to the Philippine Statistic Authority, rice production in Eastern Visayas has increased by 6.7 percent in the first three months of 2021 compared to the same period in 2020, largely due to the expansion of areas devoted to staple food production (Meniano, 2021). Leyte province contributed the biggest share in rice yield in Eastern Visayas at 139,207 MT during the period, comprising more than half or 51.6 percent of the total palay production in the region.

Modern rice farming is defined as the mechanized systems that provide opportunities for rice farmers to boost input efficiency, agricultural industry profitability, and income, reduce labor costs, and have easier access to food security (Hasan et al., 2020). Meena and Meena (2014) also agree that to ensure the sustainable production of rice, the mechanization of the cropping system indeed increases productivity. In Ghana, the adoption of better rice seeds and fertilizer increases rice farmers' net income significantly, and farmers' choice of the selected agricultural technologies lowers income inequality among the sample population, indicating that adopting the technologies has an equalizing effect on rice farmers (Addison et al., 2022). Farmers lag far behind in Bangladesh in adopting mechanization in the land preparation phase using tractors (Hasan et al., 2020). However, throughout the span of the learning process, the technology adopter farmers were able to learn that their intensity of technology adoption has increased over the time period. In Eastern Ethiopia, for instance, Wordofa et al. (2021) discovered that improved adoption of farming technologies led to higher annual farm revenue per household than non-adopters. In Mozambique, a study showed that using improved seeds and tractors increased household income, particularly for those households with better market access (Cunguara & Darnhofer, 2011). However, the increase in input costs, unsustainable production practices, and climate change are all adding to rice farmers' risks and susceptibility (Segal & Minh, 2019).

In the Philippines, insufficient financial capital is found to be the most common need in rice farming; farmers are found to manage and cope with this problem by borrowing money from informal lenders. However, they are being charged with high interest rates (Palis, 2015). The Philippine Rice Research Institute [PRRI] has implemented a "PalaySikatan" RCEF-Seed Program highlighting the advantages of employing suggested rice varieties and cutting-edge farming techniques in a few key areas nationwide. The program provides information on recent technologies to rice farmers. Farmers took advantage of this chance to improve their agricultural knowledge, which will help them boost their yield and revenue (PRRI, 2022). The program was conducted to help Filipino farmers alleviate their economic status by having high-yielding rice varieties, whether inbred or hybrid, and to lessen their burdens on farm work through modern rice farming technologies (Castillo et al., 2016).

As presented in the following literature review section, most of the studies focused on the effect of modern rice farming on income and increase in rice production of the technology adopter farmers. However, very few studies have explored the impact of modern rice farming on small-scale farmers. Some rice farmers have found it challenging to shift from traditional farming practices to more modern ones, particularly without adequate training opportunities. This phenomenon leads to the conduct of the present study. This study is significant for understanding the impacts of modern rice farming technologies among small-scale rice farmers in Tanauan, Leyte. Specifically, the researchers entirely believe that the study was advantageous to the farmers it will describe the challenges encountered in rice farming and provide information to improve their rice production and familiarize them with recent rice farming technologies. The Local Government Unit (LGU) would understand the impacts of modern rice farming technologies and the challenges encountered by rice farmers in using these technologies to formulate programs and policies that would benefit the rice farmers. To the researchers, the results of the study will provide baseline information for further studies regarding modern rice farming. The outcomes of this study will offer valuable insights into the lived experiences and challenges of small-scale rice farmers in adopting modern rice farming technologies. These insights can guide engineers in designing and implementing practical, user-centered solutions that address specific technological gaps, optimize farming processes, and enhance the accessibility and efficiency of agricultural innovations.

2.0 Methodology

2.1 Research Design

This study utilized a qualitative research method, specifically a phenomenological research design that tends to describe a phenomenon by exploring the insights of those subjected to it (Neubauer et al., 2019). A phenomenological study explores one's lived experience that delineates meaning independent of personal biases and preconceptions (Vagle, 2014). A key element of phenomenology is exploring how people define and describe their lives (Cridland et al., 2014). The researchers used this design to capture the lived experiences of the participants and describe the meaning of these experiences to determine the impacts of modern rice farming technologies among farmers and the challenges experienced by rice farmers towards using these technologies.

2.2 Research Locale

The study was conducted in Brgy. Sta. Elena, Tanauan, Leyte, Philippines, a barangay located in District IV and known as a top rice-producing community. Among the 54 barangays in Tanauan, Sta. Elena ranks at the top, with 121 rice farmers producing the most rice, according to data from the Municipal Agriculture Office. This barangay was selected not only for its prominence in rice production but also due to its farmers' diversity of farming practices, ranging from traditional to modern methods. Moreover, its socioeconomic significance, accessibility to agricultural resources, and active participation in development programs make it an ideal location for assessing the impacts of modern rice farming technologies on small-scale farmers.

2.3 Research Participants

The participants were rice farmers of Brgy. Sta. Elena, Tanauan, Leyte There were 120 rice farmers, and 30% of them had experienced the use of modern farming technology. Hennink and Kaiser (2022) suggested that a qualitative approach should have 9-17 participants. Hence a sample of fifteen (15) was chosen purposively based on specified criteria. Also, the participants were selected based on their registration with the Municipal Agriculture Office, with no age restrictions and a minimum of three years of farming experience. This ensured that participants had adequate exposure to farming practices and technologies, while unregistered farmers and those with less than three years of experience were excluded. These criteria ensured a diverse yet experienced group of farmers for the study.

2.4 Research Instrument

The semi-structured interview guide served as the main research tool in this study. Semi-structured interviews were used so participants could respond freely while having a uniform experience. The interview guide was developed based on the research objectives. It consisted of open-ended questions designed to explore participants' experiences, perceptions, and opinions on the impacts of modern rice farming. This method also allowed the researcher to delve further into relevant discussion topics when new themes surfaced during the interviews. The survey questionnaire underwent a comprehensive validation process to ensure its credibility and reliability. It was peer-reviewed by experts in the field of research, and a dry run was conducted with a small group to identify potential issues. The questionnaire's validity was also confirmed through a thorough literature review, ensuring that all relevant constructs were effectively addressed.

2.5 Data Gathering Procedure

The researchers conducted in-depth interviews in a one-on-one conversation with the participants to collect data about the researcher's study. The interview utilized open-ended questions and semi-structured interviews. Moreover, follow-up questions were made so that the participants could elaborate further on their thoughts. This allowed a discussion between the participants and the researchers to unfold a better understanding of the answers from the interviewee. Furthermore, with the participants' permission, the interviewees were recorded through an audio recorder to precisely capture the data.

2.6 Ethical Considerations

For ethical reasons, the researcher will seek participants' consent before conducting the interview. Participants will be asked to complete an informed consent form. The researcher will assure participants that all information submitted will be treated with the highest secrecy and will be used only for the purposes of the study.

3.0 Results and Discussion

3.1 Impact of Modern Rice Farming Technologies

Positive Impact of Modern Rice Farming Technologies

There are three subthemes identified and grouped under the theme "Positive Impacts of Modern Rice Farming Technologies." These are (a) producing high yields, (b) increasing farmers' income, and (c) convenient and fast. Participants 1, 2, 5, and 15 are farmers who have experienced high-yield harvests by utilizing modern rice farming technologies. According to Xu et al. (2021), modern rice farming technologies (i.e., hybrid rice, use of fertilizers and pesticides) indeed produce higher yields and more than other rice varieties, such as inbred.

"Well, hybrid is quite good because it produces high yield, unlike the inbred. Lately, we got few harvests." P2

"Firstly, about rice variety, the good thing about it is its weight, and it is pretty good because of the higher yield." P5

"The good thing about it is, if it is well maintained with fertilizers and pesticides, then it produces a higher yield. If it is not treated well, it produces a lower yield." P15

Another positive impact of modern rice farming technologies on farmers is increased income. Through the use of modern rice farming technologies, the farmers' income is increasing, which was unlikely to happen previously. According to Ojo et al. (2018), accepting new technologies in agricultural activities can lead to a significant increase in productivity, hence an increase in income and improved livelihood. Additionally, Addison et al. (2022) claimed that the preferred agricultural technologies have an equalizing impact on the income of rice farmers.

"…the higher yield you got, the higher the income" P1

"Modern rice farming technologies are better, as for me, it is not time-consuming, and results in higher income." P3

"…fast in harvesting, then sometimes you get more harvest, higher income." P10

Farmers expressed satisfaction with modern rice farming technologies because they are convenient and less labor-intensive. Technologies certainly improved the farmers' farming methods, one of which is the quick response to upcoming calamities (e.g., typhoons). According to the Philippine Rice Research Institute (PhilRice), traditional harvesting would take at least a week per hectare, whereas new farming technologies would take 4-5 hectares daily.

"The modern technologies are better to use nowadays because it is not labor intensive, unlike in traditional ways it was a hassle because you have to maneuver and follow the carabao." P4

"The modern technologies are better because rice is being harvested fast." P10

"That cultivator is fast; no matter how many hectares you work on, it will be done quickly." P12

Negative Impact of Modern Rice Farming Technologies

Rice farmers are also experiencing the negative impacts of modern rice farming technologies. Some farmers do not use modern rice farming technologies, specifically machinery, since it destroys the paddy field. According to Kirchhof et al. (2011), soil structure is destroyed by mechanical breaking and dispersal of soil aggregates, which creates a puddled zone. The wheels of heavy equipment are the common cause of such destruction; they perforate the saturated soil and result in a deeper paddy field, making it difficult to use modern machinery in farming. Additionally, fertilizer overuse causes serious environmental degradation.

"The problem is, when your field is too muddy, the wheels of tractors deepen the soil; the same goes for the use of harvesters. As a result, it is difficult to use land masters because it will embed into the soil." P1

"We do not use those cultivators and harvesters because it destroy the paddy field." P2

"The bad thing is, the wheels perforate the paddy field." P4

However, Kirchhof et al. (2011) state that through effective weed control and soil softening, puddling reduces water use by reducing percolation losses and assisting in the manual transplantation of rice seedlings. Puddling of the soil over time also results in forming a compacted layer beneath the puddled area, further reducing percolation losses. Hence, it suggests that it is a good practice. Despite increased productivity, modern rice farming technologies hurt the outcome, particularly in rice quality (e.g., discoloration). According to Raghu et al. (2020), grain discoloration indicates the poor yield and quality of rice, resulting in low market value. Shafiekhani et al. (2018) also stated that rice discoloration presents a significant loss to farmers and processors. Moreover, the farmers in this study are experiencing an unclean harvest, and with harvesters, farmers tend to harvest a lot of rice chaff.

"In terms of machinery, the bad thing is that farm fields tend to get deeper, so the rice is not clean; it has a lot of harvested chaffs." P2

"…harvester somewhat harvests some rice chaffs that is all, but not much." P5

"This harvester somewhat harvests rice chaff and the weight of rice is lighter." P12

Due to the effectiveness of technology, modern rice farming technologies mostly do farm work that is considerably labor-intensive back in traditional ways (e.g., harvesting). It would only take machinery and several operators or farm laborers to do the job. Although it may seem positive, this resulted in the availability of farm laborers. Most agricultural research found a negative relationship between labor input and machinery, suggesting that using machinery could replace unskilled laborers to increase output and decrease labor costs (Kea, 2016).

"Focus more on having the farmers because only a few farmers are left working here in rice farms." P3

"…prioritize the farmers because humanity relies on them for the food source." P5

"We are struggling to find farmers so if there are farmers available, much better." P3

3.2 Challenges Experienced by the Rice Farmers Towards New Farming Technologies

Financial Challenges
There are three (3) sub-themes identified under "Modern Rice farming technologies are financially challenging." These are (a) new farming technologies that are costly, (b) require high maintenance, and (c) loan. Although new rice farming technologies positively impact rice farmers, some rice farmers face difficulties in administering modern rice farming technologies because they are costly. Additionally, Signh (2010) reported that the high cost of high-yielding variety seeds was a problem for rice farmers. Moreover, according to Rhaman (2019), income is not significantly different, mainly due to the high cost of modern rice farming technologies (i.e., fertilizers).

"The fertilizers are now three times their previous price; the same goes for pesticides, which is the number one challenge to farmers. Even though there is a small subsidy given to farmers." P11

"… that is the only problem, the petroleum. We cannot afford to buy it." P13

"…lesser because fertilizers are costly." P13

As stated, modern rice farming technologies are good; however, farmers find it financially challenging to maintain them. For rice to grow properly, it requires a lot of fertilizers and pesticides. With this kind of problem, farmers do not like new technologies.

"In terms of rice variety, the thing is, it requires many fertilizers." P2

"In crop growing, it depends, for instance, that there is an infestation of pests. It is difficult, and that is the problem because you will buy pesticides for maintenance." P10

Some farmers also find it financially challenging to purchase modern machinery. These machines are subjected to technological malfunctions due to overuse. Mechanics sometimes suggest replacement due to unfixable conditions, which adds to their expenses.

"Just like the pump belt, you must buy a replacement if it is just the problem. In terms of machines, you get them from the field and get them fixed." P7

"The biggest problem is when the inside parts of the machine need to be fixed, you will have to spend more money." P15

With the financial challenge brought by modern rice farming technologies, some farmers have found a solution: borrowing money. However, this solution is not good for the farmers; it is a gamble because what they harvest is almost equivalent to what they have borrowed and is sometimes insufficient. According to Palis (2015), insufficient financial capital is the most common need in rice farming in the Philippines; farmers can manage and cope with this problem by borrowing money from informal lenders. However, they are being charged with high interest rates.

"Money is the partner; if you do not have money for the investment, you are definitely going to borrow money, and you will buy fertilizers and pesticides; it is necessary because if you do not, then how will you make a profit." P15

"When it is out of the field (machinery), you are going to send it to a fixing shop; if there is no money, you'll have to borrow and pay it after harvest season." P15

"You are going to look for investment for your farm; if you do not have money to spend, you are looking for money. Money is the partner." P8

Inefficiency of Agri-systems and Programs

Under "Inefficiency of Agri-systems and programs," two sub-themes were identified: (a) unsubstantial implementation of farm-to-market options and (b) insufficient government support. Road transportation is crucial to the development of agriculture. This is because it is the primary method of moving agricultural products from farms to markets and different urban areas where they can be bought and consumed (Tunde & Adeniyi, 2012). These roads assist farmers and fishermen in obtaining higher prices and a wider market for their goods, hence, higher income and lesser expenses. There are some interviewed farmers in the study who find the farm-to-market roads beneficial at some point in their lives yet still be a problem. Participants 3 and 11 said,

"…we lack with those farm-to-market." P3

"Transportation is the number one problem for farmers." P11

"Firstly, the problem of farmers is the transport expenses, from farms to possible roads." P11

Government support has one of the greatest influences on rice production in such countries. In Southeast Asia, the role of government in the rice industry is crucial. It interferes with rice production to boost output and achieve self-sufficiency in the sector (Laiprakobsup, 2019). Under Duterte's administration, the DA implemented the "Plant, Plant, Plant Program" or "Ahon Lahat, Pagkaing Sapat (ALPAS) laban sa Covid-19," which seeks to increase national agri-fishery output through increased use of high-quality seeds, suitable inputs, and modern technologies to boost productivity levels across all commodities and ensures food productivity. This program was nationwide; however, it is still insufficient, and only a handful of farmers are benefiting from this according to the interviewed farmers.

"We hope for a solution. The government should increase the number of seeds because what they give nowadays is lacking, so inbred and hybrid are somewhat combined. Then the fertilizers, there should always be a fertilizer." P2

"All farmers should be given rice variety, not selected ones only. Like financial assistance, like fertilizers, and if the Department of Agriculture gives assistance, everyone should be given it." P5

"If the DA will support us, farming will be better for me. To avail ourselves of seeds, there is also fertilizer to minimize expenses." P8

Modern Rice farming technologies have improved many of the farmers' lives and their farming practices. New rice farming technologies are useful, fast, and convenient during farming processes (i.e., land preparation, crop growing, and harvesting), and they boost production, making farmers more productive than ever. Based on the findings, farmers produce high yields because of modern technologies. However, the Philippines still imports rice from neighboring countries. According to Cardona and Garcia (2016), the Philippines' initial goal of rice self-sufficiency in 2013 was moved, and the country is likely to import rice from the neighboring countries. This is mainly because of high rice consumption, increased population growth, challenges in rice production, and an increasing amount of imported rice.

On the other hand, according to Villano (2014), the increase in production implies an increase in income, thus making rice farming a profitable livelihood for rice farmers. Based on the findings, unlike traditional rice farming practices, the farmers are experiencing an increase in income. Adapting to modern technologies in agricultural practices can increase income due to a significant increase in production (Ojo et al., 2018). However, in the Philippines, farmers remain the poorest in the country (Ocampo & Pobre, 2021). According to the Philippine Statistics Authority (PSA), it was reported in 2020 that farmers had a high poverty incidence among other basic sectors in 2018.

Furthermore, the findings of this study also revealed that the farmers preferred modern rice farming technologies due to their convenience and fast work (e.g., harvesting). According to the Philippine Rice Research Institute (PhilRice), traditional harvesting would take at least a week per hectare, whereas new farming technologies would take 4-5 hectares daily. Jones et al. (2019) also claimed that technology can increase task efficiency, improve food quality and quantity, and reduce labor-intensive tasks. Hence, with the use of modern technologies, farmers became more productive.

However, farmers are aware of the disadvantages brought by these modern technologies and cannot be helped; thus, they have embraced the negative effects of these new technologies. As farmers have observed, during farming procedures, the soil being highly saturated results in work difficulties, and modern rice farming technologies are becoming useless in this scenario. Fertilizers are being washed out, too much water slows down the growth rate of rice, and machinery perforates the paddy field, resulting in deeper soil. However, Kirchhof et al. (2011) stated that through effective weed control and soil softening, puddling reduces water use by reducing percolation losses and is useful in assisting the manual transplantation of rice seedlings. Puddling the soil over time results in a compacted layer beneath the puddled area, further reducing percolation losses.

Another negative impact of modern technology is the observed unclean harvests by the farmers, like participants 2, 5, and 12. They have observed many rice chaffs mixed in grained rice by this new technology (i.e., harvester). This may add to the observed unpleasant rice quality, such as discoloration. The discoloration of rice grain indicates poor yield and quality of rice, which causes it to lose its market value (Raghu et al., 2020). Shafiekhani et al. (2018) also noted that rice discoloration significantly loses farmers and processors. Furthermore, even though the utilization of new technologies has seemed positive about their effectiveness, the availability of farm laborers decreased. Most agricultural research discovered a negative relationship between labor input and machinery, indicating that using machinery could eliminate the need for unskilled laborers to increase output and lower labor costs (Kea, 2016).

As farmers experience the negative impacts of modern rice farming technologies, they also carry the burden of these new technologies. Based on the result of the analysis from the interviews and observations, rice farmers are struggling financially. Most of the farmers in the study admitted that finances come first to have a good and better outcome in modern farming (i.e., positive impacts). Farmers in the study also find it financially challenging in terms of maintenance; to gain more harvest, farmers provide a sustainable number of fertilizers and pesticides to ensure a good result. Machines are being sent to workshops to avoid delays to fix such damages or malfunctions. Hence, these maintenances add up to their expenses.

Furthermore, it was revealed that the solution of rice farmers to financial challenges is mainly to borrow money. However, what they have harvested is almost equivalent to their borrowed capital and sometimes less. Insufficient financial capital is the most common need in rice farming in the Philippines, and farmers are found to manage and cope with this problem by borrowing money from informal lenders. However, they are charged high interest rates (Palis, 2015). According to Teye (2021), the reason behind the high charges is that farmers are mistreated by financial institutions, which acts as a barrier to facilitating their access to loans. Moreover, government support plays a big role in the country's rice production. It interferes with rice production to boost output and achieve self-sufficiency in the sector (Laiprakobsup, 2019).

The DA under Duterte's administration implemented the "Plant, Plant, Plant Program" or "Ahon Lahat, Pagkaing Sapat (ALPAS) laban sa Covid-19." it seeks an increase in agri-fishery production through an increase in financial inputs, high-quality seeds (e.g., hybrid) and modern technologies (i.e. machinery) that will boost productivity levels across all commodities and ensures food security nationwide. However, it is still insufficient, and only a handful of farmers benefit from the said program according to the interviewed farmers. Traditionally, local politicians and representatives from national government agencies in the Philippines, as well as the Japan International Cooperation Agency (JICA), Nippon Koei, and other aid organizations, hold power making Agrarian Reform Beneficiaries (ARBs), who are much fewer powerful than other supporting actors like landowners and traders, receive disproportionately fewer benefits (Teves, 2022a).

Furthermore, the DA also provided farmers with a Farm-to-Market Road Development Program because transportation is crucial in developing the agricultural sector. It is the initial procedure of moving agricultural products from farms to markets and different urban areas where they can be bought and consumed (Tunde & Adeniyi, 2012). However, for the same reason as the "Plant, Plant, Plant Program," it is argued that even though the FMR encouraged cooperation and advantageous relationships among aid authorities, the non-poor sector benefited more significantly. In order to maximize the benefits of FMR, Agrarian Reform Beneficiaries (ARBs) demand additional support (Teves, 2022b).

This study may have several limitations. For several reasons, the findings cannot be applied to the general population or all rice farmers. This is partly because of the narrow scope of the inquiry; these new experiences varied, and the qualitative findings cannot be generalized (Brodsky, 2016). Because the study is geographically constrained, it is impossible to extrapolate participant experiences to its context. For future works, other researchers may focus on coped solutions to the problems experienced by rice farmers regarding new rice farming technologies and also the experiences of rice farmers who are still utilizing traditional practices. Additionally, considering that the current study focuses on the impacts of modern rice farming technologies among rice farmers in Tanauan, Leyte, further study may be conducted in other locales. Moreover, a qualitative study may also be conducted to provide generalized results.

4.0 Conclusion

Based on the study's findings, the farmers experienced various positive impacts, such as producing high yields, and an increase in yield implies an increase in income. Also, farmers find it convenient and fast, but they also experience the negative side of it; according to them, it destroys paddy fields, produces unclean harvests, and has observed that farm laborers are disadvantaged. Moreover, farmers also have experienced problems with new technologies. They find it financially challenging because new farming technologies are costly and require high maintenance. Farmers' solution to these problems was to borrow money; however, due to high interest rates imposed by some financial institutions, their harvests became payment, almost equivalent to what they borrowed and sometimes less. Thus, borrowing money also became a financial challenge to the rice farmers. Furthermore, farmers also experienced the inefficiency of agri-systems and programs, such as the unsubstantial implementation of farm-to-market options and insufficient government support, which the farmers are looking into in order for them to achieve sustainability.

Given the findings of this study, the researcher recommends the collaboration of Civil Organizations (i.e. farmers' associations) in order to reinforce farm laborers to one another, the encouragement of Barangay through ordinances for farmers to continue farming, the partnership between private sectors and Local Government Unit (LGU) to provide modern rice farming technologies (i.e. machinery) for the farmers, and LGU may ensure to look into the implementation of transportation (i.e. farm-to-market roads) so that delays will be avoided and fewer expenses for rice farmers.

A continuous training session will be held covering topics involving new methods from the Department of Agriculture (DA) and encouraging all farmers to attend. The National Government may ensure the proper implementation of "The Agriculture, Fisheries, and Rural Development Financing Enhancement Act of 2022," which also states that lending cooperatives, microfinance institutions, retail banks, and rural and thrift banks shall apply minimum interest rates for wholesale loans obtained from government banks. The researchers recommend increasing a sustainable supply of hybrid seed varieties, fertilizers, and pesticides for the rice farmers to have a sustainable livelihood.

5.0 Contributions of Authors

JBV, GPG –writing, editing, encoding, fieldwork, ART, JPV – data analysis, supervising.

6.0 Funding

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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. No financial, personal, or professional interests have influenced the research or its outcomes, and all work has been conducted with transparency and integrity.

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Human Resource Management Processes for Achieving Quality Teachers Through the Lens of Career Progression

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Abstract. This study investigates the relationship between human resource management processes and career progression among teachers in DepEd Region XII. Specifically, it examines how selecting and staffing, training and development, compensation and benefits, and employee assistance influence career goals, career navigation skills, and career success measures. Descriptive-predictive correlation analysis was employed using survey data from teachers in four divisions. Findings reveal a significant positive correlation between human resource management processes and career progression, suggesting that effective HR practices can enhance teacher development and career satisfaction. The study's results provide valuable insights for DepEd to improve its HR programs and foster a more supportive environment for teacher growth.

Keywords: Human Resource management processes; Career progression; Teacher development; practices; DepEd Region XII.

1.0 Introduction

Human resource management (HRM) is a critical organizational function influencing employee behavior, attitudes, and performance. Effective HRM practices are essential for fostering a positive work environment, enhancing employee satisfaction and engagement, and achieving organizational goals. While numerous studies have explored the relationship between HRM and various organizational outcomes, the specific impact of HRM practices on teacher career progression remains a relatively understudied area.

Previous research has highlighted the significance of HRM in creating a supportive and nurturing environment for employees, facilitating their professional development, and promoting job satisfaction Mensah (2014) Moreover, studies have demonstrated a positive correlation between effective HRM practices and employee performance, organizational commitment, and overall organizational success Ogedegbe, R. J. (2014) However, the literature on the specific impact of HRM practices on teacher career progression is limited. While some studies have examined the role of HRM in supporting teacher development and retention, there is a need for further research to delve deeper into the intricate relationship between HRM practices and teacher career trajectories.

This study aims to address this gap in the literature by investigating the relationship between HRM practices and teacher career progression in DepEd Region XII. Specifically, the research will examine how various HRM practices, including selection and staffing, training and development, compensation and benefits, and employee assistance, influence teachers' career goals, career navigation skills, and career success measures. By understanding this relationship, the study seeks to provide valuable insights for educational institutions and policymakers on optimizing HRM practices to support teacher development, enhance career satisfaction, and ultimately improve the quality of education.

2.0 Methodology

2.1 Research Design

This study used quantitative research utilizing descriptive-predictive correlation.. Descriptive correlational design is used in research studies that provide static pictures of situations and establish the relationship between variables Mensah (2014). This quantitative research method aims to describe two or more variables and their relationships, such as the Human Resource Management Processes and Career Progression, that provide a picture of the current state of attaining quality teachers.

2.2 Research Locale

The study was conducted in the school divisions of South Cotabato, Sultan Kudarat, Sarangani Province, Koronadal City, and General Santos City in DepEd Region XII or SOCCSKSARGEN Region. It is one of the 14 development regions of the Philippines and is in South Central Mindanao. The acronym stands for the region's four provinces and one of its cities, South Cotabato-Cotabato-Sultan Kudarat-Sarangani-General Santos City. Its older name, Central Mindanao, is more formally known in the area. The regional center is Koronadal City, located in the province of South Cotabato.

2.3 Research Participants

The respondents of this study were the 100 public elementary teachers aspiring to become school heads of these selected divisions of DepEd Region XII, namely, South Cotabato, Sultan Kudarat, Sarangani, and General Santos City. The respondents answered the questions about the HRM processes in attaining quality teachers through the lens of the career progression of their divisions. Moreover, this research used non-probability purposive sampling. Purposive sampling is used in research studies to select a specific group of individuals or units for analysis. This method is appropriate when the researcher has a clear idea of the characteristics or attributes they are interested in studying and wants to select a sample representative of those characteristics. The purposive sampling technique is appropriate for the study because it sought to describe the HRM processes of DepEd Region XII.

2.4 Research Instrument

For this study, the research instrument used was a researcher-made questionnaire. The questionnaire's contents were taken from related literature and studies, journals, books published, and unpublished theses. A questionnaire contains a set of questions that address a statistically significant number of subjects about the study to gather information for a survey, which was modified and subjected to the validation of experts.
Part I measures the extent to which human resource management processes affect participants, while Part II deals with the extent of respondents' career progression.

Three validators from CSU were asked to validate the research instrument to establish its validity. To establish the instrument's reliability, pilot testing was done on a 10% total sample with characteristics similar to those of the target respondents who were not included in the study. This was treated using the alpha Cronbach test. Results revealed that the content reliability of 0.959 greater than 0.60 is acceptable. Therefore, the figures indicate that the contents were satisfactory in terms of internal consistency.

2.5 Data Gathering Procedure

The researcher sent the survey questionnaire online to the school heads of different schools. Survey screenshots were sent to the school group chats to ensure respondents' participation. The link could be accessed once and sent to the researcher as proof of honest data gathering after the survey. The data were extracted from Google form, And the results were tabulated, presented, and analyze

3.0 Results and Discussion

3.1 Human Resource Management Processes

In terms of Selecting and Staffing

Table 1 presents the human resource management processes regarding selection and staffing.

Table 1. Descriptive result of the survey on human resource management processes in terms of selection and staffing

Indicators	Mean	Description
1. Establish an appropriate criterion for the selection process.	3.58	Highly Evident
2. Strictly employ qualified personnel.	3.54	Highly Evident
3. Regularly upload vacancies to the website for transparency.	3.58	Highly Evident
4. Establish a uniform criterion in Hiring.	3.69	Highly Evident
5. Establish an appropriate background investigation for all applicants.	3.51	Highly Evident
6. Hiring was based on the criteria set by the office.	3.67	Highly Evident
7. Establish a consistent, minimal consideration for applicants based on their qualifications.	3.57	Highly Evident
8. Provide an appropriate definition of the terms of each function.	3.61	Highly Evident
9. Implement appropriate plans and programs along with the job analysis of the recruitment process.	3.60	Highly Evident
10. Selection process based on the needs of the office	3.65	Highly Evident
Overall mean	**3.60**	**Highly Evident**

The overall mean was 3.60, which is still described as highly evident. This result means that the four school division offices of Region XII have set uniform criteria for selection and staffing. This finding implies that the Equal Opportunity Principle was evident in the department. This is supported by Gamage (2014), as cited by Daguman (2020), who states that the quality of human resources depends on the effectiveness of these two functions: recruiting and selecting capable candidates at a cost that businesses can afford. Thus, the overall aim of recruitment and selection within the organization is to obtain the number and quality of employees required to satisfy the organization's strategic objectives at a minimal cost Qutni, et. Al (2014)). This result affirms Iskarim (2017) that a better understanding of the position of human resource management in an organizational context requires an understanding of the meaning of human resource management itself to position the role of human resource management in the dynamics of organizational movements like the pointing out of hiring based on the set criteria of the office.

In terms of Training and Development

Table 2 presents the human resource management processes regarding training and development.

Table 2. Descriptive result of the survey on human resource management processes in terms of training and development

Indicators	Mean	Description
1. Develop an activity and training to improve performance.	3.61	Highly Evident
2. Establish appropriate training and orientations regularly.	3.50	Highly Evident
3. Establish a consistent conduct of training for improvement.	3.44	Highly Evident
4. Design a development plan.	3.50	Highly Evident
5. Training conducted patronizes the advanced technology	3.56	Highly Evident
6. Initiates training aims to transform values and work ethics	3.54	Highly Evident
7. Provide appropriate monitoring and evaluation of the activity	3.63	Highly Evident
8. Conducted training measuring the strengths and weaknesses of employees.	3.40	Highly Evident
9. Design an appropriate avenue of hiring based on the standards.	3.51	Highly Evident
10. Training was classified based on needs.	3.54	Highly Evident
Overall mean	**3.52**	**Highly Evident**

The overall mean was 3.52, and training and development in the department were interpreted as highly evident. This supports the study of Trot (2020), who states that one of the functions of human resource management is training and development, meaning that to get an educated workforce with excellent and appropriate human resources, it is necessary to hold training and development. This is an effort to prepare the education workforce to face job assignments that are considered to have not been mastered. This means it is more of the strengths and weaknesses but also deals with threats and opportunities. Further, Klein, F. (2014).) supports the idea that through training, employees are helped to do existing jobs, improve their overall career, and develop their responsibilities for the future. Suppose training is more oriented towards present conditions, while development is more oriented towards the future. However, it is opposed to Budiyanti et al. (2020) that training service quality is strategically crucial due to its ability to establish employee satisfaction, trust, and motivation, impacting their achievement during the training process.

In terms of Compensation and Benefits

Table 3 presents the human resource management processes regarding compensation and benefits.

Table 3. Descriptive result of the survey on human resource management processes in terms of compensation and benefits

Indicators	Mean	Description
1. Has appropriate privileges for all employees.	3.50	Highly Evident
2. Develop monitoring of career progression of all employees	3.46	Highly Evident
3. Orient employees on their accountability and responsibility in the office	3.58	Highly Evident
4. Create a feedback mechanism for all employees.	3.36	Highly Evident
5. Design an avenue to hear employees' sentiments and grievances.	3.25	Highly Evident
6. Provides a basic idea for planning and implementation of giving awards for their performance in the previous period.	3.40	Highly Evident
7. Develop a career path orientation to improve performance.	3.47	Highly Evident
8. Privileges become a motivation to improve performance.	3.42	Highly Evident
9. Employees have equal opportunities relating to privileges.	3.33	Highly Evident
10. Privileges become a motivating factor in developing further dedication.	3.38	Highly Evident
Overall mean	**3.42**	**Highly Evident**

The overall mean was 3.42, indicating that compensation and benefits are highly evident. This result implies that accountability and responsibility in the office allow employees to understand the basic do's and don'ts while being employed in the department needed for a particular role. This supports Daley, C. (2016). and Collins, C. J. (2021) that compensation is imperative for employees as it offers a sense of security, autonomy, and improved self-worth that could lead to employee commitment and productivity. This is how accountability and responsibility are expressed evidently in the workplace.

The result also agrees with Qutni (2021) that the management of compensation is an essential function in an ideal organization and is usually part of the idea of responsibility for the institution concerned. One of the most important cases is the idea of a job where most employees are paid. Ideally, Teachers or employees should be paid equal to the qualifications irrelevant to the job and the number of employees in the workforce who have that qualification. Compensation is a financial reward, service, and benefits that in-laws or employees receive as part of an employee relationship. Compensation is also what teachers or employees receive as a substitute for their contribution to the organization. This made teachers of the locale have a highly evident orientation on their accountability and responsibility in the office.

In terms of Employee Assistance

Table 4 presents the human resource management processes in terms of employee assistance.

Table 4. Descriptive result of the survey on human resource management processes in terms of employee assistance

Indicators	Mean	Description
1. Feel there are real opportunities for career development.	3.37	Highly Evident
2. Are committed to their jobs.	3.49	Highly Evident
3. Feel that the institution cares about them.	3.33	Highly Evident
4. Get ahead fairly in the institution based on the merits of their work.	3.33	Highly Evident
5. Would recommend the institution as a place to work.	3.32	Highly Evident
6. Further orientation on rights and employee discipline is needed.	3.36	Highly Evident
7. We Were loaded with complicated work tasks.	3.21	Highly Evident
8. Seek career success through their relationship with supervisors.	3.29	Highly Evident
9. See that a positive relationship is an organizational commitment that adds to job satisfaction.	3.42	Highly Evident
10. A good relation management system encourages innovativeness and supports employee efforts.	3.46	Highly Evident
Overall mean	**3.36**	**Highly Evident**

The overall mean was 3.36, which is still interpreted as highly evident regarding employee assistance. This result implies that programs for employee assistance are a component of an organization's commitment. Employees deal with issues at work that may have a detrimental impact on their commitment to their organization. It is an essential tool for helping employees deal with personal issues affecting their dedication at work. It is affirmed in the study of Klein (2014) that employees are motivated if there is work engagement, which could be induced by HRM processes such as training and development, performance feedback, social support, and supervisory coaching, which is evident in the variables of selecting and staffing and training and development. Employees are considered the essential resource for gaining a competitive advantage. Companies rely on skilled workers to be productive, creative, and innovative and to provide high-quality customer service (Liu Chong et al., 2020).

Also, this supports the claim of Suryadi et al. (2020) that increasing the quality of management resources leads people to see the concept in the totality of life, the dimensions of quality that lie in the context of the development, namely good faith and professional service, intellectual discipline, and efficiency, as to assist the employees of an organization. As Kirchmeyer, J. (2018). states, Human Resource Management (HRM) is the term used to describe formal systems devised for managing people within an organization. HRM maximizes an organization's productivity by optimizing its employees' effectiveness. Human resource management (HRM) is a strategic approach to managing employment relations that emphasizes that leveraging people's capabilities is critical to achieving competitive advantage.

3.2 Career Progression

In terms of Career Goals

Table 5 presents the extent of participants' career progression regarding career goals.

Table 5. Descriptive result of the survey on career progression in terms of career goals

Indicators	Mean	Description
1. Make career choices based on the interests of the employee.	3.47	Highly Evident
2. Want to take on increasingly challenging tasks.	3.31	Highly Evident
3. Establishment of clear career goals for oneself.	3.47	Highly Evident
4. Want to be known as an expert in a particular field.	3.39	Highly Evident
5. Want to advance one's career at all costs.	3.32	Highly Evident
6. Want to have a sense of personal achievement in an administrative role	3.36	Highly Evident
7. Give something back to the community	3.49	Highly Evident
8. Improve collegiality/ teamwork in the workplace	3.61	Highly Evident
9. Want to exercise professional autonomy through the lens of one's vision.	3.43	Highly Evident
10. Want to establish a school culture worthy of emulation.	3.58	Highly Evident
Overall mean	**3.44**	**Highly Evident**

The overall mean was 3.44, which is still interpreted as highly evident in career progression regarding career goals. This result implies that safety and trust were built in a workplace with colleagues, contributing to professional development opportunities. In the study of Ganiron and Ganiron (2013), results indicate that the most objectively successful professionals regarding their career goals appear to be the ones who are active in participating on a committee, hold an office in a professional society, and are highly skilled and computer literate. More so, professional development, network, and professional linkages contributed significantly to their career goals.

This also affirms the survey of Sandoval (2015), which states that the most important variables related to setting career goals are individual interests, abilities, desires, needs, and choices. Career planning involves the identification of career-related goals and establishing plans for achieving these goals. It is an activity performed by an individual to understand and be able to control his/her work life. Therefore, increasing challenging tasks may lead to lessened interest, but abilities, desires, needs, and choices will also increase, showing an evident response toward the challenge.

In terms of Career Navigation Skills

Table 6 presents the extent of participants' career progression regarding career navigation skills.

Table 6. Descriptive result of the survey on career progression in terms of career navigation skills

Indicators	Mean	Description
1. Know the priorities in the choice of career	3.49	Highly Evident
2. Set criteria for achieving one's goal.	3.49	Highly Evident
3. Seek help from others in career direction.	3.57	Highly Evident
4. Know what skill or skills are required by the office.	3.56	Highly Evident
5. Establish a strong collaboration in advancing one's career.	3.56	Highly Evident
6. Find interest in improving one's career.	3.53	Highly Evident
7. Decide on what career to take	3.53	Highly Evident
8. Find other opportunities to improve your career	3.53	Highly Evident
9. Explore other opportunities aligned to one's interest.	3.54	Highly Evident

10. Explore other opportunities to improve one's leadership	3.57	Highly Evident
Overall mean	**3.53**	**Highly Evident**

The overall mean was 3.53, which is still interpreted as highly evident. The result implies that matching personal preferences and market information allows individuals to make decisions that maximize their chances of achieving person-job fit, resulting in higher job satisfaction and productivity. Gati et al. (2023) suggest that decision-making, like pathway planning, is one of the most powerful tools a worker has to navigate their career effectively. The success of mapping may depend on the accuracy, thoroughness, and applicability of the knowledge acquired through self-assessment and career exploration. This is also supported by a study by Sullivan and Ariss (2021) highlighting the importance of information when making career decisions. However, other scholars argue that career decision-making is influenced more by access to opportunities. Much of the academic literature on career mapping focuses on how employers and organizations can build worker pathways to improve employee performance and opportunity. Third, career navigation involves integrating and negotiating education and work actions. This includes connecting to and exploiting opportunities facilitating skill and credential acquisition, job placement, and advancement. It requires individuals to engage in simultaneous actions that promote growth and social connections while remaining responsive to changing industry requirements. Beyond gathering information and making plans, navigation requires individuals to execute their plans and decisions–adapting to changing labor market circumstances and piecing together a series of actions that advance their career journeys.

This also supports Vitale (2016), who stated that individuals can struggle to set or navigate a path when facing career choices. Some individuals may find a counselor, teacher, or other mentors to help guide them, while others are satisfied and successful in their chosen jobs. Unfortunately, others may not. The strategies that could help them navigate their career include understanding one's interests, values, and skills, knowing the world of education and work, engaging in exploration, informed decision-making and planning, and managing educational and occupational progress over time.

In terms of Career Success Measures

Table 7 presents the extent of respondents' career progression regarding career success measures.

Table 7. Descriptive result of the survey on career progression in terms of career success measures

Indicators	Mean	Description
1. Enjoy seeing Work-life balance	3.40	Highly Evident
2. Improve work performance in the chosen career	3.51	Highly Evident
3. Improve performances that contribute to the greater majority	3.49	Highly Evident
4. Set directions to achieve personal goals in life	3.54	Highly Evident
5. Involve regularly in the organization of greater concern.	3.47	Highly Evident
6. Employ an appropriate review performance.	3.44	Highly Evident
7. Design a career path to improve compensation	3.46	Highly Evident
8. Develop new skills to improve one's life.	3.54	Highly Evident
9. Satisfied with the compensation received.	3.28	Highly Evident
10. Collaborate with others to improve career success.	3.53	Highly Evident
Overall mean	**3.51**	**Highly Evident**

The overall mean was 3.51, which is still interpreted as highly evident. This means that although no studies have investigated the relationship between career adaptability and life goals, it is known that there is a positive relationship between career adaptability and goal-seeking (Johnston, 2018). Further, it stresses that objective measures of career success pertain to those that others can observe and verify (Judge et al., 2015). Career success includes psychological and work-related outcomes from work role changes (London & Stumpf, 2012). Objective and subjective measures have operationalized career success. Objective measures of career success pertain to those that others can observe and verify (Judge et al., 2015). Career success measures based on the self-regulation approach and career goal feedback seem to use an active and constructive process in which individuals regulate their cognition, motivation, and behaviors. Both concepts seem to position the individual in a structure that makes him/her take an active and constructive role in the career process. Therefore, understanding the relationship between these two concepts and revealing the nature of the relationship could contribute to the field in terms of understanding the individual's career processes and coping with the potential problems in these processes. An analysis of the studies in the literature indicates that no studies investigated these two concepts based on similar approaches in tandem. There seems to be a need for understanding the relationship between these two concepts that might be associated with each other (Korkmaz & Kırdök, 2019).

3.3 Relationship between HR Management Processes and Teachers' Career Progression

Table 8 presents the correlation between the human resource management processes and teachers' career progression. It shows a positive correlation of 0.770 between the two variables, and they were significant at a 1% significance level (2-tailed). This means that the human resource management processes were related to teachers' career progression with some positive correlation. This result was unlikely due to chance, as indicated in the p-value = 0.000 at 0.01 significance level. Thus, this led to the decision to reject the null hypothesis, which states that there is no significant relationship between the human resource management processes and career progression. This implies that the higher the human resource management process is, the better the teacher's career progression.

Table 8. Correlation analysis between HR management processes and teachers' career progression

Human Resource Management Processes	**Pearson Correlation (r)**	**0.770****
	Sig. (2-tailed)	0.000
	N	72

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

This finding corroborates Daley, C. (2016). who states that human resource management is crucial in improving the quality of education. This means that an organization or educational institution can advance or develop with the support of human resources. Every educational institution or organization that wants to grow must pay attention to human resources and manage them well to create quality education through the lens of career progression. School education is primarily determined by the principal's success in managing educators and education personnel available. In this case, increasing productivity and work performance can be done by improving the behavior of teachers and education personnel in schools by applying various personnel management concepts and techniques. The principal is the key to achieving quality education in human resource management. The principal must strive to foster and develop human resources, educators, and staff to create quality education.

Career Progression Regressed to Human Resource Management Processes

Table 9 shows the coefficient of determination (or r square) value of 0.592, signifying that 59.2% of the variability or change in teachers' career progression was directly attributed to changes in human resource management processes. It has an adjusted r square of 0.587 and Std. The error of Estimate is at .280, where Human Resource Management Processes are the Constant Predictors. The statistical calculations were taken further by applying the linear regression analysis given the significant positive correlation. The linear regression model was used to determine the predictive value of the human resource management processes for the teachers' career progression.

Table 9. Teachers' career progression regressed to HR management processes

Model	r	r square	Adjusted r square	Std. Error of the Estimate	Significant F Change
1	0.770	0.592	0.587	.280	0.000

a. Predictors: (Constant) Human Resource Management Processes

Further testing with ANOVA assessed the linear relationship between the human resource management processes and teachers' career progression. At p-value = 0.000 at 0.01 level of significance, as shown in Table 9, it could be concluded that a linear relationship existed between the two variables because the best-fitting line had a straight appearance. Since a linear relationship was present between the two variables, a linear equation could be obtained using the coefficient data from Table 10. Thus, the equation became y = ax + b, where y teachers' career progression, a was human resource management practices, x was human resource management practices mean, and b was the human resource management practices constant. Therefore, the prediction equation could be written as Predicted teachers' career progression = 0.806(mean from human resource management practices) + .692. This result affirms Iskarim (2017) that a better understanding of the position of human resource management in an organizational context requires an understanding of the meaning of human resource management itself to position the role of human resource management in the dynamics of organizational movements like the pointing out of hiring based on the set criteria of the office.

Table 10. Coefficient from teachers' career progression regressed on HR management processes

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.692	0.280		2.474	0.016
	Human Resource Management Processes	0.806	0.080	.770	10.08	0.000

a. Dependent Variable: 2. Respondents' Career Progression

To illustrate the equation, here are the highest, average, and lowest means from indicators of human resource management practices. The highest mean was 4.0; teachers predicted career progression = 0.806(4.0) + 0.692, 3.92. Since the average mean recorded is 3.0, teachers' predicted career progression = 0.806(3.0) + 0.692 is 3.11, and the lowest mean is 2.25, predicted teachers' career progression = 0.806(2.25) + 0.692 is 2.51. Based on the data, it was concluded that as human resource management processes increased, so did teachers' career progression. More precisely, one can predict a 0.806-point difference in teachers' career progression for every one-point difference in human resource management processes. This prediction created the rate at which predicted teacher career progression changes in human resource management processes resulted. From the data interpreted, it can be summarized that the teachers' career progression demonstrated a significant positive correlation and predictive value to that of human resource management processes. With a statistically significant correlation of 0.000 for teachers' career progression, it was clear that a predictive 59.2% relationship existed for the variables investigated.This result opposed Iskarim (2017) that a better understanding of the position of human resource management in an organizational context requires an understanding of the meaning of human resource management itself to position the role of human resource management in the dynamics of organizational movements like the pointing out of hiring based on the set criteria of the office but affirms. However it affirms to Ogedegbe, R. J. (2014) studies have demonstrated a positive correlation between effective HRM practices and employee performance, organizational commitment, and overall organizational success.

3.4 Relationship Between HR Management Processes Sub-Variables and Teachers' Career Progression

In identifying the existing relationship between the human resource management processes sub-variables and teachers' career progression, correlation analysis explicitly used the Pearson r correlation. The range of relationships used was 1, which means that the two variables have a perfect positive correlation, and -1 for the ideal correlation, as shown in Table 11. After that, linear regression was applied to test the predictive ability of the relationship.

Table 11. Correlation between teachers' career progression and sub-variables of HR management processes

	Pearson Correlation	0.592**
Staffing and Selection	Sig. (2-tailed)	0.000
	N	72
	Pearson Correlation	0.607**
Training and Development	Sig. (2-tailed)	0.000
	N	72
	Pearson Correlation	0.709**
Compensation and Benefits	Sig. (2-tailed)	0.000
	N	72
	Pearson Correlation	0.**778****
Employee Assistance	Sig. (2-tailed)	0.000
	N	72

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

The table shows a positive correlation of 0.592 between Staffing and selection and career progression; .607 between training and development and career progression; .709 between compensation and benefits and career progression; and .778 between employee assistance and career progression. They were significant at a 1% level of significance (2-tailed). This means that among the sub-variables, most likely, employee assistance was related to teachers' career progression with some positive correlation. This result was unlikely due to chance, as indicated in the p-value = 0.000 at 0.01 significance level. This means that employee assistance is the best predictor of career progression. It implies that employee assistance is more predictive of the participants' career progression in human management resources processes.It conforms to the highlighted the significance of HRM in creating a supportive and nurturing environment for employees, facilitating their professional development, and promoting job satisfaction of Mensah (2014)

4.0 Conclusion

Based on this study's findings, the organization's human resource management processes effectively support employee development and career progression. Implementing structured selection and staffing practices, effective training and development programs, compensation and benefits systems, and employee assistance initiatives have created a positive and supportive work environment. The study also reveals a strong correlation between HRM practices and career progression. Participants clearly focused on career goals, including improving teamwork and collegiality, and actively sought career navigation and development opportunities. Moreover, the participants' emphasis on acquiring new skills and setting personal goals for professional growth further highlights the positive impact of HRM practices on their career trajectories. In light of these findings, it is recommended that the organization continue to prioritize and invest in its HRM practices. By maintaining a solid commitment to effective selection and staffing, training and development, compensation and benefits, and employee assistance, the organization can create a sustainable and supportive environment that fosters employee growth, development, and career success.

5.0 Contributions of Authors

AA – writing, encoding, and data analysis; BA – editing

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7.0 Conflict of Interests

There is no conflict of interest in this research

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Destination Image of Boracay Island and Tourist Satisfaction: Bases for Strategic Tourism Development Plan Enhancement

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Abstract. This study aimed to establish tourists' destination image of Boracay Island and their tourist satisfaction levels to provide bases for crafting enhancements in the existing Strategic Tourism Development Plan. Using the descriptive-correlational design, the researcher developed a questionnaire modeled after the work of Tran (2015) and surveyed conveniently 385, observing the proportional allocation sampling technique. The study found that respondents have a high destination image regarding attributes and offers. Likewise, they also admitted that they were very satisfied with their tourist experience on Boracay Island. The study also found significant relationships between tourist satisfaction and destination image regarding attributes and offers. The study's findings were used as a springboard for offering enhancements to the Strategic Tourism Development Plan. The study's findings and output are recommended for utilization, adoption, and dissemination.

Keywords: Destination image; Tourist Satisfaction; Boracay Island.

1.0 Introduction

It is known to everyone in the tourism industry that Boracay Island, located in the Philippines, has long been known as a top tourism destination celebrated for its beautiful beaches, lively nightlife, and stunning natural scenery (Carlos et al., 2023). The influx of tourists has positioned Boracay Island as a "tourist-friendly" destination, catering to the diverse interests and preferences of various types of travelers, including families, friends, couples, and solo adventurers. Maintaining the island's destination image and tourist trust is crucial amidst current challenges. Boracay's tourism industry faced obstacles related to regulations, infrastructure maintenance, entry procedures, illegal activities compromising safety and security, and overall satisfaction with hospitality and services (Boracay-Caticlan Sustainable Development Council, 2023).

These challenges have led to a decline in the island's reputation and have affected travelers' perceptions of Boracay as a premier destination in the Philippines. Issues such as deteriorating infrastructure and safety concerns have resulted in negative travel experiences, impacting Boracay's destination image negatively. Comparative analyses of tourist satisfaction surveys and feedback data from Boracay and other beaches can help identify common trends, preferences, and areas of improvement for destination management and marketing strategies (Salmon et al., 2020). Understanding Boracay Island's destination image and tourist trust is crucial for informing strategic tourism development plans. By assessing traveler perceptions and satisfaction, stakeholders can identify areas for improvement and develop initiatives to enhance the island's tourism sector effectively. These efforts will lay the groundwork for sustainable tourism development and ensure Boracay's continued appeal as a top destination in the Philippines.

Destination loyalty is always pivotal to the success and competitiveness of any tourist destination. It goes beyond mere repeat visits. It cuts across emotional attachment and positive perception about a destination. It also includes the willingness to advocate for the destination to other travelers (Lemy et al., 2020). Thus, any tourist destination must establish its sense of the matter. In this way, better planning is not only for managing the destination but also for the industry. Despite the plethora of research on the matter, very few studies have been conducted on the top tourism destinations in the Philippines. Researching this becomes a part of the social responsibility of destination managers, as Lee and Choi (2018) implied in their study.

Boracay's challenges and interventions provide a unique case study for understanding the complexities of sustainable tourism development. Destinations like Bali, Indonesia, and Phuket, Thailand, have faced similar challenges related to environmental degradation and overcrowding (Bagus et al., 2023). However, their approaches to addressing these challenges may differ based on local contexts, governance structures, and stakeholder dynamics. By comparing Boracay's interventions with those of other beach destinations, researchers can identify the best practices, lessons learned, and areas for improvement in sustainable tourism management. Studying tourist satisfaction levels across different beach destinations can provide valuable insights into the factors contributing to a positive visitor experience.

This study aimed to determine the destination image of Boracay Island and tourist satisfaction to enhance the existing Strategic Tourism Development Plan (Maming et al., 2021). The specific objectives were to address the low international tourist arrivals at Boracay Island by analyzing key factors related to tourist experiences. First, the study determined the profile of international tourists in terms of age, gender, income, occupation, origin, and frequency of travel. It also sought to assess tourists' perceptions of Boracay Island's destination image, focusing on its attributes and offers. Additionally, the study evaluated the level of satisfaction experienced by tourists during their stay on the island. Another objective was to identify if there is a significant relationship between the tourists' perception of the destination image and their overall satisfaction. Finally, the study aimed to provide recommendations for enhancing the existing strategic tourism development plan based on the research findings. This study was grounded in Boracay's unique challenges and distinct situations that differ from other referenced studies in several ways. It focused on tourist factors such as destination image and satisfaction and how they can inform strategic and sustainable tourism development planners to address Boracay's current conditions. While other related studies focused on socio-economic, cultural, environmental, and the role of information technology, this research at hand emphasized the island's unique position and offered practical recommendations for enhancing Boracay's tourism appeal. Thus, the results of this study can assist concerned agencies in restoring the image of Boracay Island as a top tourist destination without prejudice to its sustainability.

2.0 Methodology

2.1 Research Design

The descriptive-correlational research design using the survey method was used in this study. This design is particularly useful when the goal is to identify associations or patterns among variables within a specific population or context (Creswell & Creswell, 2018). Correlational designs seek to determine whether changes in one variable are associated with changes in another. Correlation indicates that two variables are related in some way. The goal is to describe the nature and strength of the relationships between variables without making causal inferences. A survey method is used to achieve the objectives of the study. Surveys are an efficient method for gathering and collecting data from a sample of individuals or groups by asking them questions about their opinions, attitudes, behaviors, or characteristics.

2.2 Research Locale

This study was conducted in Boracay Island, Malay, in the Province of Aklan in the Philippines. It is an island paradise, famous for its fine white sand beaches and crystal-clear waters. Acclaimed as the best beach in the world, the island is the premier tourist destination and dubbed the crown jewel of the Philippine tourism industry.

Roughly shaped like a dumbbell or a dog bone, it has a total land area of 1002 hectares. It is seven (7) kilometers long, and the narrowest part is nearly one (1) kilometer wide. The best part of the island is its four (4) kilometer white beach, also called Long Beach by the locals.

2.3 Research Participants
The research involved 385 tourists who were on Boracay Island at the time of the study. These tourists were randomly chosen to avoid bias in the selection. The determination of the sample size was made through scientific sampling using the previous year's data on tourist arrivals. Three types of visitors were identified: (1) foreign, (2) local, and (3) balikbayan or Overseas Filipino Workers. Proportional allocation was eventually used to determine the number of samples from each group of participants.

2.4 Research Instrument
This study adapted and modified the research instrument of Tran (2015) in the study "Destination Image, Tourist Satisfaction, and Destination Loyalty: A Case Study of Hue, Vietnam". The decision to adopt the instrument is made considering that the material has already been standardized and its contents have been evaluated for reliability. The instrument was modified to suit the present study by tweaking the first part to accommodate the variables required by the present study. The second part is the survey proper. Five questions were given to the respondents. The first question is about their general impression of the image of Boracay Island. The second question is about the destination image of Boracay in terms of its attributes and the various things it offers to tourists. The third question is about their level of satisfaction with Boracay Island. These three questions used a 4-point Likert Scale to measure respondent's perceptions. The scale is interpreted as 1 (very bad/low), 2 (bad/low), 3 (fair), and 4 (very good/high).

2.5 Data Gathering Procedure
The researcher personally administered the instrument by sending a letter first addressed to the Office of the Local Chief Executive of Malay LGU through to the Office of the Malay Tourism Officer requesting to conduct the study in Boracay Island. Permission of the Local Chief Executive was secured before conducting the study. The following steps were observed in conducting the data gathering properly: First, the researcher briefed and explained the background of the study. Second, the flow of the data gathering was discussed properly with the respondents. Third, the researcher gave the respondents ample time to complete and answer the questionnaire form. Lastly, the respondents were assured of the confidentiality of their personal information and their respective survey results.

Once the researcher had gathered enough responses through the questionnaire form for the study, the researcher started interpreting the questionnaire results using SPSS to generate descriptive and inferential data. Descriptive statistics, including means, standard deviations, and frequencies, were first calculated to provide a comprehensive overview of both variables, the respondents' perceptions of Boracay's destination image, and their reported satisfaction levels with their visit. The two variables were correlated to assess the strength and direction of the linear relationship between destination image and tourist satisfaction. This data analysis was conducted to determine the predictive power of destination image on tourist satisfaction, reinforcing that enhancing the island's image could improve tourist satisfaction. It ensured that the results were statistically validated and provided actionable insights for tourism stakeholders, informing strategic enhancements to the island's tourism development plan to focus on key image factors influencing tourist satisfaction.

2.6 Ethical Considerations
Ethical considerations were properly observed during the present study. Permission to conduct the study was requested from the office of the Municipal Mayor, and voluntary participation of the respondents was requested. Necessary permits were secured before the conduct of the study, and a letter request was also given to the respondents. The researcher informed the respondents that no harm would come to them concerning the study and that their responses would be utilized for research purposes only as part of an academic requirement. Respondents were informed that they can not answer questions where they are uncomfortable as part of their right to self-determination.

3.0 Results and Discussion

3.1 Destination Image of Boracay Island

In terms of Attributes

Table 1 reveals the ratings made by the respondents on the destination image of Boracay Island as to its attributes. Data shows that tourism quality is rated ahead of all other indicators with a mean of 3.54, which is interpreted as high. This is explained by the fact that the Department of Tourism and the Local Government Unit of Malay provide the tourism service providers and front-liners with appropriate training to improve their skills.

Table 1. Destination Image of Boracay Island in terms of its attributes

Attributes	Mean	Verbal Interpretation
Tourism service quality	3.54	High
Public safety	3.51	High
Overall cleanliness	3.40	High
Fair pricing	3.17	Fair
Vendors and beggars	3.04	Fair
Average	**3.33**	**High**

The lowest mean rating for all attributes is on vendors and beggars, with a mean of 3.04, which is interpreted as fair. The problem with beggars is difficult in the area despite continued monitoring by the Municipal Social Welfare and Development Office. Available data from the LGU reflects those beggars on the island who were once sent home during the pandemic, with the LGU shouldering their expenses. However, when the island started accepting tourists, they returned clad in tourist attire, making it difficult for the assigned personnel at the Caticlan Jetty Port to screen and apprehend them. Once on the island, they refused to leave and returned to their old ways. The average mean of 3.33 indicates that the destination image in terms of typical attributes is high. This is because the majority of the attributes have been rated high. Public safety and cleanliness have also been rated high because anyone in Boracay would not miss seeing uniformed PNP personnel, as well as the Municipal Auxiliary Police, actively doing their jobs. Waste segregation at the source and regular garbage collection are strictly implemented every morning. This is aligned with the findings of Tran (2015), who noted that a strong and positive destination image is often reflected in consistent and high ratings across various attributes.

In terms of Offers

Table 2 presents the pooled ratings made by the respondents regarding the destination image of Boracay in terms of its offers. The average mean of 3.43 speaks of the respondents' high appreciation of what Boracay Island offers. This perception also suggests that during the time of the survey, these offers were available for tourists to take advantage of.

Table 2. Destination Image of Boracay Island in terms of its offers

Offers	Mean	Verbal Interpretation
Scenic Attractions	3.62	High
Cultural Attractions	3.12	Fair
Religious Places	3.09	Fair
Island Architecture and Landscape	3.52	High
Festivals and Events	3.23	High
Local Souvenirs & Handicrafts	3.36	High
Hospitality of the local people	3.55	High
Variety of cuisines	3.56	High
Shopping opportunity	3.40	High
Quality tourism service	3.56	High
Variety of guided tours and activities	3.60	High
Reliable tourism information access	3.50	High
Average	**3.43**	**High**

Four offers stand out on the list. First is that of 'scenic attractions', which received a mean rating of 3.62, which is interpreted as high. Next to this is a 'variety of guided tours and activities' with a mean of 3.60, which is interpreted as high. This is followed by 'variety of cuisines' and 'quality tourism service', which both received a mean rating of 3.56, which is also interpreted as high. These findings confirm that Boracay Island has scenic attractions that tourists look forward to seeing. This includes the world-famous long white beach, Bolabog Beach, Beach Front Boracay Sunset, Keyhole, and the wetland parks. As to a variety of guided tours and services, tourists can bask in choices of island hopping with lunch included, snorkeling, cliff-diving, paraw sailing, and other customizations that tourists would like. Regarding cuisine or culinary experience, Boracay offers almost all cuisines to cater to its diverse clients, from oriental cuisines to western cuisines. Buffets at hotels also cater to the diverse tastes of their clients, making sure that there is always food to one's liking in the buffet service area. Regarding quality tourism service, the discussion in the preceding section already mentioned the reason.

It can also be glossed from the data that only two offers have received fair ratings. These are cultural attractions with a mean of 3.12 and 'religious places' with a mean of 3.09. The findings reflect not the lack of such offers but the extent to which such attractions would attract tourists' attention. Cultural activities on the island are limited because of the difficulty of organizing indigenous people sheltered by a religious organization that manages their affairs on the island. In terms of religious places, the island has them, but only to the extent that they can serve the locals of the island and some interested guests. The observed standard deviations show that the ratings made by respondents are not that much different from one another. This is consistent with the notion that cultural tourism development often faces hurdles related to community engagement and organizational capacity (Erni, 2022).

3.2 Tourist Satisfaction

Table 3 displays the pooled ratings made by respondents on the survey about their tourist satisfaction experience in Boracay. The satisfaction survey includes twelve attributes that contribute to tourist satisfaction.

Table 3. Respondents' level of tourist satisfaction

Attributes	Mean	Verbal Interpretation
Many scenic attractions.	3.72	Very Satisfied
A wide range of cultural activities.	3.40	Very Satisfied
A unique lifestyle of the local people.	3.49	Very Satisfied
Interesting traditional festivals and events.	3.42	Very Satisfied
A peaceful atmosphere.	3.55	Very Satisfied
A friendly and welcoming people.	3.64	Very Satisfied
Delicious food and cuisines.	3.80	Very Satisfied
Local souvenirs and handicraft products.	3.57	Very Satisfied
Well-skilled and hospitable tourism staff.	3.61	Very Satisfied
Modern means of transport.	3.53	Very Satisfied
Average	**3.57**	**Very Satisfied**

The data presented in the above table provides evidence that respondents are very satisfied with their general tourist experience. This can be seen in all mean ratings interpreted as very satisfied. The average mean rating of 3.57 for this section of the survey proves that the overall tourist satisfaction experience is very satisfactory. The standard deviation values provided reflect a small difference in their ratings of each attribute surveyed.

Three attributes stand out in the least with their high mean ratings over others; these include (1) delicious food and cuisine with a mean rating of 3.80, (2) many scenic attractions with a mean rating of 3.72, and (3) friendly and welcoming people with a mean rating of 3.64. These findings confirm that the efforts of both the national and local governments have paid off because tourists can feel them. The many scenic attractions are appreciated because they are accessible, and this is because of the investments made in infrastructure projects and the coordinated efforts to ensure safety and tranquility on the island. Delicious food and cuisines are thanks to the trained personnel who chose to work in Boracay because of the opportunities it offers, being a tourism hub in the province and the region. The friendly and welcoming people are thanks to the various training provided to tourism service providers and frontliners.

As noted in the preceding discussion on destination image, Boracay lacks cultural and religious experience. This is partly due to the migration of many of the original locals due to the island's development. The indigenous people of the island are also under threat of dispersion. Without a thriving local community, promoting the island's indigenous culture is difficult. Also, carrying capacity restrictions have led to fewer festivals and events on the island due to stringent regulations during the island's rehabilitation several years ago. Based on a study carried out by the Department of Environment and Natural Resources –Ecosystems Research and Development Bureau (2018), the island's carrying capacity for tourism is set at 19,215 at any given time, which translates to approximately 6,405 arrivals per day for visitors staying three days.

3.3 Relationship Between Tourist Satisfaction and Destination Image

Table 4 reveals the results of the inferential analysis rendered to establish the significance of the relationship between tourist satisfaction and destination image. The resulting data shows that both destination attributes and offers have a very strong relationship with tourist satisfaction. Likewise, the p-values of 0.00 indicate a highly significant relationship among the variables surveyed. This implies that as destination attributes, as well as destination offers, get better, the tourist satisfaction experience becomes better. This implies that as destination attributes and offers improve, the level of tourist satisfaction correspondingly increases. This finding is consistent with previous research by Chia et al. (2021), which demonstrated that destination image plays a crucial role in shaping tourists' overall satisfaction. Additionally, the work of Yuan and Vui (2023) supports this notion, highlighting that positive destination attributes significantly enhance tourists' satisfaction and loyalty.

Table 4. Significance of the relationship between destination image and tourist satisfaction

Variables	Cramer's V	Description	p-value	Interpretation
Tourist Satisfaction and				
Attribute	0.428	Very Strong	0.00	Significant
Offers	0.471	Very Strong	0.00	Significant

4.0 Conclusion

In light of the findings, several conclusions were drawn. First, local tourists play a crucial role in providing Boracay Island with the volume of visitors needed to overcome the challenges posed by the pandemic on its tourism health. Second, Boracay Island is recognized as an ideal tourism destination, possessing the attributes and tourism services that travelers seek in a destination. Third, the tourist experience in Boracay is highly satisfying, as it effectively meets the expectations of its clients. Additionally, the destination image strongly predicts tourist satisfaction; the higher the destination image, the more satisfying the experience becomes. Lastly, enhancements to the existing Strategic Tourism Development Plan are essential to ensure that the island remains competitive while remaining committed to sustainable tourism practices. A collaborative effort with all stakeholders will help address the current challenges and secure Boracay's position as a globally recognized premier tourist destination.

5.0 Contributions of Authors

The sole author initiated and completed this study.

6.0 Funding

The author funded this work.

7.0 Conflict of Interests

The author declares no conflict of interest.

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Socio-ecological Analysis of the Coping Mechanisms of Filipino Rural Health Midwives during the Pandemic

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Abstract. Midwives played crucial roles in the grassroots healthcare system in the Philippines, especially at the peak of the COVID-19 pandemic. Despite numerous challenges, midwives coped with several physical, emotional, and professional challenges while dispensing vital community health services. This phenomenological research investigated the coping mechanisms of Rural Health Midwives during the pandemic. The study utilized the Collaizi Method to steer the thematic identification and analysis. Using the five foci Socio-ecological Model as the theoretical lens, five immense themes for the coping mechanisms emerged: weaving social connections, bridging relationship gaps, suppressing anxieties, forging innovative solutions, and anchoring trust in the authorities. The findings underscore the pandemic-forged coping mechanisms of Rural Health Midwives, which propelled them through countless complexities in the face of the COVID-19 pandemic. While sustaining their unwavering commitments, a collective imperative intervention from the government, health sectors, and stakeholders is crucial in optimizing their well-being during and beyond the pandemic. A comprehensive support system, including mental health, professional advancement opportunities, and adequate resource allocation, is crucial for bolstering the resilience of Rural Health Midwives and ensuring the continuity of essential healthcare services in rural communities.

Keywords: COVID-19 pandemic; Coping mechanisms; Rural health midwives; Community health; Socio-ecological model.

1.0 Introduction

The COVID-19 pandemic posed tremendous challenges for Rural Health Midwives, requiring them to be resilient yet compassionate in their service (Schmitt et al., 2021). Navigating through uncertainties, they emerged as unsung heroes, often unrecognized by the community. Their roles transformed a lot to adapt to the ever-shifting tides. Undeterred by this, they continued serving their constituents amid the unpredictable chaos, a testament to their unwavering dedication to their duty.

Rural health midwives in the Philippines are crucial in providing a wide range of essential healthcare services. They are considered grassroots workers, closely working with other auxiliary health workers and the barangay key leaders. Midwives under the Department of Health (DOH) placement program implement various programs in different aspects of care, including preventive, health-promotive, curative, and rehabilitative. The highlight of their routine activities include delivery of maternal and child health services such as antepartum care, attending to labor and delivery, post-partum care, immunization, family planning counseling/services, attending to individual patients, referral of unmanageable cases, follow-up of patient discharged from the hospital, and implementation of several control programs for different prevalent and emerging diseases. They cater to individual patients, perform home visits to targeted families, and address community health and health-related problems.

With the advent of the COVID-19 pandemic, the already burdensome routines of rural health midwives became even more exhausting as new responsibilities were added. Midwives were tasked with contact tracing, monitoring quarantined patients, participating in vaccination programs, referring COVID-suspected patients, conducting nasal/throat swabbing, implementing COVID-19 protocols, and more (Felipe-Dimog, 2024). These additional duties and their existing responsibilities created a demanding workload. The pandemic also increased physical and mental health conditions among community members, resulting in more individual patient consultations at barangay health stations. The scarcity of health resources, such as PPE supplies, medications, and logistics, further burdened rural health midwives, forcing them to find creative solutions and sometimes use their resources to address challenges (Domingo, J & Domingo, J., 2024). However, despite chronic understaffing in rural healthcare settings, midwives play critical roles in delivering essential services to disadvantaged communities. Their efforts often go unrecognized (Green et al., 2020). Recognizing the needs of midwives and their contributions to community health, the Department of Health (DOH) launched the Rural Health Midwife Placement Program (RHMPP) to bolster the current workforce (Tejero, 2022).

As the world continues to recover from the COVID-19 pandemic, it is crucial to learn from people's diverse experiences during and after the crisis. Given the limited research on midwives' coping mechanisms, particularly in rural health settings, this study aims to explore the lived experiences of Rural Health Midwives working in the DOH's Deployment Program during the pandemic's peak. By examining the subjective experiences of these frontline workers, the study seeks to contribute to a deeper understanding of the midwives' coping mechanisms in overcoming the challenges they faced to continue providing essential care.

2.0 Methodology

2.1 Research Design

This phenomenological study explored the lived experiences of Rural Health Midwives as they navigated the challenges of the COVID-19 pandemic. This qualitative research offered a flexible and nuanced lens to explore their perspectives (Collins et al., 2018), allowing researchers to understand the underlying meaning and processes shaping their realities. This study adopted a descriptive phenomenological approach to gain a deep understanding of the lived experiences of Filipino rural health midwives during the COVID-19 pandemic. This qualitative research method allowed us to delve into the rural health midwives' subjective realities and the unique perspectives of these frontline healthcare workers.

2.2 Research Locale

With Koronadal City as its capital, South Cotabato is a province in the SOCCSKSARGEN region of the Philippines. According to the 2020 census conducted by the Philippine Statistics Authority, it has 975,476 residents, which makes up 22% of the region's total population. In September 2020, the province isolated 200 health professionals because of a possible infection and reported 10,976 COVID-19 cases (Punzalan, 2021). Of the 139 rural health midwives employed in South Cotabato, 102 are part of the Rural Health Midwife Placement Program run by the Department of Health (DOH). This effort aims to improve treatment for expecting mothers and infants and strengthen Barangay Health Stations (BHS) to reduce the rates of maternal and infant mortality (MB. Libatique, personal communication, January 6, 2022).

2.3 Research Participants

Ten rural health midwives who work for the DOH's Rural Health Midwife Placement Program are among the participants. During the height of the COVID-19 pandemic, these individuals were assigned to the Province of South Cotabato, Philippines. Participants were chosen through purposive sampling according to the inclusion and exclusion criteria, including being a registered midwife, a citizen of the Philippines, working for the RHMPP for a minimum of a year, willing to participate, and in good mental health.

2.4 Research Instruments
A semi-structured interview guide was developed to elicit rich qualitative data. Open-ended questions allowed flexibility while maintaining the focus. The instrument was translated into Hiligaynon and validated by three experts in community health and research. Audio recordings were utilized to capture participants' responses comprehensively. Note-taking was limited to establish rapport and minimize distractions.

2.5 Data Gathering Procedure
This study secured the necessary approval from the Provincial Department of Health, the Municipal Health Officer (MHO), and the target municipalities' Public Health Nurses (PHN). One rural health midwife was selected per municipality (N = 10) through coordination with local health offices. Participants provided informed consent after a thorough explanation of the study. Three prospective participants declined participation. In-depth interviews were conducted in private and well-ventilated settings to ensure participants' comfort and data confidentiality. Audio recordings captured verbatim conversation and vocal cues. Minimum health protocols were strictly observed throughout the data collection process. While online interviews were initially unplanned due to potential technical and observational limitations, two participants were interviewed online due to unforeseen circumstances.

2.6 Data Analysis
The thematic presentation was analyzed in depth, guided by Bronfenbrenner's Systems Ecological Model (SEM). Through repeated readings of the transcripts aligned with each stage of the SEM, the researchers immersed themselves in the data, consequently facilitating a comprehensive understanding of the rural health midwives' experiences, particularly their coping mechanisms for navigating the challenges posed by the COVID-19 pandemic. The participants' responses were categorized according to the SEM foci. Each line of these transcripts was assigned line numbers. Significant statements within each transcript were identified and tabulated, noting their corresponding page and line numbers in the final transcript. These tabulated significant statements were then analyzed for meaning, considering several factors such as the participants' expressions, tone of voice, language, emotional resonance, and personal context. The formulated meanings were categorized based on similarities, and each category was assigned a cluster theme. Through a comprehensive analysis of these clustered meanings and themes, the identified emerging themes encapsulated the core coping mechanisms of rural health midwives. Finally, emerging themes were categorized as light, moderate, or heavy based on the significance and emotional intensity expressed by the participants.

To gauge the magnitude and relevance of the emerging themes, the researchers considered factors such as vocal inflections, repetitions, accompanying emotions, eloquence of description, and non-verbal cues like gestures and facial expressions. The steps were repeatedly read to get a vivid picture of the rural health midwives' coping mechanisms. Each step was meticulously evaluated, rephrased, and restructured, retaining the core meanings of participants coping mechanisms. In describing the findings, the fundamental structures of their responses were noted and retained. Moreover, to ensure the relevance of the interpretation, the findings were presented to the research participants, validating the description of their coping mechanisms. All participants agreed to the description of their coping mechanisms, with very few additional points made. Moved by the description of their responses, rural midwives expressed gratitude for being given a voice and a platform to share their unique experiences.

2.7 Ethical Considerations
The researcher secured the approval of the ethics review board before commencing data collection. This study adhered to the ethical norms and research standards, particularly in ensuring rigor, respect for the participants, data storage, and dissemination of data and results.

3.0 Results and Discussion
The socio-ecological model guided the data analysis, as illustrated in Figure 1. The thematic landscape emerged naturally, reflecting the participants' articulation and interpretation of their experiences. The presented emerging themes were those deemed most significant. Each emerging theme within each stage of the SEM was identified.

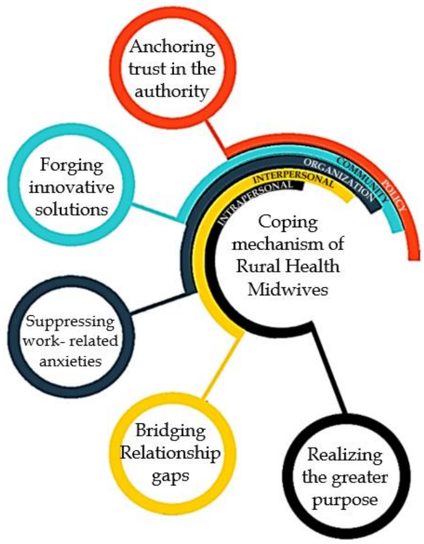

Figure 1. Coping mechanisms of Rural Health Midwives during the COVID-19 pandemic

Table 1 shows the emerging themes for coping mechanisms utilized by the rural health midwives based on each focus of the SEM. Based on their magnitude and immensity, the twenty emergent themes have been classified into three categories: light, medium, and heavy. The immense themes for the individual, interpersonal, organization, community, and policy levels are building social connections, bridging relationship gaps, suppressing job-related anxieties, forging innovative solutions, and anchoring trust in the authority, respectively.

Table 1. Immensity and magnitude of coping mechanisms' themes

Foci	Light	Medium	Heavy
Individual		• Repressing the anxieties. • Realizing the greater purpose	• Weaving social connections
Interpersonal	• Creating diversions	• Conquering the adversities. • Facing fears head-on. • Accepting worries and finding peace of mind. • Leaning on loved ones.	• Bridging relationship gaps.
Organizational	• Finding strength in faith	• Prioritizing the well-being of the community • Embracing the problem-solving mindset	• Suppressing anxieties related to job security
Community		• Suppressing work-related concerns • Respecting cultural differences	• Forging innovative solutions
Policy	• Taking a break to protect oneself	• Prioritizing public safety through responsibility • Serving as role models	• Anchoring trust in the authority

Individual Coping: Weaving Social Connections with Colleagues, Friends, and Families

The COVID-19 pandemic revealed unprecedented challenges for rural health midwives, testing their resilience and fortitude. However, amidst the adversity, these dedicated professionals found solace and strength in their relationships with family, friends, and colleagues. Sharing their experiences, fears, and concerns with loved ones provided a much-needed emotional outlet and a sense of community. Practical assistance, such as childcare and meal preparation, especially during quarantines and work-related activities, eased their burden. The shared experience of the pandemic fostered a sense of solidarity and empathy, strengthening existing bonds and creating new ones. The following descriptions of the participants best exemplify the coping mechanisms presented:

"I cried to myself, or sometimes to my husband, about how frustrated I was with the barangay officials' lack of support."

"I asked my Barangay Health Workers for advice and realized how much they cared about me."

"My kids truly helped me feel strong. They told me they were okay and I should keep helping others."

Through these connections, rural midwives were able to tap into a powerful source of hope and strength, enabling them to persevere in their challenging roles. Friends, family members, and colleagues significantly contributed to the midwives' coping with the challenges. When faced with isolation and the scarcity of social connections, many midwives turned to their faith, praying for strength and reminding themselves of their greater purpose. In the quiet hours, they channeled their worries into the rhythm of daily work, remaining productive as a testament to their unyielding spirit. These are some of the responses from the participants:

"I believe, 'I can do this, and God will care for those who insulted me."

"Seeing my elderly patients getting better makes all the tiredness go away. It encourages me to keep going."

Effective coping methods can help manage difficult situations, reducing stress levels (Waters et al., 2021). Buffeted by the relentless challenges of the COVID-19 pandemic, midwives discovered a beacon of light in the strength of their bonds (Eddy, 2019). The unbreakable camaraderie with people around them fostered resilience and a sense of belonging during times of isolation and uncertainty (Doolittle, 2021). Hence, a robust social tie is vital for rural health midwives to combat isolation. As Labrague (2021) emphasizes, this essential network of communications with people around them shields rural health midwives against the pandemic's hardest blows.

Interpersonal Coping: Bridging Relationship Gaps

Midwives innovated a bold odyssey of connections and communications with friends, colleagues, and clientele. Family members mended family conflicts and rekindled reconnections, resulting in more vibrant expressions of concern and care. Friends and families fortified the therapeutic landscape by filling the voids of connections with support and understanding, as verbalized by the rural health midwives below:

"I made sure to call them every day. I even video called them even when I was right outside our house because I couldn't go inside, especially since I had been in contact with someone who had COVID-19."

"I kept monitoring my kids even if I was at work via text or calls. I was worried when my older daughter got sick and was afraid she might give it to her younger sister."

"I explained to my husband and kids what my job is like. I told them I am always on call, and they understand that. They do not complain about it at all."

"You never know what might happen tomorrow, so we need to be there for each other. I feel closer to my family now because we talk and check in on each other more often."

The use of social media became common to our midwife front liners. It served as a bustling platform for communication, support, and networking, tethering them to sanity and a façade of normalcy while in the monotony of lockdowns and quarantines. It was their way of sharing their stories with their loved ones across the globe, both the harrowing and heartwarming ones. Petty and meaningful talks unfolded virtually, knitting frayed and old bonds and forging new ones. Even as the world felt still, they found comfort and inspiration in the tales of resilience of fellow health workers across the globe. Without a leap in information technology, midwives would have been imprisoned in boredom and seclusion, bereft of educational opportunities across screens, just silence.

"My family and friends don't see each other anymore, so we call or message each other and sometimes post on Facebook."

"I keep thinking that this is for my family. I often attend webinars and watch updates on social media."

"We refer our patients to the doctor and send him pictures if needed. The doctor decides whether to see the patient in person or give orders over the phone."

Midwives leveraged information technology to bridge the geographical gaps between rural and urban communities. It gave midwives crucial access to training and insightful webinars on relevant skills and updates on COVID-19, easing their fears of the unknown. *Telekonsulta* brought healthcare online, connecting health workers and patients virtually. High-risk pregnancies, individual clients, and several program implementations can still be monitored. Digital records, referrals, and networked communications bridged physical gaps, ensuring seamless health services while maintaining access to vital health updates in protocols.

The COVID-19 pandemic necessitated innovative approaches for rural health midwives. Social media became a lifeline during the pandemic (Saud et al., 2020). By exploiting and harnessing new information technology, midwives strengthened social connections, accessed essential training, and ensured continuity of care. Social media platforms facilitated virtual interactions, while telehealth services and digital health tools bridged geographical gaps and streamlined healthcare delivery. These adjustments showed the midwives' versatility and relentlessness in overcoming the pandemic's challenges.

Organizational Coping: Suppressing Work-related Anxieties

Midwives' precarious work contracts as job-order employees pushed them to muffle their voices for fear that their job-order status would not be renewed next term. They suppressed many of their work-related anxieties, a plight shared by many healthcare professionals, especially in regions with scarce health resources. With all the hurdles and menial jobs that rural midwives encounter in their organizations, they felt compelled to swallow their egos and anxieties, lest their means of livelihood vanish.

"I keep praying I do not get sick with COVID. We only got ten masks, so we had to wash and iron them. We also made our own PPE using a garbage bag like a gown because we ran out of supplies."

"We just have to accept what the DOH decides because we are not regular employees. We are working for them, so they'll decide whether to renew our work contract. We should be happy with whatever they offer us."

"We try to spend less during Christmas and New Year's Eve. We might not have jobs next year, so we need to save as much money as possible."

Midwives channeled their frustrations into active self-improvement by learning time management skills and setting realistic work expectations to avoid burnout. They find it crucial to find opportunities for self-care, rest, and relaxation instead of tiring themselves over petty things. Networking with fellow healthcare professionals and community key leaders ignited a collaborative spirit of innovation, empowering them to delve deeper into problems and unearth resourceful solutions.

"We kept teaching people about COVID-19, like its cause, the risks, and how to stay safe. We understand that there is only so much we can do, and we do not have that much choice."

"I was always racing against the clock to finish my report on time. I even brought my work home with me. I also tried attending as many webinars as possible because I believed they were relevant."

Suppression is a deliberate act of an individual to consciously push unwanted experiences out of the mind (Sigmund Freud, in the study by Berlin and Koch (2019). Many individuals find it convenient, but it has implicit undesirable effects. It posits that unresolved painful situations might eventually result in harmful consequences. Pent-up emotions like anger, frustration, and sadness can resurface (Happygohippy, 2020). Studies, such as Giunchi et al. (2019), further suggest that emotion-avoidance-focused coping amplifies negative associations between job insecurity and well-being. Though suppressions offered a shield against immediate conflicts, midwives recognized that it was fragile and temporary, as they claimed there was nothing they could do about it other than show their full acceptance. Midwives exhibited remarkable adaptation to new protocols gracefully and unleashed their innovativeness. They ceaselessly honed their knowledge and skills, formally and informally, to meet all the challenges posed by COVID-19.

Community Coping: **Forging Innovative Solutions**

Rural midwives resorted to remarkable resourcefulness during the pandemic surge, despite the perceived deprivation of logistic support from local authorities. Digging into their own pockets, they attempted to solve work-related issues. However, the use of personal resources is unsustainable, and it simply masks the issue of poor support and resource mismanagement in local government units. Nonetheless, it was an act of unwavering dedication to their chosen vocation and the community at hand.

"We repeatedly explained that the Barangay Health and Emergency Response Team (BHERT) is not just composed of health workers; the barangay officials should also participate in it."

"I worked closely with the nurse to create a plan. I did this to expedite the processes. Then, we presented it to the barangay council for their ideas, approval, and support."

"We think of the money we spend from our pockets as our acts of gratitude for being alive and still having jobs and income."

"At the barangay health station, we all chipped in money to help patients with food, transportation, supplies, and laboratory fees. We did this to avoid any more problems with the patient."

While the internet viewed midwives as unsung heroes, they often felt underappreciated and overlooked for their crucial contributions to healthcare. Faced with cultural, manpower, and financial constraints, they prioritized the most essential needs, forged several partnerships, and championed *Telekonsulta*. Their innovation and efficiency fueled proactive health education, empowered communities, and ensured cooperation.

"We told people they would not get their 4Ps benefits if they did not participate in the vaccination program. However, that was not true. We just said that to encourage them to get vaccinated."

"We just called the doctor and asked for medical advice using our money, personal phones, and data."

Midwives, as rural vanguards, displayed exemplary resourcefulness while implementing the COVID-19 vaccination program across different cultures. While self-funded health initiatives sustained healthcare services, studies by Crisp et al. (2018) highlighted the limitations of such stopgaps. Thus, in this premise, midwives' easy solution of spending their resources is a quick response to the pressing problems that need immediate intervention. However, when urgent response is required, midwives consider tapping into available and accessible resources as a practical option. While already weary from the massive workload and unfulfilled requests, a temporary fix through self-reliance is more feasible and time-efficient.

Policy Coping: Anchoring Trust In The Authority

Rural midwives faced the daunting task of implementing IATF protocols, often navigating conflicting guidelines and community perspectives. Despite personal reservations, they embraced their role as leaders and role models, becoming sources of information and guidance for their communities. Serving as mediators between government agencies and the community, midwives fostered peace and order by promoting adherence to local and national regulations. Recognizing the hardships and cultural nuances, they demonstrated empathy and understanding of their constituents. To preserve their well-being, midwives prioritized self-care, taking breaks to rest and recharge. These enabled them to return to their duties with renewed vigor and a commitment to serve their communities based on DOH programs and protocols. While prohibited from riding on a motorcycle with their husband as the driver, they lobbied for considerations regarding the "no back-rider" rule of the IATF for motorcycles.

"To convince people to get vaccinated, I vaccinated my family first. I even showed them that I vaccinated my 9-year-old child. Back then, getting kids between 5 and 11 vaccinated was difficult because parents were hesitant. So we kept doing information campaigns and going door-to-door to encourage people to be vaccinated."

"I kept explaining to people that we only followed the approved rules. We always carried a copy of it to show people."

"We visited a family who was holding a wake for a loved one who died from COVID-19. We wanted to show our support and explain the rules to them. The barangay captain went with us to make sure we were safe."

"We asked the barangay officials to help us implement the IATF protocols regarding burying dead people right away. I was following the rules. I tried calming myself down and understanding how the family was feeling."

Healthcare workers and frontliners demonstrated remarkable dedication by adhering to COVID-19 protocols, even when these measures conflicted with personal beliefs or preferences (Nguyen (2023). Despite potential challenges and uncertainties, they prioritized the collective good and public health over individual inclinations. This commitment to following guidelines was crucial in mitigating the spread of the virus and protecting vulnerable populations. Their considerate approach to people, supported by Bohm et al.'s (2016) findings, reduced confusion, built trust, and fostered compliance, thus promoting community order amidst stringent COVID-19 measures. Midwives, recognizing the relevance of a secure and orderly community (Leonard, 2018), actively tackled issues concerning the existing protocols of the Inter-agency Task Force (IATF) for COVID-19. Midwives stood resolute when the pandemic brought chaos to the world, reshaping their practice, unfolding new skills, and confronting the hurdles head-on. Equipped with contingency plans, no matter what happened, they stood unwaveringly, ensuring vital care was delivered when everyone seemed to wane.

4.0 Conclusion

Healthcare workers and frontliners demonstrated remarkable dedication by adhering to COVID-19 protocols, even when these measures conflicted with personal beliefs or preferences. Despite potential challenges and uncertainties, they prioritized the collective good and public health over individual inclinations. This commitment to following guidelines was crucial in mitigating the spread of the virus and protecting vulnerable populations. Their considerate approach to people, supported by Bohm et al.'s (2016) findings, reduced confusion, built trust, and fostered compliance, thus promoting community order amidst stringent COVID-19 measures.

Midwives, recognizing the relevance of a secure and orderly community (Leonard, 2018), actively tackled issues concerning the existing protocols of the Inter-agency Task Force (IATF) for COVID-19. When the pandemic brought chaos, our midwives stood resolute, reshaping their practice, unfolding new skills, and confronting the hurdles head-on. Equipped with contingency plans, no matter what happened, they stood unwaveringly, ensuring vital care was delivered when everyone seemed to wane.

A comprehensive mental health program is recommended to enhance the mental well-being of midwives and other healthcare professionals. This program should incorporate stress management strategies, physical activity, stress debriefing sessions, peer support networks, and accessible mental health services. Additionally, the program should address workplace challenges such as workload management, employment conditions, resource allocation, and professional recognition. This recommended initiative requires significant investment in infrastructure, equipment, and the establishment of a robust community health system.

5.0 Contribution of Authors

The authors collaborated equitably throughout the research process, sharing responsibilities in conceptualization, study implementation, data collection, analysis, and manuscript preparation. Ms. Jinky Flores has extensive experience as a rural health midwife and nurse under the DOH's deployment program. Her expertise in community immersion and nursing is valuable to this study. She reviewed and provided feedback on the concept paper, participated in focused-group discussions, and managed secretariat tasks such as printing, documentation, and maintaining printed and soft copies of participant responses. She also reviewed and contributed to the data analysis procedure. Ms. Jean F. Domingo conceptualized the paper and coordinated with Jinky Flores and Art Domingo to finalize it. She coordinated various paperwork, collated outputs from the co-authors, and conducted the thematic analysis. Jean Domingo facilitated the ethics review, coordinating with the two grammarians and mentors who helped finalize the study from full paper to publication manuscript. She typically initiated the writing of the manuscript submitted to publication companies. Art Domingo is frequently involved in finalizing written documents, composing research proposals, writing communication letters, creating semi-structured interview guides, and translating informed consent. He finalized the data analysis using Colaizzi's method of phenomenology, edited the entire study content, and wrote and finalized manuscripts for presentation and publication. Art Domingo also prepared presentations and posters for two research conferences to disseminate the study's findings. Art Domingo and Jean Domingo coordinated the study, particularly in sending communications and meeting with Rural Health Unit heads. Jinky Flores and Jean Domingo followed up with participants and set up appointments. All three authors contributed to the preparation and finalization of related literature. All three of them met the participants during each interview. They equitably shared responsibilities in data gathering, transcription, and deriving the thematic landscape of the study. Jinky Flores and Art Domingo were each assigned to transcribe three participant responses until emerging themes were derived, while Jean Domingo processed the remaining four responses. The authors also jointly decided on the conclusions and recommendations.

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7.0 Conflict of Interest

According to the rules governing ethical research, the authors disclosed no potential conflicts of interest for any organizations involved in the study.

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An Exploratory Study on Motivations and Outcomes of Academic Achievement Capitalization on Social Media

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Abstract. Capitalization, the process of sharing positive events to savor and relive positive moments, brings intrapersonal and interpersonal benefits to the sharer. In students' academic lives, academic achievements represent significant positive events that offer opportunities for capitalization. With the rise of social media, capitalizing on academic achievements has transitioned from traditional face-to-face interactions to digital platforms, where students increasingly share and celebrate their achievements. Given the significance of capitalization for well-being and the scarcity of research in this area, this study seeks to advance the understanding of the significance of capitalization within the context of a student's academic achievements and social media. Specifically, it aims to explore the practice of academic achievement capitalization on social media by examining the reasons for using these platforms, the motivations driving this practice, and the associated outcomes. Utilizing a qualitative exploratory research design, one-on-one semi-structured interviews were conducted with ten college students who frequently capitalize on their academic achievements. Content analysis of the interviews revealed that social media features are instrumental in facilitating the capitalization of academic achievements. Moreover, the study identified five key motivations driving this behavior: seeking validation, self-presentation, inspiring others, seeking support, and emotional expression. Consistent with existing research on capitalization, students experience predominantly positive outcomes, both interpersonal and intrapersonal, from sharing their academic achievements on social media, highlighting how digital platforms and capitalization help maximize the positive impact of these experiences. The findings provide an understanding of how and why students celebrate and showcase their academic achievements on social media, emphasizing how the capitalization of these achievements and the social media responses they receive influence their personal and social well-being.

Keywords: Academic achievements; Capitalization; Positive events; Social media.

1.0 Introduction

Young adulthood is a critical period characterized by significant transitions and challenges, such as pursuing higher education, beginning careers, and forming personal identities (Eronen, 2000). Alongside these challenges, young adults experience various positive events (Arnett, 2000), vital in alleviating negative mental health (Eronen, 2000; Langston, 1994). These positive experiences not only help counterbalance mental health challenges but also offer opportunities for further enhancing well-being through a process known as capitalization.

Capitalization is sharing positive experiences with others, such as family, friends, romantic partners, and other social networks (Langston, 1994). This process can trigger what Fredrickson (2001) describes as "broadening and building," wherein the act of sharing positive events leads to the expansion of positive emotions and the enhancement of personal and social resources (Gable & Reis, 2010). Empirical evidence has documented the benefits of capitalization, highlighting its positive effects on both intrapersonal and interpersonal domains. Interpersonal capitalization enhances positive affect, well-being, life satisfaction, and happiness (Langston, 1994; Gable et al., 2004; Lambert et al., 2013; Bierstetel, 2021). Interpersonally, sharing positive experiences strengthens relationships, promotes prosocial behavior, and deepens social bonds (Gable & Reis, 2010; Reis et al., 2010; Bierstetel, 2021). However, the extent to which these benefits are gained depends on the nature of the responses received from others. An active constructive response—characterized by engagement, enthusiasm, and support—is critical for maximizing the positive effects of capitalization (Gable et al., 2004). Conversely, negative or dismissive feedback can negate these potential benefits.

Initially, research on capitalization primarily focused on face-to-face interactions. However, the rise of digital platforms has significantly transformed social communication. Social media, in particular, has emerged as a pivotal medium for capitalization, offering new avenues for sharing positive experiences (Schreurs & Vandenbosch, 2021a; Bierstetel, 2021). The interpersonal nature of capitalization naturally extends to social media, as it enables users to share personal experiences and engage with their social networks interactively (Dawot & Ibrahim, 2014). Research suggests that young people share approximately one-third of their positive life events on social media (Choi & Toma, 2022, as cited by Noon et al., 2023). For instance, platforms like Facebook serve as popular venues for sharing positive news, with the expectation of receiving validation and support from one's online community (Blight et al., 2015).

Moreover, recent studies have highlighted how individuals use social media to showcase personal achievements and successes, thereby engaging in digital capitalization. For example, Schreurs and Vandenbosch (2021a) and Bierstetel (2021) found that users frequently share content related to their successes, such as those in school, on social media. Additionally, sharing positive events on social media has been found to positively influence the well-being of young adults (Bierstetel, 2021). This shift to online platforms underscores the evolving nature of capitalization in the digital age, where social media plays a pivotal role in disseminating and celebrating positive experiences.

While previous research on capitalization has examined face-to-face interactions, fewer studies have explored the phenomenon in social media contexts. However, these studies often take a broad approach, addressing various positive events collectively and relying on quantitative methods. This study aims to address these gaps by focusing specifically on a particular type of positive event that students celebrate on social media—academic achievements. Zheng and Mustappha (2022) offer a comprehensive definition of academic achievement, defining it as the culmination of school-related efforts and encompassing elements such as learned effort, schoolwork, academic learning, and educational attainment. Through this focused lens, the present study offers a contextualized understanding of the motivations and outcomes of capitalization in the context of academic achievements, recognizing that the benefits of capitalization may vary across different contexts (Watkins, 2021).

Existing research on capitalization highlights its positive impact on well-being, mainly through the supportive responses generated by sharing positive experiences. Building on this, the study will explore how social media networks influence the sharing of academic achievements and their effects on students' well-being. The findings can inform strategies and advocacies to encourage the capitalization of achievements, promote healthier online interactions, and cultivate a more supportive, inclusive digital environment. Considering the significant role social media plays in students' daily lives, examining how these platforms enhance or potentially diminish the celebration of academic achievements on social media is crucial.

2.0 Methodology

2.1 Research Design

This study employed a qualitative exploratory research design to explore and provide an in-depth understanding of academic achievement capitalization, focusing on the experiences and perspectives of the participants. Exploratory research is commonly undertaken to investigate undefined problems, offering clarity and a deeper understanding of the phenomenon (Olawale et al., 2023). This design is guided by research questions, making it ideal for addressing gaps in areas with limited prior exploration. Given the lack of exploration of capitalization in online settings concerning significant positive events such as academic achievements, the exploratory design was well-suited for addressing these gaps. This approach utilized semi-structured interviews to explore college students' experiences with social media to capitalize on academic achievements and the associated motivations and outcomes of such capitalization.

2.2 Research Participants

The study's participants comprised ten (10) college students enrolled in Metro Manila, Philippines institutions. These individuals are selected through purposive sampling, a technique used to identify and select participants who can provide rich and relevant information about the research problem and central phenomenon under investigation (Creswell & Poth, 2014). The researchers based the selection criteria on the participants' frequency of sharing academic achievements on social media, determined by a pre-screening questionnaire.

2.3 Research Instrument

The study employed a pre-screening questionnaire and a semi-structured interview guide as research instruments. The pre-screening questionnaire is used in conjunction with the purposive sampling approach, consisting of items on demographic profiles, frequency of sharing academic achievements on social media, and specific media use. The semi-structured interview guide included questions designed to thoroughly address the research questions, ensuring comprehensive and insightful responses. Two licensed guidance counselors from the Philippine Normal University-Manila validated both instruments, ensuring their reliability and appropriateness for the study. Some interview questions were: (1) What is the difference between sharing your academic achievements in person and sharing them on social media? (2) What drives you to share your academic achievements on social media? Moreover, (3) How does sharing your academic achievements on social media, specifically the feedback you receive (comment section, share, reactions), affect you positively or negatively?

2.4 Data Gathering Procedure

The data collection procedure commenced with distributing the pre-screening questionnaire via social media platforms, using publication materials that included a Google Form link to invite potential participants to complete the questionnaire. Ten participants were selected from the pre-screening questionnaire respondents based on the frequency of their academic achievement posts on social media. These ten participants always and often share their academic achievements on social media. Ten (10) interviews were primarily conducted online, with one held in person, using a validated semi-structured interview guide. The interview process lasted between 12 and 20 minutes, allowing participants sufficient time to reflect thoroughly on their experiences and perceptions. All data collected were treated with the utmost confidentiality and were manually analyzed using content analysis.

2.5 Ethical Considerations

In exploring the use of social media for academic achievement capitalization, along with the associated motivations and outcomes, informed consent, confidentiality, and the distress protocol, as proposed by Teresita Rungduin under the PNU Policy Brief Series, Volume 5, Issue 1, 2021, were adhered to throughout the research process. Informed consent was obtained before the study, detailing the overall purpose, design features, and any potential risks and benefits of participation. To protect participants' identities, the researchers maintained confidentiality by using anonymized identifiers in the manuscript and codebook (e.g., Participant 1). During the interviews, the researcher followed a distress protocol to manage any potential distress experienced by participants. However, the distress protocol was not utilized during the ten interviews, as the participants perceived or experienced no distress.

3.0 Results and Discussion

3.1 Reasons for Using Social Media as a Platform to Capitalize on Academic Achievements: Features of Social Media

Social media has varying designs and features for the user's purpose and desired functionalities (Dawot & Ibrahim, 2014). In the case of academic achievement capitalization, college students turn to social media because its features enable them to meet particular needs and functionalities. These findings align with the Uses and Gratifications Theory (UGT), which proposes that users actively engage with media to satisfy particular needs, including cognitive (information updates), affective (enjoyment), interpersonal relationships, self-presentation, and self-actualization (Shao, 2009; Bossen & Kottasz, 2020; Febrian & Husna, 2023). The following sub-categories highlight the social media features that fulfill college students' goals in academic achievement capitalization.

Broader Audiences

Social media's ability to reach a wider audience is one of the features highlighted by college students, as it allows them to share their academic achievements with a more extensive network than in-person interactions permit. This includes distant relatives, friends, former classmates, and other social connections. This is consistent with Whiting and Williams (2013), who found that the convenience of connecting with social networks was one of the driving factors behind people's use of social media platforms. Additionally, this category aligns with one of the motivations in social media capitalization highlighted in the study by Bierstetel (2021). As expressed by Participant 1,

"*I choose to share my academic achievements on social media primarily because our relatives live far away. I want to tell them how I am doing well academically and update them on my academic status and other events in my life.*"

Feedback section

College students noted the feedback section feature of social media that allows them to receive generally positive feedback from their posts about their academic achievements, thereby significantly contributing to the success of their capitalization attempts. This positive feedback notably impacts them, motivating and inspiring their academic pursuits. This favorable reception of positive feedback aligns with the findings of Metzler and Scheithauer (2017), who found that positive feedback is notably common when individuals share positive content on social media platforms. Bierstetel (2021) found that people who share positive experiences on Facebook and feel their friends respond well tend to report higher life satisfaction and positive emotions. As stated by Participant 1,

"*I feel so inspired to do more because of the positive comments about my academic achievements, right? That is great about having a comment section on social media.*"

User-generated Content and Personal Profile

Social media users can curate their profiles to reflect their identity by posting content (McCay-Peet & Quan-Haase, 2016; Vițelar, 2019). Hence, user-generated content and personal profile features are some of the features highlighted by college students. Accordingly, social media offers the opportunity to share content related to their academic achievements, which, in turn, becomes part of their online personal profile and helps construct an image of being an academic achiever student. As expressed by Participant 8,

"*Social media is where I express the certificates I gain and achieve because that is where I build my image.*"

Post-Sharing

The post-sharing feature of social media is also emphasized. Accordingly, universities and classroom-based awards are often posted on social media, and the sharing functionality of social media enables college students to access these achievements and easily share them with their social networks. Participant 3 said,

"*That is also where the university posts now, unlike before when it was done in a classroom set-up, so they just share it online.*"

Content Revisitation

According to two college students interviewed, content revisitation is one of the reasons for using social media to capitalize on academic achievements. This feature allows users to revisit posts about their accomplishments and the feedback received at any time. Although not explicitly mentioned by the participants, examples include Facebook Memories, and social media feeds that retain posted content. These memory functions on various social media platforms, which prompt users with reminders of past activities (e.g., one year ago, two years ago, etc.), facilitate the ongoing re-experiencing of past events, thereby augmenting their salience and accessibility (Bierstetel, 2021). Participants 1 and 2 said,

"*I share it so that when I look back, I am motivated to study.*" "*Also, in social media, you can look back at your awards.*"

3.2 Motivations for Capitalizing Academic Achievements on Social Media

Seek Validation

Social media has enhanced self-esteem and validation-seeking behavior (Dhingra & Parashar, 2022). For instance, platforms such as Facebook serve as channels for sharing positive experiences in hopes of receiving validation and ways of seeking support (Blight et al., 2015). Similarly, college students capitalize on their academic achievements on social media to gain approval and recognition from their social networks and determine whether they deserve academic achievements and whether their academic efforts are worth it. Participant 4 said,

"*Let us also include that your hard work gets validated, that, of course, people also see in social media the different phases of your efforts; it is like they validate that your hard work is worth it.*"

Self-Presentation

Individuals who capitalize on positive events aim to enhance their status in the eyes of others (Langston, 1994). This aligns with various social-psychological theories suggesting that individuals strive to establish and maintain positive esteem among significant others (Shrauger & Schoeneman, 1979; Leary & Baumeister, 2000; Murray et al., 2006, as cited by Reis et al., 2010). For college students, social media is a platform to curate and present themselves as 'academic achievers' to their networks. By posting academic achievements, students seek to construct an image of academic excellence, which helps them demonstrate their academic capabilities and build a positive scholarly reputation. The presence of positive content on social media may be explained by theoretical and empirical evidence indicating that individuals generally seek to preserve and enhance a favorable self-image in the eyes of others (Goffman, 1959; Leary, 2007; Vranken, 2023). Individuals often selectively highlight their favorable aspects to influence how others perceive them (Goffman, 1959; Vranken, 2023). Within the context of social media, this inherent tendency toward positive self-presentation is evident. Participant 1 said,

"*I want to prove more about myself that I am not just a beautiful girl but also an academic achiever. I am not being boastful, but people think I am just beautiful, and I do not want that kind of impression. I want to be seen as both smart and beautiful, at least somehow.*"

Inspire others

Watkins (2021) pointed out that sharing positive events fosters inspiration. College students are capitalizing on their academic achievements to inspire their social networks to strive for academic excellence and give their best, just as they do. This motivation stems from their experiences of being inspired by a social network of others who share their academic achievements on social media. People share online not only because they get positive feedback in person and find online platforms convenient but also to spread positivity, inspire others, and connect with people they do not often see or talk to (Bierstetel, 2021). Participant 9 said,

"*We also want to motivate others, not just ourselves. By sharing, we motivate other people, saying, 'If I can do this, you can do it too.*"

Seek Support

Social media reaches broader audiences and is commonplace for positive feedback for shared positive events (Metzler & Scheithauer, 2017). Hence, another motivating factor driving college students to capitalize on their academic achievements on these platforms is the desire to maximize their audience to seek support and influence their well-being. They anticipate receiving congratulatory, validating, and motivating feedback from their social networks, which elicits positive emotions. When social media is utilized in capitalization, it can help fulfill needs in social support and enhance subjective well-being (Bierstetel, 2021). Positive social sharing may encourage connection, contributing to feelings of belonging and emotional health. Participant 4 said,

"*Many people appreciate my hard work by posting my achievements on social media.*"

Emotional Expression

The social sharing of emotions theory posits that emotions, though initially internal and private, are subsequently communicated to others by the individual experiencing them (Rime et al., 1991). Similarly, college students perceive capitalizing on their academic achievements in social media as an avenue to express their emotions, particularly feelings of pride and fulfillment. Given that the user-generated content feature of social media (Shao, 2009; Dawot & Ibrahim, 2014; Vițelar, 2019) enables self-expression, they utilize this platform to its maximum potential for such expression. Participant 8 said,

"*And also, when I share on social media, there is a sense of fulfillment that I have completed this– that I received this, because it is difficult, like when you finish it, I want to express that I have accomplished it.*"

3.3 Intrapersonal Outcomes of Academic Achievement Capitalization on Social Media

Intrapersonal outcomes are those experienced within the individual. The following are the intrapersonal outcomes of academic achievement capitalization of college students on social media.

Positive Affect

As college students share their academic achievements on social media, they experience positive affectivity from the positive feedback they receive, such as congratulations, affirmations, and motivational messages. This aligns with various experimental and quantitative studies on capitalization, which consistently find that sharing positive experiences amplifies positive affect (Langston, 1994; Gable et al., 2004; Reis et al., 2010; Lambert et al., 2013; Bierstetel, 2021). In addition, the broaden-and-build theory, which posits that positive emotions broaden an individual's thought-action repertoires, may support the existing category. The theory sustains the idea that positive affect exerts a profound influence by enhancing cognitive processes and behaviors and facilitating the development of social resources (Fredrickson, 1998, 2001; Gentzler et al., 2013). Participant 4 said,

"*Whenever I read positive comments from them, it makes me want to do better and use it as motivation to be more consistent in receiving academic achievements.*"

Motivation

The positive effect students experience is closely linked to increased motivation. The positive feedback they receive, such as compliments and recognition, encourages them to strive for even higher academic goals. This connection reflects research showing that positive reinforcement or feedback enables individuals to set more ambitious goals, ultimately leading to improved performance (Krenn et al., 2013; Schunk & DiBenedetto, 2020). Participant 1 said,

"*It is motivating to do better when you see many people leaving positive comments for you.*"

Validation

College students garnered validation from their academic achievement capitalization attempts on social media, receiving recognition for their accomplishments and the value of their academic efforts. This aligns with the findings of Gable & Reis (2010), which state that capitalization fosters feelings of being understood, validated, and cared for. Moreover, responses from capitalization amplify feelings of worthiness, a sense of belonging, and a lower frequency of being labeled boastful (Bierstetel, 2021). Participant 6 said,

"*I would feel that everything is worth it because I am getting appraisals or validation.*"

Enhances Self-Esteem

The validation students receive also plays a pivotal role in boosting their self-esteem. Positive feedback enhances their confidence in their abilities, encouraging them to embrace challenges and aim for more remarkable academic achievements. This outcome mirrors previous studies showing how sharing positive experiences helps cultivate self-esteem (Gable & Reis, 2010; Reis et al., 2010) and promotes well-being (Bierstetel, 2021). When students see others believing in their potential, it reinforces their belief in themselves, creating a relationship between validation, self-esteem, and the motivation to achieve more. As Participant 3 expressed,

"*It boosts my self-esteem or self-confidence because if they believe you can do it, why am I still doubtful?*"

Pressure

The final intrapersonal outcome involves college students experiencing pressure when sharing their academic achievements on social media. This outcome is intriguing because, ideally, the outcomes should serve as resources that positively impact those engaging in capitalization, especially when the feedback is active-constructive (Gable, 2004; Gable & Reis, 2010; Rimé et al., 2020). However, in the context of academic achievement capitalization on social media, there is an internal sense of pressure experienced, even in the presence of positive feedback. Consequently, feelings of shame arise, leading capitalizers to exhibit reluctance in posting when their achievements do not align with the level of accomplishments they have previously shared. This outcome mirrors the broader dynamics of contemporary society, where an accelerating pace, heightened competitiveness, and mounting pressure have become defining features. As a result, individuals feel compelled to continuously achieve to gain and maintain recognition (Rosa, 2010, as cited by Krogh, 2022). Participant 10 said,

"*It imposes pressure, and there is that feeling that you cannot afford to fail because they have already seen your success.*"

3.4 Interpersonal Outcomes of Academic Achievement Capitalization on Social Media
Interpersonal outcomes are those experiences related to social relationships. The following are the interpersonal findings of academic achievement capitalization on social media.

Strengthening of Existing Relationships
The interpersonal outcomes resulting from capitalization are rooted in strengthening relationships through positive and active interactions between the capitalizers and the recipients (Gable, 2004; Gable & Reis, 2010; Donato et al., 2013; Rimé et al., 2020). In the context of academic achievements capitalization on social media, the findings align with existing studies, indicating that interactions within the social media community, such as exchanging congratulatory messages, contribute to strengthening relationships with those social network members personally known by the capitalizers. Interestingly, it also functions as a means to assess the current status of friendships; for instance, when a friend from afar comments, it signifies that the friendship is still alive; this low-effort interaction and the ubiquity of social media allows people to strengthen bonds and relationships without having to meet face-to-face (Décieux et al., 2019). Participant 1 said,

"*It further strengthens relationships, especially with friends, because you know that they are happy with your achievements and that there are people who support you. Moreover, from the support they give or show, I feel more motivated to study because I know that I have a support system that always has my back.*"

Builds New Relationships
Capitalization is primarily studied within romantic relationships, where existing relationships are already established. However, in academic achievement capitalization on social media, new relationships can form with social network members who interact with these posts, even if they are not personally acquainted with the individuals sharing the achievements. Décieux et al. (2019) stated that with the ubiquity of social media and more individuals sharing their lives, experiences, and achievements on social media, people know more about a person's life and be informed about their essential milestones, thus making an effortless way to communicate with each other and to build new relationships. Moreover, these online interactions often extend to in-person interactions. Participant 8 noted,

"*Little conversations start in the comments, and from there, friendships develop.*"

4.0 Conclusion
The experiences and perspectives of college students offer an understanding of their engagement in academic achievement capitalization on social media. Their involvement in sharing academic achievements is driven by motivations such as seeking validation, presenting themselves as achievers, inspiring others, receiving supportive feedback, and expressing fulfillment and pride. Social media enables the fulfillment of these motivations through positive feedback on social media, making sharing academic achievements a meaningful way to extend benefits beyond the initial joy of receiving achievement. This practice fosters positive emotions, boosts self-esteem, and provides validation, creating a motivational cycle that encourages students to maintain and enhance academic performance. Thus, the emotional uplift from the feedback on their posts offers both intrapersonal and interpersonal benefits, promoting personal well-being and strengthening social connections.

However, beneath this cycle of positivity lies a subtle pressure—the expectation to sustain high academic performance. While supportive feedback is uplifting, it may also create unspoken expectations, driving students to continually meet the standards they have set for themselves. Students may need to compete in surpassing or maintaining their previous achievements. Therefore, the foundation of validation and motivation from social networks may also generate heightened competitiveness and stress, leading them to live up to the image they have cultivated online. Therefore, these challenges highlight the importance of integrating mental health interventions to help students navigate the tension between motivation and the pressure to perform.

In conclusion, the study's findings conclude that sharing academic achievements on social media is a beneficial practice that enhances the positive impact of receiving academic recognition. This practice serves as an effective way for students to celebrate and savor their achievements. Given that feedback on these posts significantly enhances both personal and social benefits, it is essential to cultivate an online environment that encourages supportive recognition of academic accomplishments. Promoting this environment helps students fully experience the positive effects of sharing their achievements. It may also alleviate their pressure, ultimately enriching their academic experience and well-being.

5.0 Contributions of Authors

Angeline A. Paumar – study conceptualization, data collection, analysis and interpretation, editing and writing, supervising, revisions **Francine Faith A. Villanueva**– editing and writing, revisions **Thea Angela R. Romero** - editing and writing, revisions **Evelyn C. Bagaporo** - study conceptualizations and revisions.

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7.0 Conflict of Interests

The authors declare no conflict of interest in the study.

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Knowledge, Attitude, and Practices Regarding Antibiotic Misuse among Residents of San Pablo City, Philippines

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Abstract. Antibiotic misuse emerged as a growing global health crisis, significantly contributing to the rise of antimicrobial resistance. This study focused on the issue in San Pablo City, Philippines, where research on antibiotic misuse was scarce. Data gathered revealed that barangay officials often distributed antibiotics without proper prescriptions or oversight from health workers. Additionally, individuals commonly shared prescriptions and prematurely stopped using antibiotics once their symptoms improved, practices that contributed to the escalating problem of antibiotic resistance. This research aimed to evaluate the knowledge, attitudes, and practices (KAP) regarding antibiotic misuse among residents aged 20 years and above. A descriptive-comparative research design was employed, utilizing non-probability purposive sampling. Respondents were selected from both rural and urban areas of San Pablo City. A structured KAP survey questionnaire, validated by field experts and pilot-tested, was administered to 364 respondents. Data on demographic characteristics, knowledge, attitudes, and practices concerning antibiotic misuse were statistically analyzed using frequency and percentage distribution, mean formula, Kruskal-Wallis H Test, and Mann-Whitney U Test. Results indicated that most respondents, predominantly female and aged 20-24, demonstrated commendable knowledge, attitudes, and practices regarding antibiotic misuse. However, significant differences were observed when data were analyzed based on demographic factors such as age and income. Interestingly, no significant differences were found in KAP between rural and urban respondents. In conclusion, while general awareness about antibiotic misuse was promising, targeted educational interventions were essential to address specific demographic groups. These efforts were crucial in promoting responsible antibiotic use and combating the growing threat of antimicrobial resistance in the region.

Keywords: Knowledge; Attitude; Practices; Antibiotic misuse; San Pablo City.

1.0 Introduction

Antibiotics effectively treat bacterial infections, but their proper use is crucial. Misuse, such as sharing antibiotics, taking leftover medications, or not adhering to prescribed dosages, can lead to antibiotic resistance. This resistance diminishes the effectiveness of antibiotics, posing significant risks to public health. According to the World Health Organization (WHO), antibiotic resistance occurs when bacteria adapt to medications, rendering treatments less effective and increasing healthcare costs. However, antibiotic resistance can be mitigated through improved knowledge and responsible usage among healthcare providers and patients alike. In 2019, antimicrobial resistance contributed to 1.27 million deaths globally, with 15,700 directly linked. In 2023, there were 1.05 million deaths. The WHO predicts that by 2050, antibiotic resistance could cause 10 million deaths annually if current treatment methods do not improve. The misuse of antibiotics presents several challenges, which are not solely attributable to a lack of discipline. Often, financial instability hinders individuals from accessing the help they need. Those with limited financial resources may resort to self-medicating, accepting medications from friends or family, or forgoing treatment altogether. These issues highlight the consequences of insufficient information and education about the proper usage of antibiotics (Tagum-Briones, 2023). Moreover, in some cases, the problem is not just financial but also relates to the affordability of healthcare services. High costs associated with healthcare often deter individuals from seeking professional help (Greem et al., 2023). Additionally, a lack of education from medical practitioners leaves patients unaware of the potential effects of antibiotics, particularly regarding the consequences of misuse (Hassan et al., 2023).

People living near pharmacies and hospitals are shown to understand better what antibiotics work and how they work. Their knowledge and attitude on how to take antibiotics have a positive outcome. This is what health education can do for people not medically inclined (Sartelli et al., 2018). Consequently, people near pharmacies tend to overuse antibiotics. Even if they have the means and easy access, they abuse the medicine for their good. They do not seek professional help (Jani et al., 2021). The researchers observed that antibiotic resistance was becoming increasingly common due to misuse. They expressed concern after encountering patients, including young individuals, who exhibited resistance for various personal reasons during their hospital duties. Additionally, the researchers noted that in some barangays, local officials dispensed antibiotics without prescriptions, categorizing them as “other medicine” to bypass the need for oversight from health practitioners.

Given the limited research on antibiotic misuse in the Philippines, the researchers conducted this study to address this gap. The lack of research highlighted a significant population gap in understanding antibiotic use and misuse. By focusing more on this issue, the researchers believed that the knowledge, attitude, and practices surrounding antibiotics among the population could be significantly improved. This study aims to assess the knowledge, attitude, and practices regarding antibiotic misuse among residents of San Pablo City. It explores the reasons behind antibiotic misuse, whether individuals are from rural or urban areas, and examines their adherence to prescribed instructions and tendency to use antibiotics for minor illnesses without consulting a physician. The researchers anticipate that residents' knowledge, attitudes, and practices may vary significantly. Another objective of this study is to reduce the increasing incidence of antibiotic misuse. Health education is a key component, and the researchers plan to implement effective educational strategies, such as distributing leaflets and displaying tarpaulins, to reach a large audience. This approach is crucial because information about antibiotics is disseminated more slowly than the detrimental effects of misuse on the population (McCracken, 2023).

Several individuals and organizations stand to benefit from the outcomes of this study following data collection and intervention. The residents of San Pablo City will be the primary focus and source of data, making them the central target for intervention efforts. Community health nurses, barangay officials, and healthcare professionals will be informed of the issues surrounding antibiotic misuse, enabling them to properly educate individuals seeking antibiotics, whether at barangay halls, centers, or hospitals. Additionally, the City Health Office and the Department of Health will better understand the situation of antibiotic misuse in the city. They will acquire baseline data regarding the community’s knowledge, attitude, and practices. Community health nursing will play a critical role in disseminating education and information about the proper use of antibiotics. Furthermore, future researchers will have access to this baseline data, serving as a foundation for further studies on antibiotic use and misuse.

2.0 Methodology

2.1 Research Design

The study employed a quantitative descriptive-comparative design to examine the impact of independent variables—age, sex, and monthly income—on the dependent variables of knowledge, attitude, and practices concerning antibiotic misuse among the residents of San Pablo City.

2.2 Research Locale

The study was conducted in six barangays of San Pablo City, including the rural areas of Barangay Atisan, Bautista, and Santiago II and the urban areas of Barangay V-B, V-D, and VII-B. These barangays were selected due to their distinct challenges, ranging from limited access to healthcare services to excessive primary care availability, which contribute to the risk of antibiotic misuse.

2.3 Research Participants

The study targeted residents aged 20 years and above from Barangay Atisan, Bautista, Santiago II, V-B, V-D, and VII-B in San Pablo City, comprising 180 male and 184 female respondents. All respondents voluntarily participated, having read and signed informed consent, ensuring full understanding and agreement with the study's purpose. The study employed purposive sampling, a non-probability method in which respondents were deliberately chosen based on predefined criteria rather than random selection. Also referred to as judgmental sampling, this approach ensured the inclusion of respondents who met key characteristics essential to the research. Specifically, respondents were selected based on their proximity to pharmacies where antibiotics are purchased and the classification of their barangays as either rural or urban, which aligned with the study's objectives.

2.4 Research Instrument

The study utilized an adapted questionnaire authorized by Crucis et al. (2019), with data collected using a traditional paper-and-pen method. The research instrument comprised four sections: the first captured the demographic profile of respondents, including name, age, sex, and monthly income; the second assessed knowledge about antibiotic misuse; the third gauged attitudes toward antibiotic misuse; and the fourth evaluated practices related to antibiotic misuse. Respondents expressed their level of agreement or disagreement using a Likert scale, ranging from (4) Strongly Agree to (1) Strongly Disagree. A pilot test involving 30 respondents from rural and urban barangays was conducted to evaluate the instrument's reliability on knowledge, attitudes, and practices related to antibiotic misuse. Using SPSS v27, Cronbach’s Alpha was calculated, revealing good reliability across all subscales, with an overall score of 0.763 for rural and urban areas.

2.5 Data Gathering Procedure

The data-gathering process began with the researchers submitting a formal letter, signed by the research adviser and the dean of the College of Nursing, to seek approval for accessing vital data from the City Health Office. The researchers obtained authorization via email from various authors to modify and adjust a research questionnaire originally developed by Crucis et al. (2019), for which consent was granted. The instrument was then validated by three experts—a pharmacist, a community health nurse, and a nursing professor—who ensured its accuracy. At the same time, a Filipino grammarian reviewed the content for clarity and grammatical precision. One rural and one urban barangay were selected for pilot testing, and permission was sought from the Dean of Nursing to conduct the test outside the institution’s premises. Letters were also sent to the chairmen of Barangay San Bartolome and Barangay III-D to facilitate this initial phase, allowing the researchers to identify errors and assess the questionnaire's reliability. After receiving feedback, the researchers, in consultation with their statistician and adviser, refined the instrument, which was then approved. Subsequently, a letter was sent to the Dean for permission to collect data in the six selected barangays: Barangay Atisan, Bautista, Santiago II, V-B, V-D, and VII-B. Separate letters were issued to each barangay chairman. Finally, the researchers analyzed the gathered data to assess the knowledge, attitudes, and practices regarding antibiotic misuse among the residents of San Pablo City.

2.6 Ethical Considerations

The researchers implemented stringent ethical considerations throughout the study, which focused on assessing respondents' knowledge, attitudes, and practices regarding antibiotic use. Before initiating data collection, the researchers sought permission from relevant authorities, including the Dean of Nursing at Canossa College and barangay chairmen, ensuring transparency and accountability in their research process. Informed consent was a cornerstone of the study; respondents were informed of their right to refuse participation and assured that their responses would remain confidential and accessible only to the research team. To further enhance ethical integrity, the researchers assisted respondents facing difficulties reading or comprehending the questionnaire, minimizing bias and ensuring accurate data collection. The research instruments underwent thorough validation and refinement, reflecting a commitment to methodological rigor. Furthermore, the researchers expressed their gratitude to respondents and helpers, recognizing their contributions through tokens of appreciation. By adhering to these ethical standards, the researchers aimed to uphold the dignity and rights of all respondents while contributing valuable insights into antibiotic misuse.

3.0 Results and Discussion

3.1 Demographic Profile of the Respondents

In Table 1, the highest number of respondents fell in the age category of twenty to twenty-four (20-24) years old, with a frequency of eighty-two (82) individuals or twenty-two-point-fifty-three percent (22.53%) of the total. This was supported by the study of Hulvershorn (2021), which showed that generative motivation to engage in studies that created a better world was exhibited by young adults between the ages of fourteen (14) and twenty-nine (29) at levels that were comparable to or higher than those of older adults.

Table 1. Frequency and percentage distribution of the demographic profile of the respondents

Category		Frequency	Percent (%)
Age	20-24 years old	82	22.53
	25-29 years old	37	10.16
	30-34 years old	34	9.34
	35-39 years old	26	7.14
	40-44 years old	35	9.62
	45-49 years old	32	8.79
	50-54 years old	26	7.14
	55-59 years old	27	7.42
	60-64 years old	3	8.24
	65 years old and above	35	9.62
	Total	**364**	**100**
Gender	Male	180	49.45
	Female	184	50.55
	Total	**364**	**100**
Monthly Income	Php 9,100 and below	240	65.93
	Php 9,100 - Php 18,200	89	24.45
	Php 18,200 - Php 36,400	29	7.97
	Php 36,400 - Php 63,700	5	1.37
	Php 63,700 - Php 109,200	0	0.0
	Php 109,200 - Php 182,000	0	0.0
	Php 182,000 and above	1	0.27
	Total	**364**	**100**

The study also revealed a higher proportion of female respondents, totaling one hundred eighty-four (184) or fifty-point-fifty-five percent (50.55%), followed by male respondents at one hundred eighty (180) or forty-nine-point-forty-five percent (49.45%). This breakdown emphasized the predominance of female respondents in the study. According to research by Chamie (2018), gender variations in childbearing and child-rearing result in the fact that more women than males remain at home with their families. The study revealed that women devote over twice as much time as men to household chores and caring for their families. As a result, women are more likely to participate in community research projects since they are the ones who are often at home. Moreover, the study by Royall (2020), showed that women are generally more likely to contribute to survey responses because they tend to be highly engaged respondents.

Regarding monthly income, the majority of the respondents reported a monthly income of nine-thousand-one-hundred pesos (Php 9,100) and below, with a frequency of two hundred forty (240) individuals or sixty-five-point-ninety-three percent (65.93%). In the study by the IBON Foundation (2023), it was stated that the average nominal minimum wage nationwide was just Php 8,902 monthly, which was 26% less than the average monthly poverty threshold, making the minimum wage a poverty wage for families. According to Albert et al. (2018), the low-income class constituted a significant majority of the population in the Philippines. Following the income brackets provided, most of the respondents were under the low-income category, earning nine-thousand-one-hundred pesos (Php 9,100) and below, with only a few falling under the low-income and lower-middle-income categories, earning nine-thousand-one-hundred to eighteen-thousand-two-hundred pesos (Php 9,100 - Php 18,200) and eighteen-thousand-two-hundred to thirty-six-thousand-four-hundred pesos (Php 18,200 - Php 36,400).

3.2 Knowledge of Antibiotic Misuse

In Table 2, the overall mean score for the knowledge section among rural barangay residents was 3.22, with a standard deviation of 0.84. This suggested that residents generally possessed good knowledge regarding antibiotic misuse. Many individuals understood that antibiotics required a prescription and that overuse could be harmful; however, some mistakenly believed that antibiotics could treat ailments beyond bacterial infections, such as pain and inflammation. Additionally, many rural residents incorrectly thought that antibiotics could treat viral infections. This finding aligned with the work of Ancillotti et al. (2018), which highlighted the risks associated with improper antibiotic use and underscored the importance of obtaining a doctor's prescription.

Table 2. Descriptive statistics of the level of knowledge on antibiotic misuse in rural barangays

Indicators	Rural Barangays			Urban Barangays		
	Mean	**SD**	**Interpretation**	**Mean**	**SD**	**Interpretation**
1. Antibiotics can treat bacterial infections such as UTI, strep throat, skin infections, and pneumonia.	3.46	0.67	Very Good	3.40	0.70	Very Good
2. Antibiotics only work against bacteria, but not all bacterial infections need to be treated with antibiotics.	3.08	0.76	Good	3.24	0.70	Very Good
3. Antibiotics can prevent bacterial diseases from becoming worse.	3.46	0.65	Very Good	3.39	0.63	Very Good
4. Antibiotics cannot treat viral infections like the common cold and influenza (flu).	2.80	0.87	Good	2.79	0.97	Good
5. Antibiotics are not indicated to reduce pain and inflammation.	3.03	0.95	Good	3.08	0.87	Good
6. If taken too often, antibiotics are less likely to work in the future.	3.07	1.00	Good	3.23	0.85	Good
7. The effectiveness of antibiotics is not based on their price.	2.97	0.98	Good	3.24	0.89	Good
8. Antibiotic overuse is hazardous to one's health.	3.46	0.87	Very Good	3.46	0.82	Very Good
9. A prescription is required when buying antibiotics because they are unavailable over the counter.	3.66	0.79	Very Good	3.58	0.73	Very Good
Overall	**3.22**	**0.84**	**Good**	**3.27**	**0.80**	**Very Good**

The overall mean score for the knowledge section among urban barangays was 3.27, with a standard deviation of 0.80, indicating that residents possessed very good knowledge regarding antibiotic misuse. Similar to their rural counterparts, some individuals in urban settings mistakenly believed that antibiotics could cure viral infections; however, the majority recognized the necessity of prescriptions. Nonetheless, a lack of awareness about the potential harms of antibiotic overuse highlighted a gap in understanding their proper use and effects. A study by Pogurschi et al. (2022) corroborated these findings, revealing that some individuals misunderstood the purpose of antibiotics and misused them for viral infections. Such misconceptions could lead to self-medication, diminish antibiotic efficacy, and pose health risks, as Lim et al. (2021) noted.

3.3 Attitude on Antibiotic Misuse

In Table 3, the overall mean score for the attitude section among rural barangay residents was 3.44, with a standard deviation of 0.83. This indicated a very good attitude toward antibiotic misuse among the residents.

Table 3. Descriptive statistics of the attitude toward antibiotic misuse in rural barangays

Indicators	Rural Barangays			Urban Barangays		
	Mean	**SD**	**Interpretation**	**Mean**	**SD**	**Interpretation**
1. I consult a physician first before taking any antibiotics.	3.64	0.71	Very Good	3.59	0.67	Very Good
2. I read the instruction labels of the antibiotics.	3.61	0.64	Very Good	3.64	0.62	Very Good
3. I look at the expiry date of antibiotics before taking them.	3.70	0.56	Very Good	3.70	0.58	Very Good
4. I complete the course of antibiotics that is prescribed to me.	3.59	0.84	Very Good	3.53	0.72	Very Good
5. I do not need to take antibiotics immediately when I get sick.	3.41	0.84	Very Good	3.46	0.74	Very Good
6. I do not take antibiotics when I have colds.	3.26	0.93	Very Good	3.32	0.84	Very Good
7. I do not use an antibiotic that was prescribed to me for a previous illness if I develop similar symptoms any time later without seeking medical advice.	3.36	0.95	Very Good	3.32	0.82	Very Good
8. I do not share my leftover antibiotics with someone, even if they have similar symptoms.	3.34	0.96	Very Good	3.41	0.83	Very Good
9. I do not pour antibiotic powder onto the wound to prevent infection.	3.03	1.06	Good	3.34	0.91	Very Good
Overall	**3.44**	**0.83**	**Very Good**	**3.48**	**0.75**	**Very Good**

Those in rural areas demonstrated caution regarding antibiotic expiration dates and label instructions, emphasizing the importance of physician prescriptions. Despite this awareness, some individuals occasionally bypassed doctor consultations and reused old prescriptions. Research by Bhardwaj et al. (2021) and Alnasser et al. (2021) indicated that, despite certain misconceptions, the rural population generally understood the appropriate attitudes toward antibiotics. While many demonstrated proper usage, a segment of the population still required further health education on appropriate antibiotic use.

The overall mean score for the attitude section among urban barangay residents was 3.48, with a standard deviation of 0.75, indicating a very good attitude. Residents in urban areas were highly aware of the need to check expiration dates and read instruction labels for all medications, underscoring the importance of consulting a physician before using antibiotics. However, the availability of certain antibiotics at nearby convenience stores often led to self-medication for minor ailments. Despite this, respondents strongly adhered to not sharing antibiotics and discontinued using antibiotic powder on wounds. These findings aligned with Sartelli et al. (2018), highlighting the affordability challenges in accessing medical care, leading individuals to purchase over-the-counter medications and self-medicate despite their high knowledge of antibiotics. While respondents expressed trust in their healthcare providers, infrequent doctor visits due to external factors were common; nonetheless, the overall attitude toward antibiotic misuse among urban residents remained positive.

3.4 Practice on Antibiotic Misuse

In Table 4, the overall mean score for the practice section among residents of rural barangays was 3.30, with a standard deviation of 0.89, indicating a very good interpretation of the respondents' practices regarding antibiotic misuse. However, some responses deviated from ideal practices due to challenges such as financial constraints, which hindered individuals from completing the full course of antibiotics. Additionally, some respondents prematurely ceased antibiotic intake, unaware of the potential harm upon feeling better. They often opted for herbal remedies, perceived as more affordable and effective, overlooking the risks associated with self-medication. Financial limitations frequently obstructed the continuation of antibiotic treatment, as noted by Tagum-Briones (2023), emphasizing that a lack of discipline was not always the underlying issue behind premature cessation. Accessibility to physician consultations also posed challenges, particularly for those with lower incomes, prompting individuals to use self-medication for convenience (Do et al., 2021).

Table 4. Descriptive statistics of the practice of antibiotic misuse in rural barangays

Indicators	Rural Barangays			Urban Barangays		
	Mean	SD	Interpretation	Mean	SD	Interpretation
1. I buy the complete dose when I purchase antibiotics.	3.44	0.90	Very Good	3.39	0.76	Very Good
2. I follow the right time of taking antibiotics.	3.79	0.45	Very Good	3.56	0.66	Very Good
3. I do not stop taking antibiotics when I start feeling better.	2.92	1.08	Good	3.01	1.02	Good
4. I do not take antibiotics for sore throat, fever, or cold.	3.21	0.90	Good	3.17	0.88	Good
5. I do not need to take antibiotics when the color of my mucus changes to yellow or green.	3.00	1.06	Good	3.16	0.86	Good
6. I do not drink high antibiotics for fast recovery.	3.26	0.89	Very Good	3.37	0.78	Very Good
7. I do not use leftover antibiotics when I am sick.	3.44	0.87	Very Good	3.38	0.81	Very Good
8. I do not keep antibiotics at home for emergency use by my family members.	3.34	0.91	Very Good	3.28	0.92	Very Good
9. I do not accept the antibiotics given to me by my parents/guardian/relatives/friends.	3.25	0.96	Good	3.12	0.99	Good
Overall	**3.30**	**0.89**	**Very Good**	**3.27**	**0.85**	**Very Good**

The overall mean score for the practice section among urban barangay residents was 3.27, with a standard deviation of 0.85, reflecting a very good interpretation as well. While residents in urban barangays generally exhibited positive practices regarding antibiotic use, areas remained for improvement, particularly concerning the premature discontinuation of antibiotics once they felt better. Financial constraints and a sense of improvement likely influenced this behavior, along with a prevailing belief that keeping antibiotics at home was unnecessary, viewing them as medications not to be taken at the onset of illness. These observations were supported by research such as Cambaco et al. (2023), which highlighted self-medication as a common practice contributing to antibiotic resistance. Similarly, Lalithabai et al. (2022) emphasized the inappropriate use of antibiotics for various conditions, contributing to decreased effectiveness and treatment challenges.

3.5 Comparison of Knowledge, Attitude, and Practices on Antibiotic Misuse

In Table 5, when grouped by age, the results indicated that respondents did not significantly differ in their knowledge ($p = .216$). However, significant differences emerged regarding their attitudes ($p = .045$) and practices related to antibiotic use ($p = .001$). When the respondents were grouped by sex, the results showed no significant differences between males and females regarding knowledge ($p = .815$) and attitudes ($p = .066$). However, a notable distinction was observed in antibiotic practices (p = .024), where male and female respondents demonstrated significant differences. Finally, when grouped according to monthly income, the results indicated that participants did not show significant differences in knowledge (p = .779) and attitudes (p = .096). However, there were significant differences in their antibiotic practices (p = .040).

Table 5. Comparison of Knowledge, Attitude, and Practices on Antibiotic Misuse

Demographic Profile	Scale	P-value	Interpretation
	Knowledge	0.216	Not Significant
Age	Attitude	0.045	Significant
	Practices	0.001	Significant
	Knowledge	0.815	Not Significant
Sex	Attitude	0.066	Not Significant
	Practices	0.024	Significant
	Knowledge	0.779	Not Significant
Monthly Income	Attitude	0.096	Not Significant
	Practices	0.040	Significant

In Table 6, the results of the comparison of knowledge, attitude, and practices on antibiotic misuse between rural and urban barangays show that there is no significant difference between residents of these areas in terms of their knowledge (p = .756), attitude (p = .859), and practices (p = .895) on antibiotic use.

Table 6. Comparison of Knowledge, Attitude, and Practices on Antibiotic Misuse between Rural and Urban Barangays

Scale	p-value	Interpretation
Knowledge	0.756	Not Significant
Attitude	0.859	Not Significant
Practices	0.895	Not Significant

When considering both areas collectively in terms of knowledge, attitude, and practices related to antibiotic misuse, no notable distinction was found between rural and urban barangays, as indicated by the data presented. Factors contributing to antibiotic misuse appeared consistent across both settings, suggesting identical combined knowledge, attitude, and practices. However, ongoing issues were discovered during data gathering, with respondents providing incorrect responses based on beliefs and developing negative attitudes and practices due to financial constraints.

The study reveals that residents from both urban and rural areas exhibited commendable knowledge, attitudes, and practices concerning antibiotic misuse. This indicates no significant differences between rural and urban barangays regarding awareness of the proper use of antibiotics and the potential harm caused by misuse. Nola Pender's Health Promotion Model aims to provide individuals with the knowledge and techniques to maintain health and prevent illness, emphasizing that health is a dynamic, positive state beyond the mere absence of disease. Similarly, the Health Belief Model, created by social psychologists including Rosenstock, seeks to understand and predict health behaviors by examining the relationship between individuals' beliefs and actions, particularly focusing on their perceptions of susceptibility, severity, benefits, cues to action, and self-efficacy. Both theories underscore the importance of understanding and influencing individual behaviors and beliefs to promote positive health outcomes and prevent illness.

Despite the generally positive results regarding respondents' knowledge, attitudes, and practices from rural and urban areas, further examination, especially of demographic subgroups, indicates areas needing improvement. Enhancing the level of knowledge, attitudes, and practices among these subgroups is crucial to mitigating the increasing misuse of antibiotics, which could lead to antibiotic resistance. Continued efforts to educate and influence health behaviors across all demographics are essential for sustaining and improving public health outcomes. Additionally, behavior change interventions effectively reduce inappropriate antibiotic use, emphasizing the importance of continuous education for healthcare providers and the public (Arnold et al., 2005).

4.0 Conclusion

This research reveals no significant differences in knowledge, attitudes, and practices concerning antibiotic misuse between urban and rural areas in San Pablo City, with both showing positive results. A small portion of the population, however, still misuses antibiotics and is unaware of their effects. This goes unnoticed as it is not one of the major concerns of the residents of the six barangays, namely, Barangay Atisan, Bautista, Santiago II, V-B, V-D, and VII-B San Pablo City.

The research shows that while San Pablo City generally has good knowledge, attitudes, and practices regarding antibiotic use, the community has noticeable differences. Women and younger people tend to use antibiotics more correctly, likely due to better education, health awareness, and more frequent interactions with healthcare services. In contrast, men, older adults, and those with lower incomes often misuse antibiotics by self-medicating or not finishing their prescriptions, which can lead to antibiotic resistance and other serious health issues. A major issue worsening this situation is barangay officials distributing antibiotics without proper control. This means people can get antibiotics without prescriptions, which encourages misuse and weakens public health efforts to promote correct use. To address these problems, there needs to be stricter control over antibiotic distribution, improved healthcare facilities, and better public education to ensure everyone uses antibiotics appropriately.

Addressing antibiotic misuse effectively requires a comprehensive approach. Conducting thorough qualitative research is crucial to uncover the social factors influencing these behaviors, such as socioeconomic conditions, cultural attitudes, and access to healthcare. Strengthening regulations on antibiotic distribution is essential to manage the availability of these drugs and reduce misuse. Additionally, investing in healthcare infrastructure—by enhancing clinic facilities and increasing the number of healthcare professionals—is vital for supporting proper antibiotic management. Comprehensive health education programs are needed to raise awareness about the dangers of misuse and the importance of adhering to prescribed treatments. Healthcare providers play a vital role by focusing on patient education to ensure proper antibiotic use, exploring and recommending alternative treatments when suitable, and engaging in continuous training on antibiotic stewardship to remain up-to-date with best practices. By addressing these interconnected factors, San Pablo City can improve its antibiotic stewardship efforts, enhancing public health and minimizing the risks of antibiotic resistance.

5.0 Contributions of Authors

The authors, JC, ES, NB, AP, and MM, each contributed equally to the paper, benefiting each section from their combined efforts. They collaborated closely to ensure the content was comprehensive and well-rounded, drawing on their diverse areas of expertise. GL and MQ played a pivotal role as supervisors, overseeing the paper and providing valuable guidance. Their leadership helped maintain the project's direction and coherence, ensuring that all stages of research and writing adhered to high academic standards.

Once the manuscript was completed, it was subjected to a thorough review by all authors. This collaborative review process involved detailed discussions and revisions to refine the work further and enhance its quality. Ultimately, all authors agreed on the final version of the paper, collectively approving it as a reflection of their joint commitment to producing a rigorous and accurate scholarly work.

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The authors declare that they have no conflicts of interest related to the publication of this paper.

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Knowledge, Attitude, and Perceived Stigma Towards Mental Health: Basis For Community-Based Program

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Abstract. On a global scale, mental health is a significant and urgent concern at present. In the Philippines, mental health illness is one of the most common forms of disability that has been reported. Despite the need to address mental health and mental illness in the community, the Philippines faces persistent obstacles such as inadequate funding, a shortage of mental health experts, and underdeveloped community-based mental health services. Thus, this research aims to measure the knowledge, attitude and perceived stigma of the residents of Lucban, Quezon. The data suggests that the respondents possess a high degree of knowledge. Additionally, the participants displayed a generally favorable attitude towards mental illness and an average level of perceived stigma. The results implicate the need to sustain further the positive trend of having a high mental health knowledge and positive attitude towards the mentally ill. On the other hand, there is a need to address the perceived stigma of the respondents further. Thus, the result of the study will be used as a basis for creating a specialized community-based program by also factoring in the demographic characteristics of the respondents.

Keywords: Attitude; Knowledge; Mental health; Mental illness; Perceived stigma.

1.0 Introduction

According to data given by the World Health Organization (WHO) in 2019, it was determined that over 970 million individuals worldwide were diagnosed with mental health disorders, with anxiety and depression being the most prevalent disorders. In addition, those with severe mental diseases generally have a life expectancy that is ten to twenty years less than that of the general population. Consequently, in the Philippines, mental health illness is the third most common form of disability, according to a survey on mental health services. (Martinez et al., 2020). In addition to that, data from the early 2020 Philippine WHO Special Initiative for Mental Health reveals that an average of 3.6 million Filipinos have been diagnosed with various types of mental, neurological, or substance use disorders.

Given this information, despite the numerous recognition of mental health illness and mental health concerns as a public health priority, many Filipinos continue to face different barriers, such as inaccessible mental health care in their area that prevents them from receiving adequate mental health care. This was also mentioned in a study by Lally et al. (2019); the mental healthcare sector in the Philippines faces persistent obstacles such as inadequate funding, a shortage of mental health experts, and underdeveloped community-based mental health services. While the current Mental Health Act legislation has established a legal structure for providing comprehensive mental healthcare, it is important to acknowledge the economic barriers that hinder persons from accessing such care. In order to provide fair and easily accessible mental healthcare for the population, it is essential to take such obstacles into consideration.

Moreover, in the celebration of Mental Health Month in 2020, Francisco T. Duque III, the former Secretary of the Department of Health (DOH), emphasized the scarcity of psychiatrists, psychologists, and other experts in the field of mental health in the Philippines, with less than one practitioner accessible for every 100,000 Filipinos. As a result, many individuals are unable to obtain the necessary mental health care. Accordingly, to support the mental health care of the residents of Lucban, Quezon, the local government unit took the initiative by partnering up with the Southern Luzon State University (SLSU) Psychology Program to address the need for psychological services and intervention. So far, since the memorandum agreement held last July 1, 2020, at the Lucban Municipal Building, they have been helping the LGU to provide psychological services such as counseling, psychotherapy, and rehabilitation, which is currently handled by the faculty of SLSU, which consists of registered guidance counselors, psychologists, psychometricians, and licensed professional teachers.

According to the university's data, as of March 2018, they had handled 130 reported cases. However, there are no reported initiatives yet to address the stigma in the community towards mental health and provide more accessibility and holistic mental health care to every resident of Lucban, Quezon. Currently, the LGU does not have a psychologist or psychiatrist, and they are actively seeking assistance for psychological support from the psychology department at Southern Luzon State University. Residents in need of mental health help typically seek assistance from social workers at the Office of the Municipal Social Welfare and Development for initial counseling interviews. They are then referred to the psychology department at SLSU for additional care if the social workers assess that there is a need, which may also take weeks before they can get a schedule with the faculty of Psychology. If a client requires psychiatric intervention, they are referred to either Mount Carmel Diocesan General Hospital, a private hospital in Lucena City, or Quezon Medical Center, a public hospital also located in Lucena.

Moreover, according to a personal interview with Ms. Mutya Rada, the head of the Office of the Municipal Social Welfare and Development (MSWDO) in Lucban, Quezon, their office has implemented a simple mental health initiative. This initiative includes conducting seminars on Stress Management Debriefing for the MSWDO staff to enhance their capacity development efforts. Additionally, they presently offer a community-based rehabilitation program for individuals recovering from substance abuse. This program provides simple counseling sessions and assists in successfully reintegrating these individuals into society. In addition, the MSWDO office stated that in 2023, a total of 156 residents from Lucban, Quezon, registered for psychosocial disability.

Overall, one of the pressing issues that we face in today’s time is how to address and improve the mental health situation in the Philippines and improve the accessibility of mental health care even in rural areas. Thus, this research aims to investigate the knowledge, attitude and perceived stigma of the residents of Lucban, Quezon. At the same time, it will also look at the demographic characteristics of the residents in order to create a more specialized community–based program. This plan would greatly benefit both the residents and the LGU. The community–based program would focus on providing accessible mental health assistance, considering the limited availability of psychiatric hospitals in the area.

2.0 Methodology

2.1 Research Design

The study utilized a quantitative descriptive-correlational research approach to establish the connection between knowledge, attitude and perceived stigma. This relationship was then used as a foundation for developing a community-based intervention program. Moreover, it is a useful research method that analyzes the characteristics of a chosen population or group. It enables the researcher to identify the relationship between each variable, which can help better understand the variables and how they relate to each other.

2.2 Research Participants

A sample of 500 individuals, all of whom are present residents of Lucban, Quezon, and must be at least 18 years of age, have been gathered to participate in the study. The group included individuals of both genders and various age groups. The convenience sampling technique was utilized in this study since this technique is best for a study that has a large population and to accommodate inclusivity, which participants can answer the questionnaire as long as they are of legal age, and this is the most cost-effective way to collect data since it is uncomplicated and economical. This study's sample size was determined using Raosoft. The calculation was based on the 53,091 population of Lucban, Quezon. A minimum of three hundred eighty-two (382) participants, but a total of five hundred (500), were gathered in the study as representatives of Lucban, Quezon.

2.3 Research Instruments

The study used three standardized instruments: Mental Health Knowledge Schedule, Community Attitude towards the Mentally Ill, and Perceived Stigma Questionnaire – Perceived Devaluation Scale. Moreover, the researcher collected the demographic profile of the respondents, including age, sex, educational attainment, and economic status, using a personal data sheet. The MAKS is a 12-item questionnaire created in the United Kingdom at King's College London by Thornicroft and his associates. The questionnaire aimed to assess significant evidence-based information about stigma reduction that can be used for the general population in conjunction with measurements of behavior and attitude. The internal consistency of the questionnaire obtained a score of 0.65 (Cronbach's Alpha).

As for the perceived stigma questionnaire, it was developed by Link, and the original PSQ had 29 items and used four separate scales to measure stigma. Furthermore, in this study, the revised PSQ was developed by Angermeyer, Link, and Majcher-Angermeyer (1987). The questionnaire asks how much respondents agree with assertions that most people view as failures, people who are not as intellectual as other people, and people whose ideas shouldn't be taken seriously, thereby devaluing those who are or were psychiatric patients. Additionally, it queries the respondent's level of agreement with claims that the majority of people discriminate against mental health patients in a variety of social contexts. For this scale, reliability coefficients vary from.78 to.87 (Angermeyer et al., 1987; Link, 1987). The questionnaire's Cronbach's alpha also received a score of 0.93.

While for the community attitude towards mentally ill questionnaire, it was Taylor and Dear in 1981. Since the 1980s, the CAMI scale has been utilized and employed in a variety of contexts throughout the world. CAMI is organized into four attitude categories, each comprising ten statements. The scale's psychometric properties, including dimensionality, reliability, and construct validity, have been systematically reviewed, indicating that while the global scale's internal consistency is adequate ($\alpha \geq 0.80$).

2.4 Data Gathering Procedure

The researcher visited different barangays in Lucban, Quezon, under the supervision of staff from MSWDO and gave questionnaires to different households. Significantly, every participant provided informed consent before they participated in the research study. Once the consent form was obtained, the researcher gave the three instruments and requested to complete three questionnaires: the Mental Health Knowledge Schedule (MAKS), the Perceived Stigma Questionnaire (PSQ), and the Community Attitudes Towards the Mentally Ill (CAMI). At the same time, the personal data sheet form was also provided to obtain the participants' demographic information. Once the data has been gathered and completed, the researcher anonymizes it by assigning code pseudonyms instead of using your real name.

2.5 Ethical Considerations

The researcher obtained approval from the PUP Graduate School Ethics Committee to gather the research data. Furthermore, consent was acquired from the office of the Mayor of Lucban, Quezon, to formalize gathering data from several barangays in the area. Participants were provided with an informed consent form outlining the study's potential risks and benefits. The form also included directions on how to complete the questionnaire in order to gain a better understanding of the research objectives. In addition, participants were requested to give their informed consent by signing the document, indicating their voluntary involvement and the ability to withdraw at any point. Furthermore, by encoding their responses, the researcher guaranteed that the participants' personal information remained anonymous and confidential.

3.0 Results and Discussion

3.1 Demographic Characteristics of the Respondents

As shown in Table 1, 75.20% of the respondents fell within the 18- to 28-year-old age category. This group consisted of 376 individuals out of five hundred respondents. The data reveals that a significant proportion of participants (75.20%) fall into the younger age bracket, specifically between 18 and 28 years old.

Table 1. Descriptive statistics of the demographic characteristics of respondents

Demographic Characteristic	Frequency	Percentage
Age		
18-28	376	75.20
29-38	57	11.40
39-48	34	6.80
49-58	21	4.20
59-68	7	1.40
69 and above	5	1.00
Sex		
Male	237	47.40
Female	263	52.60
Educational Attainment		
Elementary Graduate	5	1
Highschool Undergraduate	147	29.4
Highschool Graduate	160	32
Vocational	1	0.2
College Undergraduate	115	23
College Graduate	66	13.2
Master's Level	4	0.8
Master's Degree Holder	1	0.2
Doctoral Level	1	0.2
Economic Status		
Poor	292	58.40
Low-Income Class (but not poor)	91	18.20
Lower middle-income class	41	8.20
Middle middle-income class	19	3.80
Upper middle-income class	13	2.60
Upper-income class (but not rich)	2	0.40
Rich	3	0.60
I prefer not to say	39	7.80
Total	500	100

The sex of respondents totaled 263 (52.60%) females, whereas 237 (47.40%) were males. 32% of the respondents have completed high school education, while 29.40% are high school undergraduates and 23% are college undergraduates. Of the responses, 66 individuals, accounting for 13.2% of the sample, have successfully obtained a college degree. Five respondents, which accounts for 1.0% of the total, have finished primary education. Four respondents, who account for 0.8% of the total, have achieved a master's degree. Out of the total respondents, only one individual (0.2%) has successfully finished a vocational course, one individual (0.2%) possesses a master's degree, and one individual (0.2%) has achieved a doctoral level of education. However, there were no participants recorded in the elementary undergraduate and Doctorate Degree Holder categories.

More than half of the economic status of the respondents, or 58.40%, falls under the category of poor, which means they have less than ₱12,082 monthly income because based on the government's 2023 rankings, Lucban, Quezon ranks 137 out 257 municipalities in economic dynamism because economic dynamism can promote better consumer results like reduced pricing and greater service standards, as well as favorable economic outcomes like a faster rate of productivity growth that will raise wages and living standards, new products and services, and the sustainability of government.

3.2 Knowledge on Mental Health

As shown in Table 2, the respondents scored high in mental health knowledge with a mean score of 49.95, which means that the respondents are generally knowledgeable about mental health and are familiar with some mental health disorders, such as depression, stress, grief, and others.

Table 2. Descriptive statistics of the level of knowledge on mental health

Level	Frequency	Percentage
Very Low	0	0.00
Low	0	0.00
Average	47	9.40
High	416	83.20
Very High	37	7.40
Mean (Verbal Interpretation)	**42.95 (High)**	

3.3 Stigma Towards Mental Health

As shown in Table 3, the respondents scored low in stigma attitude with a mean score of 122.77, which illustrates that they have a positive attitude toward the mentally ill and are very accepting of them. They also have a positive outlook toward the mentally ill because they believe that those who are diagnosed with mental illness can still recover and resume their normal lives.

Table 3. Descriptive statistics of the attitude toward mentally ill

Level	Frequency	Percentage
Very High Stigma Attitude	0	0.00
High Stigma Attitude	0	0.00
Average Stigma Attitude	172	34.40
Low Stigma Attitude	328	65.60
Very Low Stigma Attitude	0	0.00
Mean (Verbal Interpretation)	**122.77 (Positive Attitude)**	

Overall, it was found that the respondents have moderate perceived stigma with a weighted mean of 3.10. Since the residents have a positive attitude towards the mentally ill, this could also affect their perceived stigma towards the mentally ill and mental health in general. Thus, it was found that they have moderately perceived stigma. This shows that still could be improved by developing a mental health program that could address more about the stigma towards mental health.

3.4 Relationship Between Knowledge, Attitude, and Perceived Stigma

As shown in Table 4, the correlation between knowledge and attitude showed a statistically significant but extremely weak positive association. This indicates that when knowledge levels rise, attitudes tend to align positively, suggesting that better knowledge is associated with more favorable and inclusive attitudes towards those with mental illness.

Table 4. Correlation analysis of the relationship between knowledge, attitude, and perceived stigma

Variables		Spearman's ρ	Interpretation	p-value	Decision	Interpretation
Knowledge	Attitude	0.177	weak positive relationship	0.000	Reject Ho	Significant relationship
Knowledge	Perceived Stigma	-0.258	weak negative relationship	0.000	Reject Ho	Significant relationship
Perceived Stigma	Attitude	-0.095	weak negative relationship	0.034	Reject Ho	Significant relationship

The correlation between knowledge and perceived stigma indicates a statistically significant but weak negative relationship. This implies that when knowledge expands, the perception of stigma generally decreases. Put simply, those with higher knowledge levels tend to perceive less stigma. Conversely, the correlation between perceived stigma and attitudes towards mental illness indicates a weak yet statistically significant negative relationship.

3.5 Variance of Knowledge, Attitude, Perceived Stigma Based on Demographic Characteristic

Table 5 displays multivariate test results in knowledge, attitude, and perceived stigma among respondents categorized by age, sex, educational attainment, and economic status.

Table 5. Analysis of the differences in knowledge, attitude, and perceived stigma based on demographic characteristic

Effect	Pillai's Trace Value	F	Hypothesis df	Error df	p-value
Age	0.056	2.340	12	1476	0.006*
Sex	0.012	2.006[b]	3	493	0.112
Educational Attainment	0.045	2.482	9	1479	0.008*
Economic Status	0.008	0.581	6	912	0.745

Overall, based on the data, it showed that there is a significant difference in knowledge, attitude, perceived stigma, and age [Pillai= 0.056, F(12,1476) = 2.34, p = 0.006], and educational attainment [Pillai = 0.045, F (9, 1479) = 2.482, p = 0.008 $\eta 2p$ = 0.015] Therefore, this implies that the knowledge, attitude, and perceived stigma of the respondents are significantly dependent on age and educational attainment. The probability of obtaining that is not due to chance. On the other hand, there is no significant difference between the sex and economic status of the respondents, with a p-value of 0.112 and 0.745, respectively.

Table 6 illustrates the specific significant difference in age, which is the perceived stigma (df = 4, F = 3.992, η2p=.031, p-value = .003). Furthermore, based on the post hoc analysis of age found in the appendices, it was found that the perceived stigma towards mental health and age group has a p-value of 0.003, which illustrates a significant difference. Perceived stigma scores vary significantly among different age groups. More precisely, individuals in the age range of 59 years old and above have an average perceived stigma of 3.66, which indicates a high level of perceived stigma compared to younger age groups. This can be attributed to the phenomenon that as individuals age, they progressively encounter an increased feeling of perceived stigma towards mental health.

Table 6. Between-Subject Effects

Independent Variables	Dependent Variables	Sum of Squares	df	Mean Square	F	p-value	Partial Eta Squared
	Knowledge	109.400	4	27.350	1.436	.221	.012
Age	Attitude	187.545	4	46.886	1.377	.241	.011
	Perceived Stigma	5.241	4	1.310	3.992	**.003***	.031
	Knowledge	70.531	3	23.510	1.231	.298	.007
Educational Attainment	Attitude	76.748	3	25.583	.748	.524	.005
	Perceived Stigma	5.550	3	1.850	5.659	**.001***	.033

Moreover, it was discovered that there are comparisons between different age groups regarding their levels of perceived stigma. The age comparison results illustrate in the analysis that 18-28 vs. 59 and above, with a mean difference of -0.592, has a significant p-value of 0.004, illustrating a statistically significant difference in perceived stigma between the 18-28 age group and those 59 and above. The negative mean difference suggests that the 18-28 age group reports lower perceived stigma than those aged 59 and above. While for 29-38 vs. 59 and above, it has a mean Difference of -0.551, with a significant p-value of 0.022, which shows a statistically significant difference between the 29-38 age group and those 59 and above. The 29-38 group has lower perceived stigma than the 59 and above group. Elderly participants generally exhibit greater perceived stigma associated with mental health, a view that generational mindsets, personal encounters, and prevailing social standards could have shaped.

These findings highlight the nuanced relationship between age and perceptions related to mental health. While age does not notably affect knowledge or attitudes towards mental health, it does influence perceived stigma. Targeted interventions and education addressing age-specific stigma, particularly among the older generation, could effectively promote positive attitudes and reduce perceived stigma towards different age groups in the community. In alignment with this finding, a study by Lima and Ivbijaro (2013) highlights that the current elderly demographic often fails to recognize or seek treatment for mental disorders, contributing to higher stigma. Many older individuals perceive mental illness as a sign of vulnerability and may be reluctant to acknowledge their challenges, particularly when concerns about loss of autonomy arise. There is also a misconception among a significant number of elderly individuals who view symptoms of dementia and depression as normal aspects of aging. Moreover, accessibility to essential mental health services remains limited for many elderly individuals.

Meanwhile, as for the educational attainment, Table 6 shows that there is a significant difference in knowledge, attitude, perceived stigma, and the educational attainment of the respondents [df = 3, F = 5.659, η2p=.033, p-value = 0.001]. The post hoc analysis also showed that perceived stigma and educational attainment of high school undergrad versus high school graduates has a mean difference of -0.2157 and a significant p-value of 0.005, which shows that it has a statistically significant difference between high school undergraduates and high school graduates, with high school graduates reporting lower perceived stigma. Meanwhile, high school undergrads versus college undergraduates have a mean difference of -0.2621 and a significant p-value of 0.001, which shows that there is a significant difference between high school undergraduates and college undergraduates, with college undergraduates reporting lower perceived stigma, which can suggest that educational attainment, may lead to greater awareness and reduced stigma towards mental health issues.

Accordingly, a study by Shim et al. (2022) shows that education is an important factor in understanding mental health and reducing stigma. By offering students mental health education and training, they were able to acquire knowledge and comprehension of mental illness-related matters. In conclusion, it is evident that there is a requirement for targeted community-based intervention, and it is crucial to take into account characteristics such as age and educational attainment when developing such interventions.

4.0 Conclusion

The findings suggest that knowledge, attitudes, and perceived stigma are correlated, which highlights the need for customized interventions that take into account each person's unique demographics, especially the age and educational attainment of the residents of Lucban, Quezon. Creating community–based programs should prioritize initiatives aimed at increasing the mental health knowledge of an individual by addressing the specific needs of different age groups and educational backgrounds. This can foster a better understanding of mental health and mental illness. Given the findings that perceived stigma played a significant role in the help-seeking behavior of an individual, stigma reduction strategies are encouraged in order to encourage a safer space for the residents to express their mental health concerns freely.

These findings emphasize the value of collaborations between local government, educational institutions, and community organizations. Stakeholders can develop comprehensive programs that educate the community about mental health issues and offer mental health services, all while fostering a culture of understanding and support. This can be achieved by utilizing the resources and networks that are already in place. In conclusion, the results of this study support the development of targeted community-based initiatives that consider the target demographic's demographics. These kinds of initiatives are crucial for reducing the barriers to mental health care in rural areas and creating a more encouraging atmosphere for those who are struggling with mental health issues.

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7.0 Conflict of Interests

The authors declare no conflicts of interest about the publication of this paper.

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Antimicrobial Activity of Kangkong and Paragis Leaf Extracts against *Klebsiella oxytoca*

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Abstract. The global spread of multidrug resistance challenges antimicrobial therapy, necessitating the search for alternative approaches. The present study assessed the antimicrobial efficacy of the methanolic leaf extracts of *Ipomoea aquatica* Forssk. (Kangkong), *Eleusine indica* (L.) Gaertn. (Paragis), Moreover, its combination at varying concentrations of 25%, 50%, 75%, and 100% against *Klebsiella oxytoca* using established microbiological techniques. Fifty (50) grams of powdered leaves from the *Ipomoea aquatica* Forssk. (Kangkong) plant was soaked in 375 mL of 95% methanol for 48 hours (2 days) with intermittent stirring—similarly, 50 grams of *Eleusine indica* (L.) Gaertn. (Paragis) were processed using the same method. The macerated powdered leaf samples were filtered using a Whatman filter paper No. 1 and extracted using a rotary evaporator. The obtained extracts were utilized to prepare varying concentrations of 25%, 50%, 75%, and 100% of methanolic leaf extracts for each plant. Positive control (Tigecycline) and negative control (10% DMSO), along with the preparation of extracts, were also prepared. The antimicrobial efficacy of these methanolic leaf extracts at different concentrations and the controls were evaluated against *Klebsiella oxytoca* using the disk diffusion method. The results obtained indicate that the methanolic leaf extracts of *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis) did not exhibit any inhibitory effects on *Klebsiella oxytoca*. Both plants' combined methanolic leaf extracts also showed non-inhibitory effects, indicating that *Klebsiella oxytoca* is resistant to both plant extracts and, thus, did not yield a synergistic effect. This study provides a scientific understanding of the antimicrobial efficacy of the plants' properties. Further investigation is needed to assess alternative extraction and methods to determine the antimicrobial efficacy of the plant extracts.

Keywords: Antimicrobial Efficacy; *Eleusine indica*; *Ipomoea aquatica*; *Klebsiella oxytoca*.

1.0 Introduction

Microorganisms' resistance to antibiotics continuously increases over time (Singh et al., 2016). According to Aslam et al. (2018), the appearance and stability of multi-drug-resistant bacteria is an increasing concern for global human health. Among these several types of multi-drug-resistant bacteria are *Klebsiella* species, which is emerging as a significant human pathogen related to the increasing morbidity rates in healthcare settings. This bacterium is isolated from varying clinical specimens, primarily from respiratory secretions and blood; as a result, it is presently invading intensive care units. Thus, hospital infection control committees must monitor the *K. oxytoca* antibiotic susceptibility pattern for better healthcare service (Singh et al., 2016). Shaikh et al. (2015) state that beta-lactamases have made *Klebsiella oxytoca* more resistant to penicillin and ampicillin. The bacterium produces Extended-Spectrum Beta-Lactamase (ESBL), making it resistant to broad-spectrum medicines like cephalosporins and ceftazidim. According to the study of Biswas et al. (2013), Gram-negative bacteria often exhibit an increased resistance to plant-origin antimicrobials due to their distinct cell wall structure, as this serves as a protective barrier that resists the entry of plant extract's component. Singh et al. (2016) found that *Klebsiella oxytoca* was susceptible to tigecycline and colistin.

Due to the progressive resistance of harmful pathogens to synthetic antibiotics, phytomedicine or the science of plant medicine regains interest in current research (Vaou et al., 2021). Naturally occurring plants have secondary metabolites rich in bioactive components, eliciting many beneficial effects in man and animals (Zhao et al., 2015). These active chemicals possess antibacterial properties that hinder the growth of certain bacteria, making them natural antibiotics (Allemailem, 2021). Henceforth, this study looked at the efficacy of *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis or Goosegrass) as an antimicrobial agent. *Ipomoea aquatica* Forssk. (Kangkong) belongs to the Convolvulaceae family. It is a tropical crop cultivated for its soft stem and leaves (Sasikala & Sundaraganapathy, 2017). The presence of flavonoids, tannins, glycosides, and saponins was identified through a phytochemical examination of its leaf extracts (Konwar et al., 2021). Additionally, *Ipomoea aquatica* Forssk. (Kangkong) methanolic extract exhibits antimicrobial activity against certain gram-positive and gram-negative bacteria (Sivaraman et al., 2010). Moreover, *Eleusine indica* (L.) Gaertn. (Paragis or Goosegrass) is a perennial grass typically growing in tufts or clumps (Green Institute, 2023). It is historically utilized for illnesses related to the liver and kidneys. Al-Zubairi et al. (2011) stated that Paragis produces many naturally existing secondary metabolites. The methanol, ethanol, and aqueous extracts of *Eleusine indica* (L.) Gaertn. leaves are rich in alkaloids and flavonoids. Among these extracts, the methanol extract stands out as it also contains a small number of tannins. All the extracts share the presence of anthraquinones, while saponins are absent in all of them (Alaekwe et al., 2015).

The emerging resistance of multi-drug-resistant K. oxytoca is increasingly becoming a prominent bacterial strain (Singh et al., 2016). This result is due to its capability to acquire antibiotic resistance (Yang et al., 2022). *Klebsiella oxytoca* resistance to antibiotics is increasingly alarming, as it can acquire antimicrobial resistance by carrying many carbapenemase genes as well as β-lactamase genes; it can also carry multiple virulence genes, making the bacteria a potentially significant detriment to human health (Yang et al., 2022). Naturally, plants have secondary metabolites, considered biologically active chemicals that can exhibit antimicrobial effects (Zhao et al., 2015). Hence, this study assessed the antimicrobial efficacy of the methanolic leaf extracts of *Ipomoea aquatica* Forssk. and *Eleusine indica* (L.) Gaertn. against *Klebsiella oxytoca.* Specifically, this study determined the antimicrobial efficacy of the two plants by measuring the efficacy of the plants to inhibit the growth of *K. oxytoca.* It determined the minimum inhibitory concentrations that yielded potent results. Lastly, this study determined the synergistic activity of the tested natural plants.

2.0 Methodology

2.1 Research Design

The study used an experimental design with methods related to medical technology. According to Frost (2024), an experimental design is a systematic strategy for gathering and organizing data to determine causal connections between variables. It is a scientific examination performed in a controlled setting to observe how an independent variable impacts a dependent variable (Zubair, 2023). This design is a crucial part of the research process as it aids the researchers in achieving the study's objectives (Kelkar, 2024). Hence, the study emphasized the in vitro analysis of the antimicrobial efficacy of methanolic extracts of *Ipomoea aquatica* Forssk. (Kangkong), *Eleusine indica* (L.) Gaertn. (Paragis), and their combination against *Klebsiella oxytoca*.

2.2 Experimental Procedure

Pre-experimentation Phase

To prevent contamination, all the materials required for the sterilizing procedure were subjected to an autoclave at 121 degrees Celsius for about 15 minutes at 15 psi.

Plant Extraction

The following procedures were adapted from the study of Caccam et al. (2020) with modifications. The plants were washed using tap water. The rinsed samples were shade-dried for 14 days. Shade drying provides better advantages as it can preserve light-sensitive phytochemicals and reduce light-induced reactions like oxidation (Naz et al., 2017). Leaves were powdered using a grinder before extraction. The extraction process of the two plants was adapted to the method of Sanchez et al. (2016). *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis) powdered leaves (50 grams each) were soaked in the solvent of 95% Methanol (375 mL) to increase the polarity and to dissolve the components of the leaves. The extraction took 48 hours with occasional mixing using a stirring rod. The solution was filtered using Whatman filter paper No. 1. Finally, the crude extracts of each plant were obtained using a rotary evaporator for 45 minutes at 80 rpm at 40 degrees Celsius. The extracts were stored in a container wrapped with aluminum foil at refrigerator temperature. It was left at room temperature for an hour before its usage.

Preparation of Concentration

Prior to preparing the varying concentrations, one (1) mL of 10% DMSO was added to dissolve the crude extract due to its viscosity. The researchers used volume per volume (v/v) to calculate the concentrations of methanolic extract (experimental control) utilized for the susceptibility testing against *K. oxytoca.*

The researchers utilized volume per volume (v/v) with the given formula:
Concentration = volume of solute ÷ volume of solution
Concentration (C) = 25%, 50%, 75%, 100%
Total volume = 10% DMSO (μL) + extract (μL) = 500 μL
Volume of Solute (μL) = Crude extract of I. aquatica / E. indica

Table 1 shows the measurements of solute, solvent, and total volume at varying concentrations of the methanolic extracts of I. aquatica and E. indica

Table 1. Concentration of *Ipomoea aquatica* and *Eleusine indica*

Concentration (%)	Solute (μL)	Solvent (μL)	Total volume (μL)
25	125	375	500
50	250	250	500
75	375	125	500
100	500	0	500

To prepare the varying concentrations of combined methanolic extracts of *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis), the researchers utilized the following ratios: 1:1:6 (25%), 2:2:4 (50%), 3:3:2 (75%), and 4:4 (100%).

Table 2 shows the amounts of solute, solvent, and the total volume of varying concentrations of the combined methanolic extracts of I. aquatica and E. indica with their ratios, respectively.

Table 2. Concentrations of the combined *Ipomoea aquatica* and *Eleusine indica*

Concentration (%)	Solute (μL) I. aquatica	Solute (μL) E. indica	Solvent (μL)	Total volume (μL)
25	62.5	62.5	375	500
50	125	125	250	500
75	187.5	187.5	125	500
100	250	250	0	500

Agar for Disk Diffusion

Mueller-Hinton Agar was poured into 150 mm plates with a uniform depth of 4 mm (McPherson & Pincus, 2021). The plates with agar were left slightly open to avoid moisture collection. The medium was allowed to harden. One sample plate was incubated at 37 degrees Celsius overnight to check for sterility. The plates were refrigerated and placed at room temperature prior to their usage.

Subculturing of Bacteria

The acquired *Klebsiella oxytoca* was delivered to the laboratory in an agar slant. The bacteria were subcultured every week in a MacConkey agar plate. Before inoculum preparation, it was subcultured in two MacConkey agar plates a day before the testing, as 24-hour young culture is required for a better outcome (Mahon & Lehman, 2022).

Impregnation of Blank Disk

Impregnation of 115 blank disks (6 mm) followed the method used in the study of Vineetha et al. (2015) with modifications. The disks were made from Whatman filter paper no. 1 using a puncher and were autoclaved before usage. Each disk was impregnated with a fixed volume of 20µL of 10% dimethyl sulfoxide (negative control), tigecycline (positive control), and varying concentrations of methanolic leaf extracts of 25%, 50%, 75%, and 100% inside the biosafety cabinet and was left for two (2) hours until it dried.

Inoculum Preparation
The inoculum was prepared based on the study of Suurbaar et al. (2017) by suspending the subcultured bacteria in a sterile normal saline solution (NSS), as it is imperative to use fresh colonies for accurate results. A cotton swab was used to touch two to four isolated colonies in the MHA agar plate to be tested (McPherson & Pincus, 2021). The cotton swabs with colonies were suspended in 3 ml NSS. A vortex mixer was utilized to achieve the 0.5 McFarland turbidity standard. The inoculum was used within 15 minutes of preparation (Mahon & Lehman, 2022).

Inoculation of MHA Plates
The cotton swab was dipped into the tube using the prepared inoculum, and excess fluid was removed. The MHA agar plates were inoculated with a moist swab streaked four times over the surface. The plates are then rotated roughly 60 degrees to achieve even distribution of the inoculum. Each plate was streaked with a different sterile cotton swab. The swabs were discarded in the designated container. After the inoculation of the plates, they were covered with their lids. The disks with varying concentrations of 25%, 50%, 75%, and 100% were placed using sterile forceps in each plate. On the other hand, in a separate plate, the Tigecycline disks (positive control) and 10% DMSO disks (negative control) were placed using sterile forceps. Incubation at 37 degrees Celsius lasted for 24 hours, using a caliper, and the zone of inhibition in millimeters was measured (McPherson & Pincus, 2021).

Kirby-Bauer Disk Diffusion Method
The researchers focused on the antimicrobial efficacy of *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis) methanolic leaf extracts against *K. oxytoca*. Therefore, the researchers conducted antimicrobial susceptibility testing (AST). To further analyze the data, the Kirby-Bauer test was utilized to assess the sensitivity or resistance of *K. oxytoca* to the methanolic extract of *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis).

The Kirby-Bauer test determined the resistance or sensitivity of the pathogen to numerous antimicrobial compounds. The researchers interpreted the results as S (susceptible), I (intermediate), and R (resistant). A result categorized as sensitive shows that the bacteria will die when exposed to the methanolic leaf extract of *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis). An intermediate result suggests that the maximum recommended dosage is required to inhibit the bacteria. The resistance result shows that the bacteria is resistant to the antimicrobial compounds of the methanolic extract leaf of *Ipomoea aquatica* Forssk. (Kangkong), *Eleusine indica* (L.) Gaertn. (Paragis). Moreover, combined based on the standard zone of inhibition, FDA breakpoints of the Kirby-Bauer method set by the Food and Drug Administration.

Waste Disposal
After the experiment, the researchers placed all laboratory solid waste contaminated with biohazardous materials in the cabinet. Afterward, the research staff autoclaved all the contaminated materials for 60 minutes at 121°C and 15 psi.

2.3 Ethical Considerations
The laboratory implemented various considerations to ensure a safe environment in the microbiology laboratory. The Center for Basic Biomedical Research (CBBR) has collated laboratory safety information into one manual as a reference for personnel using the laboratories of CBBR. The Laboratory Safety Manual of De La Salle Health Sciences Institute Research Division Center for Basic Biomedical Research is the basis for the following ethical and safety considerations.

The student researchers were well-informed about the bacteria handled in the laboratory. Upon acquiring the bacteria, the Philippine National Collection of Microorganisms (PNCM) UP-LB included the authenticity of

Klebsiella oxytoca. The researchers utilized a class II biosafety cabinet as *Klebsiella oxytoca* is a risk group 2 microorganism. Materials and supplies stayed in the laboratory to prevent contamination and the spread of potential infection. Student researchers and the laboratory staff were well-informed about the biosafety practices and techniques used in the laboratory.

3.0 Results and Discussion

3.1 Inhibition Zone of the Methanolic Leaf Extract of *I. aquatica*

The study used the disk diffusion method to evaluate the antimicrobial efficacy of the methanolic leaf extracts of *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis) against *Klebsiella oxytoca* with trials one (1), two (2), and three (3), and replicates one (1), two (2), and three (3) using varying concentrations (25%, 50%, 75%, and 100%). The researchers used the measurement of the disk diameter, which measures 6 mm, as an indicator of no diameter of inhibition. Thus, the result of the methanolic leaf extract of *Ipomoea aquatica* Forssk. (Kangkong) against *Klebsiella oxytoca* demonstrated a 6 mm diameter of inhibition, which falls on the resistance breakpoints set by the FDA.

Table 3. Diameter inhibition of the methanolic leaf extract of *I. aquatica* compared with the positive control and negative control against *k.*

Trials	25%			50%			75%			100%			(+)	(-)
	Replicates			Replicates			Replicates			Replicates				
	1	2	3	1	2	3	1	2	3	1	2	3		
1	R	R	R	R	R	R	R	R	R	R	R	R	33.21mm (S)	R
2	R	R	R	R	R	R	R	R	R	R	R	R	32.65mm (S)	R
3	R	R	R	R	R	R	R	R	R	R	R	R	33.21mm (S)	R

Note: Food and Drug Administration Disk Diffusion Breakpoints for Tigecycline Susceptible (S) = ≥19mm Intermediate (I) = 15-18mm Resistant (R) = ≤14mm + = Positive Control, - = Negative Cont

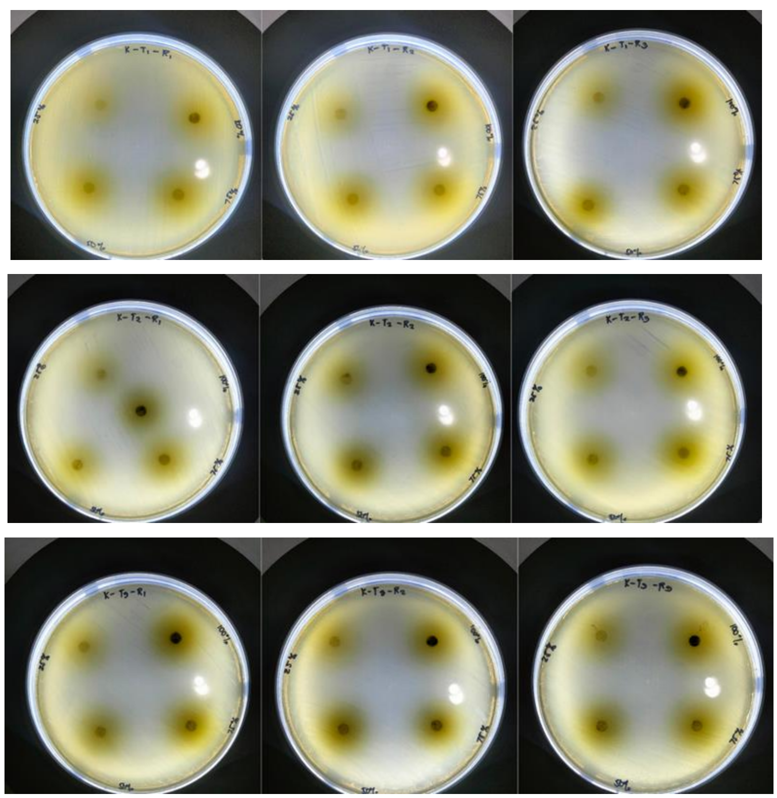

Figure 1. Trial 1,2,3, with Replicates 1-3, of Agar Disk Diffusion of the Varying Concentrations of Methanolic Leaf Extract of *Ipomoea aquatica*

This finding suggests that the extract, at these concentrations, is ineffective against this specific bacterial strain. Thus, this indicates that establishing the minimum inhibitory concentration is not possible. A study by Yoon et al. (2018) demonstrated the methanolic leaf extract of *Ipomoea aquatica* Forssk. (Kangkong) is effective against certain gram-negative bacteria. The study is limited to *Escherichia coli, Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*.

In addition to the previous research of Yoon et al. (2018), the researcher's study indicates that the methanolic leaf extract of *Ipomoea aquatica* is not a highly effective antimicrobial against *K. oxytoca*.
Tigecycline, the positive control, exhibited a diameter inhibition of 33.21mm (Trial 1), 32.65mm (Trial 2), and 33.21mm (Trial 3) with an average of 33.02 mm (Figure 2) against *Klebsiella oxytoca*, indicating its susceptibility to the antibiotic mentioned above. The results of the two plants, specifically Ipomoea aquatica Forssk. (Kangkong) and Eleusine indica (L.) Gaertn. (Paragis), strongly suggest that establishing the minimum inhibitory concentration is not possible.

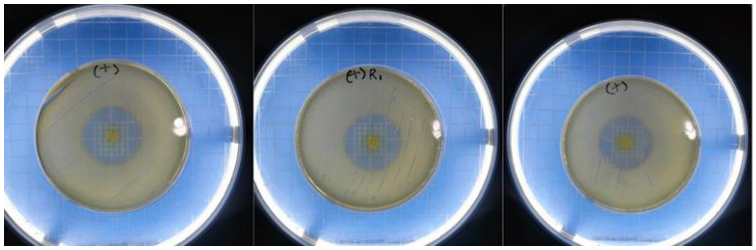

Figure 2. Three (3) trials of Agar Disk Diffusion of the positive control (Tigecycline)

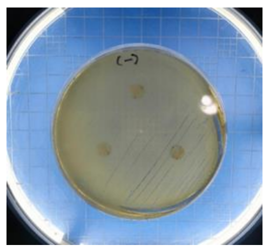

Figure 3. Agar Disk Diffusion of the negative control (10% DMSO).

3.2 Inhibition zone of the Methanolic Leaf Extract of *E. indica*

The researchers observed a 6 mm diameter in the results of the methanolic leaf extract of *Eleusine indica* (L.) Gaertn. (Paragis) against *K. oxytoca*. This result suggests the ineffectiveness of the extract against *Klebsiella oxytoca* at varying concentration levels. A study conducted by Adoho et al. (2021) showed that the methanolic and chloroform extracts of *Eleusine indica* (L.) Gaertn. (Paragis) exhibits antibacterial activity against certain gram-negative bacteria, including *Klebsiella aerogenes, Proteus vulgaris, Enterobacter aerogenes, Pseudomonas aeruginosa, and Escherichia coli*. Conversely, these findings suggest that the methanolic extract is not a potent antimicrobial against *Klebsiella oxytoca*.

Table 4. Diameter Inhibition of the Methanolic Leaf Extract of *E. indica* in Comparison with the Positive Control and Negative Control against *K. oxytoca*

Trials	25%			50%			75%			100%			(+)	(-)
	Replicates			Replicates			Replicates			Replicates				
	1	2	3	1	2	3	1	2	3	1	2	3		
1	R	R	R	R	R	R	R	R	R	R	R	R	33.21mm (S)	R
2	R	R	R	R	R	R	R	R	R	R	R	R	32.65mm (S)	R
3	R	R	R	R	R	R	R	R	R	R	R	R	33.21mm (S)	R

Note: Food and Drug Administration Disk Diffusion Breakpoints for Tigecycline Susceptible (S) = ≥19mm Intermediate (I) = 15-18mm Resistant (R) = ≤14mm + = Positive Control - = Negative Control

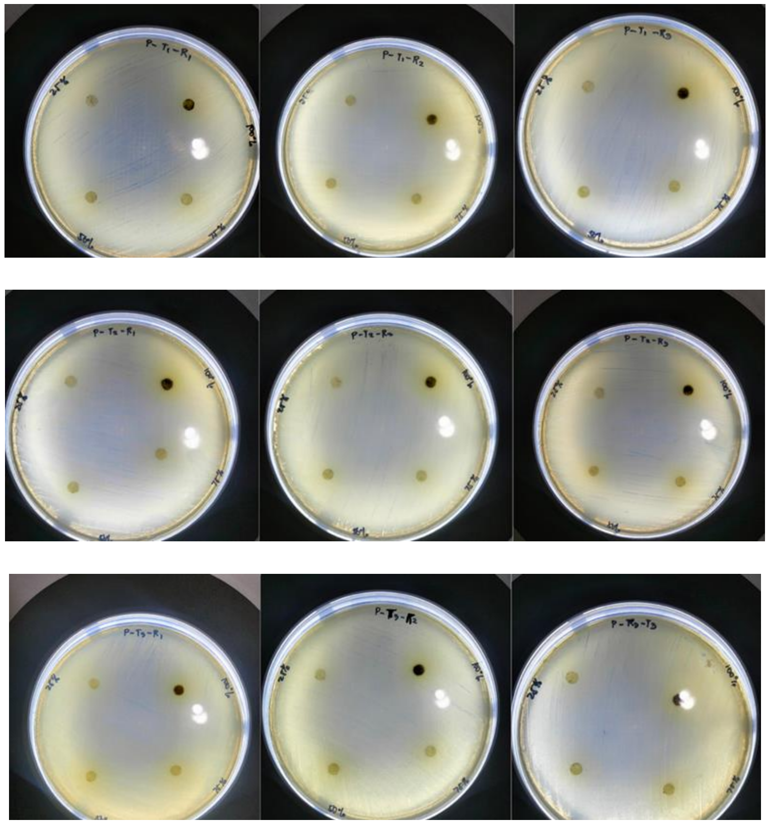

Figure 4. Trial 1,2,3, with Replicates 1-3, of Agar Disk Diffusion of the Varying Concentrations of Methanolic Leaf Extract of *Eleusine indica*.

3.3 Inhibition zone of the Combined Methanolic Leaf Extracts of the I. aquatica and E. indica

The researchers combined the methanolic leaf extracts of *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis). The disk diffusion method results exhibit a 6 mm diameter of inhibition on all three trials and three replicates of varying concentrations. Thus, it was concluded that *Klebsiella oxytoca* is resistant to the combined methanolic leaf extracts. Therefore, the findings show no synergistic effect between the methanolic leaf extracts of the two plants, specifically *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis). It was observed that the combination of the two plants does not enhance their antimicrobial action.

Table 5. Diameter Inhibition of the Combined Methanolic Leaf Extracts of the I. aquatica and E. indica in Comparison with the Positive Control and Negative Control Against K. oxytoca

Trials	25%			50%			75%			100%			(+)	(-)
	Replicates			Replicates			Replicates			Replicates				
	1	2	3	1	2	3	1	2	3	1	2	3		
1	R	R	R	R	R	R	R	R	R	R	R	R	33.21mm (S)	R
2	R	R	R	R	R	R	R	R	R	R	R	R	32.65mm (S)	R
3	R	R	R	R	R	R	R	R	R	R	R	R	33.21mm (S)	R

Note: Food and Drug Administration Disk Diffusion Breakpoints for Tigecycline Susceptible (S) = ≥19mm Intermediate (I) = 15-18mm Resistant (R) = ≤14mm + = Positive Control - = Negative Control

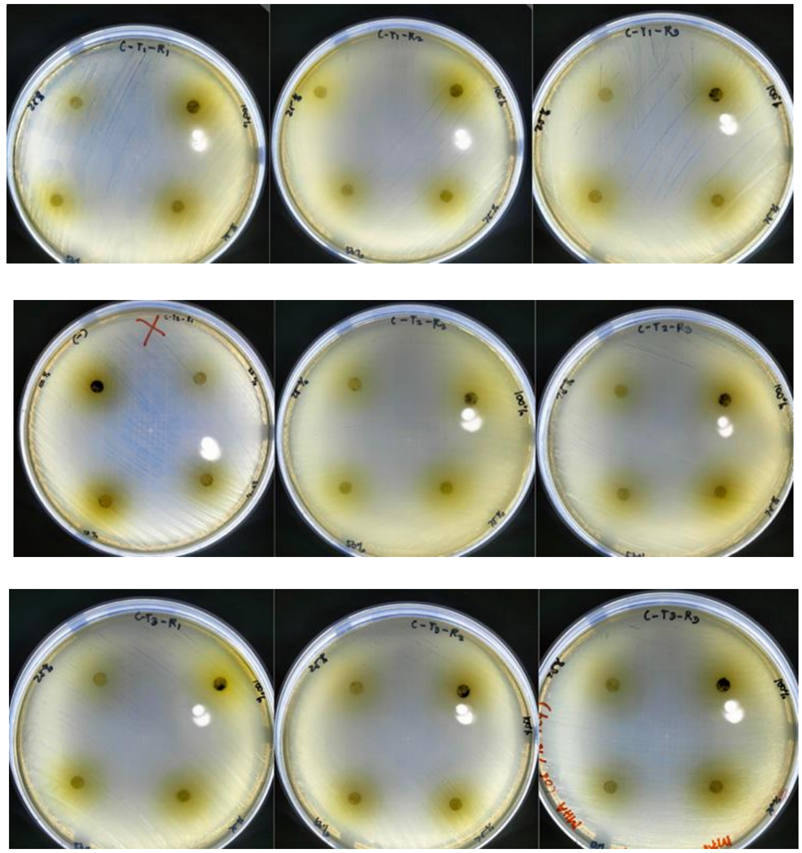

Figure 5. Trial 1,2,3, with Replicates 1-3, of Agar Disk Diffusion of the Varying Concentrations of Combined Methanolic Leaf Extracts of *I. aquatica* and *E. indica*

According to Izah (2018), several factors influence the antimicrobial susceptibility pattern of plant extracts, including adaptability, physiology, and microorganism metabolism. Gram-negative bacteria often exhibit increased resistance to plant-origin antimicrobials due to their distinct cell wall structure, which serves as a protective barrier that resists the entry of plant extract components (Biswas et al., 2013). *Klebsiella oxytoca* is a gram-negative, encapsulated bacteria (Al-Khikani et al., 2020). The bacteria's resistance to plant extracts is due to the capsule, which obstructs the penetration of the methanolic leaf extracts of *Eleusine indica* and *Ipomoea aquatica*. According to Yang et al. (2022), current research discovered that *Klebsiella oxytoca* is not a single species, but a complex one composed of other *Klebsiella* species, which are *K. oxytoca, K. grimontii, K. michiganensis, K. pasteurii, K. spallanzanii, K. huaxiensis* and other three unnamed novel species based on the microorganism's genomic taxonomy. The current study highlighted the genetic flexibility of *Klebsiella oxytoca*, which is highly diverse, and the data regarding the species is limited; however, the study suggests that *Klebsiella oxytoca* can acquire antimicrobial resistance independently (Moradigaravand et al., 2017). The outcome of the current research shows that the tested bacteria (*Klebsiella oxytoca*) is resistant to the methanolic leaf extract of *Ipomoea aquatica* Forssk. (Kangkong), *Eleusine indica* (L.) Gaertn. (Paragis) and their combination.

4.0 Conclusion

The methanolic leaf extract of *Ipomoea aquatica* Forssk. (Kangkong), in varying concentrations of 25%, 50%, 75%, and 100%, showed a diameter inhibition of 6mm, compared to the positive control (tigecycline) with a diameter inhibition of 33.21mm, 32.65mm, and 33.21mm with an average of 33.02 mm. Thus, this result indicates resistance of *Klebsiella oxytoca* to the extract. Furthermore, the methanolic leaf extract of *Eleusine indica* (L.) Gaertn. (Paragis), also exhibited a diameter inhibition of 6mm at concentrations of 25%, 50%, 75%, and 100%, in contrast to the positive control (Tigecycline), with a diameter inhibition of 33.21mm, 32.65mm, and 33.21mm with an average of 33.02mm. Thus, this outcome implies that *Klebsiella oxytoca* is resistant to the extract. In addition, the combined methanolic leaf extracts of *Ipomoea aquatica* Forssk. (Kangkong) and *Eleusine indica* (L.) Gaertn. (Paragis) produced a diameter inhibition of 6mm at varying concentrations of 25%, 50%, 75%, and 100%, in contrast to the positive control (tigecycline), which showed a diameter inhibition of 33.21mm, 32.65mm, and 33.21mm with an average of 33.02mm. As a result, this implies that the *Klebsiella oxytoca* is resistant to the extract. The conclusion was reached that there is no synergistic effect between the methanolic leaf extracts of the two plants.

This study concluded that there was low antimicrobial efficacy against *K. oxytoca* and that a minimum inhibitory concentration could not be established on both plants and their combination. Further investigation is needed to assess the bacteria's minimum inhibitory concentration, such as utilizing alternative extraction techniques and methods used in antimicrobial susceptibility testing. Furthermore, this study would recommend that policymakers or pharmaceutical companies explore other plants that will help combat the ongoing resistance of the bacteria to various antibiotics. In addition, future researchers may find the gaps in this study. They could improve or explore other procedures that could exhaust the possible applications of *I. aquatica* and *E. indica.*

5.0 Contributions of Authors

The following are the author's contributions; RJC – conceptualizing, writing, editing, supervising, data analysis, finalizing. DCDC – conceptualizing, writing, editing, data analysis, funding, finalizing. MJEG - conceptualizing, writing, editing, data analysis, funding, finalizing. ARM - conceptualizing, writing, editing, data analysis, funding, finalizing. JFRP - conceptualizing, writing, editing, data analysis, funding, finalizing. MRSP - conceptualizing, writing, editing, data analysis, funding, finalizing.

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This work has not received funding from any funding agency.

7.0 Conflict of Interest

The authors declare no conflict of interest.

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Linking Entrepreneurial Competencies and Financial Risk: Pathways to Sustainable Business Growth

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Abstract. This study explores the relationship between entrepreneurial skills and financial risk tolerance among ambulant vendors operating in informal economies. Focusing on key competencies such as self-competency, risk management, and control focus, the research aims to determine how these skills influence vendors' willingness to engage in financial risks, a vital factor for business growth and sustainability. Data collected from 152 ambulant vendors in Agusan del Sur was analyzed using Pearson's correlation and multiple regression. The results show a strong positive correlation between entrepreneurial skills and financial risk tolerance, with self-competency emerging as the most influential factor. With higher self-efficacy, entrepreneurs are more sure of handling financial uncertainty and grabbing chances. The study emphasizes acquiring entrepreneurial competencies to improve financial decision-making and corporate resilience. It also emphasizes the importance of focused training initiatives to improve these competencies, therefore providing information for stakeholders and legislators endorsing unofficial economies

Keywords: Entrepreneurial skills; Financial risk; Self-competency; Risk-taking behavior correlation; Sustainable business growth.

1.0 Introduction

Small enterprises' survival and profitability depend on entrepreneurial skills, particularly for street sellers operating in unorganized and uncertain surroundings. These vendors' various difficulties include unpredictable income, limited access to official financial institutions, and insufficient business support (Boermans & Willebrands, 2017). Developing these skills helps street vendors overcome these obstacles, enabling them to manage their businesses better and navigate daily uncertainties. Developing strong entrepreneurial competencies helps them navigate these difficulties, allowing them to sustain and grow their businesses despite their tough conditions. They must have important abilities, including risk management, financial planning, and flexibility, to overcome these challenges. These skills enable them to identify fresh prospects, control daily hazards, and make wise choices, bolstering the stability and expansion of their companies (Fisher et al., 2020). Many vendors find it challenging to reach financial stability without these entrepreneurial abilities, endangering their companies' long-term survival.

On the other hand, building on this, financial resilience is another important factor determining ambulant vendors' capacity to survive and grow in unpredictable economic times. Financial resilience is a company's capacity to weather and recover from financial shocks so business operations remain intact (Sabri, 2016). Financial resilience is vitally crucial for ambulant sellers whose income is sometimes irregular and influenced by outside factors like economic downturns or sudden market changes. Two elements affected by an individual's entrepreneurial capacity, financial literacy, and risk tolerance, are rather correlated with this resilience (Mamavi et al., 2015). Financially resilient entrepreneurs can better control unanticipated costs, save for future investments, and make deliberate decisions, lowering their susceptibility to economic difficulties (Fisher et al., 2020). Therefore, developing entrepreneurial abilities directly and significantly affects the financial resilience of ambulant sellers.

However, Though financial resilience and entrepreneurial skills are very important, studies on the particular difficulties experienced by ambulant merchants are still few. Although current research on financial resilience in formal small businesses has been conducted, the literature lacks on informal entrepreneurs, especially active vendors in local settings like Trento, Agusan del Sur (Ah Ahmad et al., 2010). Most studies concentrate on formal start-ups or small-to-medium businesses, therefore excluding the special experiences of informal sector entrepreneurs who run without the safety nets given by official banking systems. Understanding how their entrepreneurial abilities affect their financial resilience is crucial for creating efficient support systems since ambulant vendors generally lack formal business knowledge (Boermans & Willebrands, 2017). Therefore, this study intends to close this gap by examining the correlation between financial resilience and entrepreneurial abilities among active vendors.

Furthermore, given these factors, the necessity and relevance of this research cannot be emphasized too much. A major part of the unofficial economy in the Philippines, ambulant vendors directly affect local economic activity and their livelihoods (Sabri, 2016). This study aims to give an insightful analysis of how developing entrepreneurial skills might help these suppliers become more financially resilient, therefore arming them to manage uncertainty and financial risks. Focusing on ambulant sellers in Trento, Agusan del Sur, this study helps create tailored initiatives to enable informal entrepreneurs to be more financially robust (Fisher et al., 2020). By doing this, it intends to guide local government projects and non-governmental organization (NGO) efforts to increase the economic viability of local businesses, including ambulant sellers. The results of this research will be crucial for designing focused interventions addressing informal entrepreneurs' particular needs, guaranteeing their success in a demanding business climate.

2.0 Methodology

2.1 Research Design

The study employs a descriptive correlation research design to investigate the relationship between entrepreneurial skills and financial risk tolerance among ambulant vendors operating in the informal sector. This research design is well-suited to achieving the study's objectives, as it allows for a thorough exploration of the key variables of entrepreneurial skills and financial risk tolerance by describing their characteristics and determining how they are correlated.

2.2 Research Locale

The research was conducted in Trento, Agusan del Sur, with ambulant vendors as the primary respondents. These vendors include street vendors, marketplace sellers (commonly known as TABUAN sellers), micro-scale traders, shoe shiners, and junk collectors. They were chosen because they represent informal entrepreneurs who operate outside the formal economic structure, often lacking the necessary permits, formal recognition, or tax obligations imposed by local government authorities. Unlike formal business owners, who typically have physical establishments and are subject to regulation and taxation, ambulant vendors often operate without these formalities, making them harder to monitor and regulate.

2.3 Research Participants

For this study, a simple random sampling technique was employed to select the participants from the total population of ambulant vendors. This method ensured that every vendor had an equal chance of being chosen, eliminating selection bias and enhancing the sample's representativeness. A total of 152 ambulant vendors were targeted, and the sample size was calculated using the Raosoft sample size calculator, which is 110. The computation was based on a confidence level of 95% and a margin of error of 5%, ensuring that the sample was statistically representative and reliable for the study’s objectives. Including ambulant vendors provides a focused perspective on the informal economy and how entrepreneurial skills influence financial risk management in this sector.

2.4 Research Instrument

The survey questionnaire, which was adapted from Geri's (2013) work and tailored to the specific setting, was used as the main method for gathering data in this study. The survey questionnaire on entrepreneurial talents was derived from Geri (2013), while the questionnaire on financial risk tolerance was inspired by Zheng (2013). To improve the contextual relevance in the local environment, the modified tools were meticulously customized according to suitability and impartiality criteria. The reliability of the modified questionnaire was tested, and it yielded a Cronbach's alpha coefficient from 0.72 to 0.8.

2.5 Data Gathering Procedure

The Researchers asked permission to conduct the study by providing a formal letter addressed to the Municipal Mayor of Trento, Agusan del Sur. After the approval, the survey was immediately conducted. The purpose of the study was discussed with the respondents. The questionnaires were formulated in English and translated into the vernacular. The respondents' questionnaires were collected right after the survey was completed, and the data gathered was tabulated for further analysis.

2.6 Ethical Considerations

Ethics approval for this study was obtained from the Agusan del Sur State College of Agriculture and Technology's Institutional Review Board (IRB). The IRB ensured the study adhered to ethical guidelines and principles for research involving human participants. All participants provided written consent before participating in the study. Ethical standards were used to conduct the consent process, ensuring participants were fully informed about the study's purpose, procedures, potential risks, and benefits. Participants were also informed about their right to withdraw from the study at any time without repercussions.

The consent form provided detailed information about the study's objectives, confidentiality measures, and data handling procedures. Participants were allowed to ask questions and clarify any concerns before consenting. Only after obtaining written consent did participants proceed to participate in the study. The consent forms and study protocols were reviewed and approved by the Institutional Review Board to ensure compliance with ethical standards and participant protection measures.

3.0 Results and Discussion

3.1 Entrepreneurial Skills of Ambulant Vendors

As shown in Table 1, the results provide important new perspectives on the entrepreneurial abilities of ambulant merchants and expose an amazing consistency in their answers. With a standard deviation of 0.43, less than 1.00, the group's perspective of entrepreneurial aptitudes seems homogeneous. Particularly, the mean score of 3.81—orally stated as "high—showcases the great prevalence of financial risk tolerance among these ambulant merchants. This implies that most suppliers can properly control their financial risks, which is necessary for surviving in unofficial company surroundings. This implies that most suppliers can properly control their financial risks—a crucial competence for survival in informal business contexts (Caliendo et al., 2015).

Table 1. Level of entrepreneurial skills of an ambulant vendor

Entrepreneurial Skills	Mean	Standard Deviation	Descriptive Rating
Self-Competency	4.48	0.39	Very High
Control Focus	3.38	0.68	Moderate
Tendency To Take Risk	3.57	0.61	High
Overall	**3.81**	**0.43**	**High**

Examining particular indicators helps one to grasp the entrepreneurial skills displayed by the ambulant merchants on a deeper level. The indications run from 3.38 to 4.48; Self-Competency is the most highly ranked indicator. This outcome shows that ambulant traders are strongly aware of the hazards involved in their jobs and activities. A high level of self-competency implies that these vendors have the necessary skills to not only navigate uncertainties but also to enhance their productivity and performance, thereby achieving their business objectives. This finding is consistent with previous research, such as Nguyen et al. (2023), which found that a strong sense of self-competency significantly improves the ability of informal entrepreneurs to implement effective risk management strategies. As a result, this enhances overall performance and facilitates the successful attainment of business goals.

Despite this, it was consistently observed that not all aspects of entrepreneurial skill obtained high marks. For example, a score of 3.38 on the average scale indicates that the ability to manage attention is deemed "moderate." Given this information, it is possible to conclude that although these suppliers have a certain degree of concentration and control inside their corporate activities, this is not as widely visible in other elements of their capacity to engage in entrepreneurial endeavors. The moderate assessment suggests that ambulant suppliers could have to work on areas of strategic focus and operational control since they are crucial for maximizing business success in competitive and turbulent surroundings (Boermans & Willebrands, 2017). The little degree of control attention points to room for development, especially in fields that might increase their general entrepreneurial capacity.

Finally, the thorough examination of entrepreneurial abilities shown in Table 1 offers a clear image of ambulant vendors who show a generally high degree of self-competency, which is crucial in efficient financial risk management. Still, the modest result in control attention points to a possible improvement area. By strengthening focus and control in their operations, these vendors could enhance their general entrepreneurial performance in line with previous studies stressing the need for these elements to reach business success (Sabri, 2016).

3.2 Financial Risk Tolerance of Ambulant Vendors

The result presented in Table 2 shows that the considerable degree of financial risk tolerance shows that these active suppliers have an entrepreneurial attitude that accepts challenges and uncertainty as part of their daily activities. This outcome aligns with the corpus of studies on entrepreneurship since it stresses risk tolerance as a basic element of small business success (Boermans & Willebrands, 2017). The consistency in how the vendors handle financial risk tolerance highlights their shared attitude toward handling corporate uncertainty—a necessary component for the survival and expansion of unofficial businesses like ambulant vending (Stuetzer et al., 2016).

Table 2. Level of financial risk tolerance of the ambulant vendors

Entrepreneurial Skills	Mean	Standard Deviation	Descriptive Rating
Financial Related Behavior	4.09	0.32	High
Financial Related Personality	4.14	0.42	High
Attitude Towards Risk and Return	3.93	0.36	High
Financial Confidence Level	4.08	0.28	High
Overall	**4.06**	**0.28**	**High**

The calculated average score of 3.81 highlights, even more, the high degree of financial risk tolerance these sellers have. This score shows their general inclination toward risk-taking activities, indicating their readiness to participate in corporate operations, including financial uncertainty. The considerable degree of financial risk tolerance shows that these active suppliers have an entrepreneurial attitude that accepts challenges and uncertainty as part of their daily activities. This outcome aligns with the body of more studies on entrepreneurship since it underlines risk tolerance as a basic element of small business success (Boermans & Willebrands, 2017). Furthermore, the financial risk tolerance displayed by these suppliers supports the opinion that entrepreneurs usually flourish on the strategic difficulties presented by uncertainty (Palich & Bagby, 2020).

A closer examination of the elements affecting financial risk tolerance reveals that Financial-Related Personality scored the highest on average among the assessed criteria. This implies that the degree of financial risk willingness of ambulant merchants depends much on their social and psychological profiles. By contrast, the indication Attitude Toward Risk and Return got an average score of 3.93, verbally categorized as "High," thereby attesting to their great inclination to take chances in search of business prospects. With an aggregate mean score of 3.90, also categorized as "High, this highlights the vendors' general openness to welcome financial risks in their business operations. With an overall mean score of 3.90, also classified as "High," these results highlight the vendors' openness to embrace financial risks in their operations, so complementing earlier conclusions that risk-taking behaviors are essential for entrepreneurial success, especially in informal business sectors (Kihlstrom & Laffont, 2018; Caliendo et al., 2015).

Supporting these results, Krueger and Carsrud (2014) underlined the connection between faster corporate development and higher risk tolerance. This implies that, especially in the early phases of their companies, the inclination of ambulant suppliers to participate in risk-taking activities could help to enable faster development. Their proactive strategy for handling financial risks—by embracing higher risks in return for possible high returns—showcases a deliberate choice to embrace chances despite natural uncertainty. More conservative investor profiles displaying reduced tolerance for risk contrast strikingly with this normal attitude of financial risk tolerance among ambulant providers. The information in Table 2 highlights these suppliers' excellent financial risk tolerance and strategic predisposition to view financial risks as an inherent part of their entrepreneurial route. Their hunt for possible satisfying answers mostly relies on this risk-embracing attitude, which sets them apart from more risk-averse peers.

3.3 Relationship between Entrepreneurial skills and Financial Risk Tolerance among Ambulant Vendors

Using Pearson's product-moment correlation, Table 3 thoroughly analyzes the relationship between entrepreneurial ability and financial risk tolerance among ambulant vendors. The obtained r-value of 0.613 shows a positive correlation between the two variables, indicating their strong association. This outcome is consistent with earlier studies by Zhao et al. (2019), which revealed that people with higher entrepreneurial competencies usually show more financial risk tolerance since both qualities are essential for surviving in uncertain corporate contexts. Moreover, the p-value of 0.000 emphasizes the statistical relevance of this link, so verifying that the observed correlation reflects a real connection between financial risk tolerance and entrepreneurial abilities rather than the result of random chance.

Table 3. Correlation analysis of the relationship between entrepreneurial skills and financial risk tolerance among ambulant vendors

		Financial Risk Tolerance
Entrepreneurial Skills	r-value	0.613**
	p-value	0.000
	N	100

These results are significant since they show a clear correlation between the financial risk tolerance of the vendors and their entrepreneurial capacity. The statistically significant p-value, well below the widely accepted threshold of 0.05, reinforces the reliability of this relationship (Neck & Greene, 2011). This result suggests that any variation in the degree of financial risk tolerance is likely to influence the entrepreneurial capacity of ambulant vendors. Their capacity as entrepreneurs increases as their competence to control financial risks increases. Studies like Baron et al. (2016), which underline that entrepreneurial success often depends on the capacity to negotiate and embrace financial risk, support the reciprocal link between these two elements.

This strong correlation indicates that the financial risk tolerance of ambulant vendors increases in tandem with their entrepreneurial skills. The mutual reinforcement between these two elements emphasizes the critical dependency: vendors with greater entrepreneurial abilities are better equipped to manage financial uncertainties. As individuals hone their abilities in decision-making, financial planning, and flexibility, they also get better at negotiating risks, which is essential for informal business owners working in uncertain surroundings (Boermans & Willebrands, 2017).

These results provide insightful analysis of the mechanisms influencing the informal business environment, especially the presence of ambulant sellers. The study emphasizes the need to acquire entrepreneurial qualities to improve capacity for financial risk management. This link is especially important for ambulant suppliers who lack official financial infrastructure and business support systems since they have specific difficulties controlling business risks (Sabri, 2016). Thus, developing their entrepreneurial abilities will help them to be far more resilient and successful in small-business operations.

3.4 Influence of Entrepreneurial Skills on Financial Risk Tolerance

Table 4 shows that the multiple regression analysis presents significant fresh angles on how specific entrepreneurial talents influence ambulant vendors' financial risk tolerance. The main focus of the study was three basic skills: self-competency, control focus, and tendency to take chances, all of which were statistically significant in determining the vendors' preparedness to take on financial risks. Emphasizing their statistical relevance in determining financial risk tolerance, the p-values for these skills were 0.00, 0.13, and 0.14, respectively, all below the essential significance level of 0.05 (Farid & El-Sayed, 2016).

Table 4. The domain of entrepreneurial skills best influences financial risk tolerance among ambulant vendors.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	*Std. Error*	*Beta*		
1	(Constant)	1.953	0.260		7.506	0.000
	Self Competency	0.316	0.059	0.431	5.336	0.000
	Control Focus	0.093	0.037	0.223	2.528	0.013
	Tendency to Take Risk	0.106	0.042	0.228	2.506	0.014

One especially interesting result is that in this setting, self-competency was the most important ability. The unstandardized coefficient value of 0.316 shows this:, assuming other parameters remain constant, the financial risk tolerance of ambulant vendors increases by 0.316 units for every unit increase in self-competency. This emphasizes the important part self-competency plays in raising financial risk tolerance. Higher self-competency ambulant sellers are more prone to participate in risk-taking conduct, showing confidence in their capacity to negotiate uncertainty. This result underscores the pivotal role of self-competency in enhancing financial risk tolerance (Bryant, 2020). Vendors with higher self-competency are likelier to engage in risk-taking behavior, reflecting their confidence in managing uncertainty and demonstrating entrepreneurial resilience (Hassan & Wajdi, 2019).

These results complement earlier studies by Ayob et al. (2019), revealing a noteworthy correlation between enhanced risk management among company founders and strong entrepreneurial abilities. The statistical relevance of these entrepreneurial skills emphasizes the complicated interaction in entrepreneurship between personal capacities and risk-taking actions. Essential for success in the informal business sector, vendors who are more skilled in key areas such as self-awareness and decision-making are more suited to control financial uncertainty. All in all, the results offer an insightful analysis of how particular entrepreneurial abilities affect ambulant vendors' financial risk tolerance. Particularly, the great impact of self-competency emphasizes the need to develop such abilities to increase vendors' capacity to manage financial risks. These results highlight the need for focused training and support programs that improve the capacities of informal entrepreneurs and add to the general knowledge of the part entrepreneurial skills play in risk management.

4.0 Conclusion

The study investigated the relationship between entrepreneurial talents and financial risk tolerance, highlighting the critical role of self-competency. Our results show that companies with higher entrepreneurial competencies, particularly self-competency, are more inclined to embrace financial risks, improving their capacity to manage uncertainty and seize opportunities. This is consistent with previous studies, therefore supporting the view that success in risk-bearing environments, especially in unofficial companies like ambulant vending, is dependent on entrepreneurial skills.

This study adds to the growing understanding of how entrepreneurial abilities influence financial risk tolerance, particularly in informal business settings. It implies that building entrepreneurial competencies will enable companies to negotiate ambiguity and increase their resistance to financial risks. Future research should investigate how variables particular to a sector and the evolution of entrepreneurial skills over time influence financial risk tolerance. Moreover, considering the performance of targeted training programs that improve specific entrepreneurial abilities and support calculated risk-taking would enable one to acquire significant knowledge on running a business and making judgments.

5.0 Contributions of Authors

DCLM and RCG conceptualized the study. DCLM conducted the literature review and data analysis. RCG contributed to the data interpretation and provided critical revisions. Both authors contributed equally to the writing and editing of the manuscript. All authors have read and approved the manuscript.

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7.0 Conflict of Interests

Following ethical guidelines, we, Donald Cyndyl L. Miguel, MBA, and Rosalie C. Gemina, MBA, declare no financial or personal conflicts of interest that might compromise the objectivity or integrity of the research, "Linking Entrepreneurial Competencies and Financial Risk: Pathways to Sustainable Business Growth."

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Lived Experiences of Families With a Schizophrenic Member: A Phenomenological Study

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Abstract. Limited existing studies in Pagadian City explored the experiences of families with schizophrenic members, which led to a lack of knowledge about schizophrenia and mental disorders in general. Thus, this phenomenological study aimed to explore the lived experiences of five family members with schizophrenic members in Pagadian City, Zamboanga del Sur, to fill the gap in people's knowledge about how families go through their lives with schizophrenic members. The study focused on the behaviors the participants observed in their loved ones before the diagnosis, their emotions upon knowing the diagnosis, their concerns and challenges, and their coping strategies. Information was gathered by interviewing the participants. Using Moustakas' transcendental phenomenological analysis, the researchers were able to determine that the families noticed the reserved personalities, shifting personalities, staring into blank space, delusional thoughts, and being temperamental of their schizophrenic members before they were diagnosed. They felt fear and anxiety, immense sorrow, pity, sympathy, and hope as they knew about the diagnosis. The study highlighted concerns such as uncertainty about the future, the propensity to harm themselves and others, and the tendency to leave home. Furthermore, financial hardships, communication difficulties, and deprioritization of other family members became challenges for them. The families coped by praying, supporting one another, and having more patience. The implications of this study included understanding the families' concerns and coping strategies, helping schizophrenic members understand interventions, and assisting educators and therapists in tailoring their approaches. Additionally, the findings of this study can contribute to the knowledge of the schizophrenia field and potentially influence practice and policy.

Keywords: Lived experience; Schizophrenia; Schizophrenic family member; Phenomenology.

1.0 Introduction

Schizophrenia is a severe brain disorder that causes people to perceive reality incorrectly. Schizophrenia is characterized by delusions, hallucinations, abnormal physical behavior, and disorganized thought and speech (Substance Abuse and Mental Health Services Administration, 2023). Following the psychiatric revolution and deinstitutionalization policies, mental health care shifted from hospitals to families, causing challenges for family caregivers who had to take full responsibility for patients (Tamizi et al., 2020). Adjusting to a new family life ecology and dealing with social dishonor is marked by strength, sacrifice, and the search for meaning in an uncertain environment. According to Wan and Wong (2019), caring for a family member with schizophrenia leads to increased stress and psychosocial burden. A family member with schizophrenia may lead to high financial, emotional, as well as physical stress among their families (Ranjan et al., 2022). Family members experienced stigma and negative consequences (Young et al., 2019).

Approximately 24 million people, or 1 in 300 people (0.32%), worldwide have schizophrenia. Adults (2) make up 1 in 222 of these rates, or 0.45% (World Health Organization, 2022). The National Alliance on Mental Health estimated the prevalence of schizophrenia among adults in the United States and was estimated at 1.5 million people per year (Team et al., 2024). According to a global trends report released in 2020, China has the highest age-adjusted schizophrenia rates, followed by the Netherlands and Australia. These findings are consistent with a 2018 systematic review, which found that schizophrenia was most common in East, South, and Southeast Asia, Western Europe, and high-income North America (Gillette, 2023). The Department of Health report shows that 1 million Filipinos (1% of the population) are affected by this disorder each year (Maravilla & Tan, 2021).

For more than 60 years, psychiatric services have gradually transitioned from an asylum to a community model. This change has resulted in the emergence of a deinstitutionalization movement (Salime et al., 2022). As a result, most patients now live in the community with their families rather than in mental health facilities (Di Lorenzo et al., 2021a). An unpaid family member, friend, or neighbor who provides care to a person with an acute or chronic condition and requires assistance with various tasks, such as dressing, bathing, and medication administration, as well as tube feeding and ventilator care, is referred to as an informal caregiver or family caregiver (Jegermalm & Torgé, 2021).

Chen et al. (2019) stated that family caregivers play crucial roles in taking care of people experiencing schizophrenia in the community since the caregiving process is complex, with both negative and positive emotional reactions, societal barriers like stigma and isolation, and unmet needs (Cleary et al., 2020). Previous studies have shown that people with schizophrenia are negatively affected when they live in a family environment with high levels of criticism, whereas living in an environment with encouragement and praise from family members can improve the life satisfaction of schizophrenia patients. Furthermore, family dynamics refers to how family members are linked, so family members' attitudes and attributions toward people with diseases influence the occurrence and progression of mental illness (Wang et al., 2019).

According to Sharifi et al. (2023), the experiences of the parent caregivers can be divided into two main categories: The "burden of care" and "negative attitude and inefficient performance." The former encompasses three subcategories: disrupted social and family interaction, helplessness, and poor support quality. At the same time, the latter incorporates two: negative attitude and poor performance by those responsible for caring for such a person and negative attitude towards patients from caregivers. Due to their old age and medical needs, older parents should carry an extra burden of care. Among the top priorities for improving the situation of caregivers and patients with schizophrenia were the government's increased efforts to provide patients and caregivers with multifaceted support, the development of an integrated team of specialists, and acceptance and improvement of public attitudes against stigma and explicit discrimination in society (Sharifi et al., 2023).

Participants described the diagnosis of schizophrenia for a relative as a heartbreaking experience. In contrast, some participants controlled the experience with a sense of relief at finally recognizing the condition and gaining access to care. Before learning the diagnosis, the caregivers' experiences and representations significantly impacted how the "news" was digested. The sharing of the diagnosis served as a starting point for the participant's acceptance of the illness's reality. Participants reported various unmet needs related to the diagnosis, including individualized support, detailed explanations of the disease, and direction on their caregiver role (Forcheron et al., 2022).

Families who care for schizophrenic patients go through loss and cope with social stigma and isolation, which can make them feel ashamed or guilty and hurt their physical and mental health. Although most of the effects of caring for a patient with schizophrenia are unpleasant, some family caregivers have recently begun to recognize more advantageous and positive features of this position (Darban et al., 2021). In addition, a study by Glecia and Li (2023) presented that parents reported mixed emotions, providing insight into the severe psychological distress they experienced after their child was diagnosed with schizophrenia. The period immediately following diagnosis can be especially stressful. On the contrary, parents experienced acceptance of their new caring role, which was supported by their love and responsibility for their child with schizophrenia.

Despite the primary role that family serves in the lives of people with serious mental illness, it is an understudied source of support (Chronister et al., 2021). According to some studies, it showed that family caregivers of individuals with schizophrenia complain of a heavier burden than those who care for an individual with a chronic medical illness (Di Lorenzo et al., 2021b). While barriers differ depending on their location, both Filipinos in the Philippines and overseas are hindered by self-stigma, social stigma attached to mental illness, and cultural values that prioritize conformity and discourage seeking help. Filipinos living in the Philippines face financial constraints and limited access to services, while those overseas experience difficulties due to immigration status, lack of health insurance, language barriers, discrimination, and lack of acculturation. Filipinos tend to use formal help only as a last resort or when problems become severe (Martínez et al., 2020). According to the World Health Organization (2020), there is limited data on Filipinos' mental health help-seeking behavior. Due to the comfort, camaraderie, trust, maturity level, and validation of their informal sources of support, adolescents favored them above official ones. It was discovered, specifically, that when Filipino youth seek mental health assistance, they do so through friends, peers, family, and online support groups (Villamor & Dy, 2022).

In Pagadian City, there have been no existing studies exploring the experiences of families with a schizophrenic member. Therefore, there is a lack of knowledge about schizophrenia and mental disorders in general. Thus, this study aimed to explore the lived experiences of families with a schizophrenic member to fill the gap in people's knowledge about how families go through their lives with a schizophrenic member. Furthermore, this study was supported by the Family Systems Theory of Murray Bowen (1966). The Family Systems Theory provided an understanding of what happens with relationships and family dynamics when a family is disabled due to the challenge of caring for a member diagnosed with schizophrenia. From the Family Systems perspective, all family members are viewed as an emotional system deeply built with interconnected and interdependent behaviors. When one of the members is diagnosed with schizophrenia, the roles, styles of communication, relations, and emotional climates may change dramatically (Minuchin, 1974).

Thus, this study was conducted in the 2nd semester of the academic year 2023-2024 to answer the question, "What are the lived experiences of families with a schizophrenic member?". In addition, it also answered the following questions: "What are the behaviors the participants observed in their loved ones before they were diagnosed with schizophrenia?" " What are the emotions of the participants upon knowing that their family member had been diagnosed with schizophrenia?" "What are the concerns the participants experienced about their schizophrenic members?" "What are the challenges that participants have faced after the diagnosis of schizophrenia in their family members?" and " How did the participants cope with the challenges of living with a schizophrenic member?"

2.0 Methodology

2.1 Research Design

This study used a qualitative research design, with a phenomenological methodology in particular. The researchers chose to use a qualitative research approach and conducted a factual study to explore the subjective experiences of families with schizophrenic members. The purpose of this study was best addressed through phenomenological research, which mainly focused on the transcendental phenomenological approach. As Moustakas (1994) highlighted, the transcendental phenomenological approach calls for one to put aside judgments, prejudices, and preconceptions to see the phenomenon through “fresh eyes.” It allowed researchers to explore how family members lived and constructed their views, which disclosed the emotional and relational forces at play. In so doing, the research looked at these families' admittedly complex everyday worlds and how they managed things within their family setup.

Furthermore, an aspect of this method was that prior assumptions were put between brackets to involve the participants in a more sincere discussion by allowing for trust and openness. This phenomenological approach demonstrated numerous enlightening points of understanding about the experiences of these families and culminated in better-targeted support and resource development.

2.2 Research Locale

This study was conducted in Pagadian City, Zamboanga del Sur. According to the Philippine Statistics Authority (n.d.), Pagadian City, located in the Zamboanga Peninsula of the Philippines, had a population of 210,452 as of

2020. The city is characterized by its hilly terrain and tropical climate, which can influence agricultural practices and resource access. In addition, the city's economy is primarily driven by agriculture, trade, and small-scale industries. Moreover, many households engaged in farming, fishing, and various forms of local commerce, reflecting a rural lifestyle intertwined with urban elements. These environmental conditions may impact the community's mental health, as socioeconomic stressors can exacerbate mental health issues.

Furthermore, the research locale has limited access to formal mental health services for families supporting schizophrenic individuals. Due to this shortage of professional resources, a closer look is necessary at the peculiarities and adaptive strategies at the level of these families in their cultural environment. Based on the social landscape of Pagadian City, which incorporates aspects such as strong family relations, religious sentiments, and quasi-social stigma surrounding mental illness, is likely to contribute to the role in shaping the experiences as well as the coping mechanisms among families struggling with schizophrenia.

2.3 Research Participants

In this study, the researchers utilized snowball sampling to identify participants within a specific community dealing with a sensitive topic like schizophrenia. The method relied on referrals from initial participants, which helped reach individuals who may have difficulty identifying through other sampling methods. Given the stigma surrounding mental illness, this sampling allowed for a more organic and trustworthy recruitment process, encouraging individuals to share their experiences in a supportive environment.

Five participants from Pagadian City were involved in the study, each having a family member diagnosed with schizophrenia for at least one year. The first participant was a mother of two children. The second participant is a grandmother of a schizophrenic patient. The third participant was the eldest brother of a schizophrenic member. He is married with five children. The fourth participant is also a sibling of a schizophrenic member. She is the younger sister to her brother, who was diagnosed with schizophrenia. Lastly, the fifth participant is the eldest sister of a schizophrenic patient. She is married and has five children. All participants were given the choice of whether to participate in the study, and a time and place were agreed upon for their interviews.

2.4 Data Gathering Procedure

The data gathering was based on the standards of qualitative research. Initially, the researchers made a formal letter asking for permission from the families involved in the study, which was signed by the researchers and noted by the research adviser and the Dean of the College of Teacher Education, Arts, and Sciences (CTEAS). Upon approval, the researchers went to the respective houses of the participants according to their agreed date and time. Informed consent and permission letters were also obtained before the interviews. Each of the interviews conducted had a minimum of 30 minutes and a maximum of 1 hour and 30 minutes. The participants were assured of the secrecy of their personal information, which would not be disclosed at any point in the study.

In the research process, the researchers identified a phenomenon to study, bracketed out one's experiences, and collected data from several individuals who experienced the phenomenon. The researchers started with transcription of the interviews and horizontalization (Moustakas, 1994). The common or shared experiences of the family members were identified so that the researchers would understand how the participants were experiencing the phenomenon. Next, the researchers developed a cluster of meanings and themes from these significant statements. Open codes were temporarily assigned. Afterward, similar codes were grouped and assigned to a logical category. The categories were further analyzed to determine overarching themes that provided insight into the experiences of families with schizophrenic members. Finally, the panel members of this study reviewed the themes created by the researchers to ensure their validity and relevance to the participants' lived experiences.

2.5 Ethical Considerations

Ethical considerations were critical in research due to the need to secure and protect study participants. At all times, the researchers ensured that participants were safe from harm and protected from unnecessary stress. The obtained informed consent ensured by the researchers that all potential risks—physical, social, and psychological harm—were disclosed to participants before the study and kept to an absolute minimum. Moreover, written consent was given to the participants who chose to participate in the study. When gathering data, privacy was maintained by only asking questions required for the study. The interviews were conducted in private settings where the research participants felt at ease.

3.0 Results and Discussions

The participants consisted of siblings, a mother, and a grandmother of a schizophrenic member from the City of Pagadian. They have years of experience taking care of their family member who has schizophrenia. The participants' years of experience in taking care of their loved ones helped the researchers capture the genuine and authentic experiences of families living with schizophrenic members. Each participant was designated with a code of P1, P2, P3, P4, and P5 to maintain the confidentiality of their profiles.

3.1 Behaviors of the Schizophrenic Member Observed Before the Diagnosis

The data gathered by the researchers during the interview revealed the different observations of the family before the diagnosis of their loved ones. Upon reading and rereading the transcripts of the interview, four themes were revealed regarding the behaviors the participants observed in their loved ones before they were diagnosed with schizophrenia. These themes were Having Reserved Personalities, Shifting Personalities, Staring into Blank Space, Having Delusional Thoughts, and Being Temperamental.

Having Reserved Personalities

During the interview, most of the participants shared a common response in which their loved ones, before being diagnosed with schizophrenia, were observed as being reserved. This raises the question of whether these subtle changes could be early signs of the condition. With this category, the respondents narrated:

"*As I have observed, she was very quiet in elementary when she was still little. Unlike other kids who were talkative, she was just quiet. If you will not call her first, she will not answer.*"– P2

"*What we observed when he was still a child is that he is shy, and he did not want to approach others.*" – P5

According to Peters (2020), social withdrawal is a common observation made by family members who have schizophrenia. It is also a predictor of psychosis in the future in children who are more susceptible to the illness. The social withdrawal could be a subtle manifestation of the underlying psychotic process beginning to develop.

Furthermore, Camisa and her colleagues (2005) suggested that the symptoms of schizophrenia were frequently associated with decreased extraversion aside from the increasing rate of neuroticism. This result was consistent with the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR) (2024) description of the symptoms of individuals with schizophrenia. Accordingly, individuals with schizophrenia often exhibit reservedness characterized by a significant withdrawal from social interactions and a diminished desire to engage with others.

Shifting of Personalities

Families of individuals with schizophrenia often grapple with a heartbreaking paradox: living with someone you have known for a long time. However, it seems like they are already a completely different person. The illness can cause dramatic personality shifts, leaving loved ones struggling to connect with a seemingly "different" person.

"*Yes, she was diligent. I did not expect it. At fourteen, she seems different; she is not who she was. She became aggressive.*" – P1

"*It is like he is different from others. Because he easily gets angry and insults others. And then he stares. It seems different. His eyes look aggressive.*" – P3

"*I witnessed even before when his brain was still not damaged; he was very caring and generous. Then, when his brain was damaged, his personality changed. Very aggressive. Him being good, he turned aggressive.*" – P5

Personality changes are a fundamental feature of psychotic disorders; it is most typical of schizophrenia and has been used to differentiate schizophrenia from other severe mental illnesses (Conneely et al., 2020). Furthermore, some studies have found that untreated psychotic symptoms, especially delusions and hallucinations, tend to be a source of aggression in people with schizophrenia. Coid et al. (2021) recorded persecutory delusions as strong risk factor for violent crime properties. Similarly, Volavka (2014) also stated that the high rates of violent behavior in schizophrenia were largely associated with acute psychoses situations during which delusional thoughts are intertwined with paranoid feelings.

Staring Into Blank Space

When witnessing a schizophrenia patient, one noticeable sign is their tendency to appear to be staring into space. This empty glance, separated from the immediate surroundings, can be a subtle yet deep indicator of the complicated inner workings of their mind.

"*At times when she is thinking deeply, I do not even have any idea about what it could be, but she seems to be looking at a distance.*" – P1

"*His actions are unusual and difficult to comprehend. At times, he always appeared to be looking far away.*" – P4

Blank stares or blank facial expressions are said to be caused by psychotic diseases such as schizophrenia and associated disorders (StÖPpler, 2022). According to WebMD (2024), people with schizophrenia struggle to organize their thoughts. They may not be able to follow along when you speak to them. Instead, it may appear they are staring into space or being distracted. When they speak, their words can become jumbled and difficult to understand. Additionally, there were also individuals diagnosed with schizophrenia who may have experienced catatonia. During this situation, individuals will have prolonged periods of immobility or repetitive, purposeless movements often accompanied by vacant stares (Tandon et al., 2008).

Having Delusional Thoughts

For families of individuals with schizophrenia, dealing with their loved one's delusional thoughts can be emotionally draining. They may feel helpless and confused about how to respond, torn between confronting the delusions and trying to redirect the conversation. There is also a sense of grief for the person they once knew. With this category, the respondents narrated the following:

"*Sometimes, when parents fall asleep, she might go out. She already went to the road and waited for a car because she said there is someone who wants to get her, she will ride in the truck.*" – P2

"*I felt so scared when there was a moment that.. what was it? He tried to kiss me because he assumed I was his wife. That was my fear, and I ran fast to our neighbor. If it was you- I was really scared that time and ran to our neighbor.*" – P4

These statements showed how delusional thoughts affect schizophrenic patients' actions and goals. They reveal a mix of imagination and reality, where desires and ambitions can be unclear. Whether it is sneaking out at night because of fear, wanting to leave while feeling restless, or dreaming big but struggling to act, these experiences highlight how confusing delusions can be. Delusions are a hallmark of schizophrenia, deeply influencing patients' perception of reality (Hany et al., 2024). These delusions, often fixed and resistant to logic or contradictory evidence, can range from paranoid thoughts to grandiose or somatic beliefs, profoundly shaping the individual's behavior and cognitive processes.

Being Temperamental

One of the most challenging aspects of schizophrenia is its unpredictable and often tempestuous nature, which can manifest in various ways, from erratic behavior to volatile mood swings. These temperamental fluctuations not only present significant challenges for individuals with schizophrenia but also for their families, who must maintain a delicate balance of support, understanding, and coping with the illness's unpredictable nature. The respondents had common similarities when it came to this category. The responses were as follows:

"*There are instances that she suddenly gets irritated.*"– P1

"*Yes, she does get silent and has a sudden reaction to become irritated, throwing tantrums that are evident in her expression.*" – P2

"He would get upset and even tries to insult us to make it seem that he is against us." – P5

A study conducted by Dib et al. (2021) stated that patients with schizophrenia exhibited considerably higher mean depressive, cyclothymic, irritable, and anxious temperament ratings than healthy controls. These responses were agreed by Dib et al. (2021), who conducted a study about patients with schizophrenia. Accordingly, these patients exhibited considerably higher mean depressive, cyclothymic, irritable, and anxious temperament ratings compared to individuals not diagnosed with the said illness.

3.2 The Emotions of the Participants When They Learned that Their Family Member Has Schizophrenia
Family members experienced various emotions upon knowing that their loved ones were schizophrenic. The emotions they felt were similar to those of other participants. The themes acquired from their responses were the following: Fear and Anxiety, Immense Sorrow, Pity and Sympathy, and Hopeful.

Fear and Anxiety
The family members had similar feelings of fearfulness and anxiety upon hearing the news about the condition of their loved ones. The participants were anxious because they saw that their loved ones were different from the others. The family members were anxious as their loved ones tended to isolate themselves and did not want to interact with others. Additionally, the thought of schizophrenic members being left with no one in the future made them worried. The respondents said:

"I am worried because she is different and then what will she do if she is left all alone." – P1

"I felt so scared when there was a moment that.. what was it? He tried to kiss me because he assumed I was his wife. That was my fear, and I ran fast to our neighbor. If it was you- I was really scared that time and ran to our neighbor." – P4

The development of a schizophrenic disorder, as well as acute episodes in the later course of the disease, caused significant emotional suffering to the family members who also act as caregivers to their schizophrenic members. It was emphasized that the families of schizophrenic individuals experienced burden on a practical, financial, and emotional level, and the level of burden is positively associated with the frequency of symptomatic behavior of the said individual (Lowyck et al., 2020).

Sadness
It was inevitable to feel so much sadness when hearing sad news about a family member. While doing the interview, it revealed that some of the participants could not stop themselves from crying because it made them reminisce about the moments when they heard about the diagnosis of their loved ones. While doing the interview, it revealed that the family never experienced true happiness because they had to deal with so many obstacles in their lives ever since.

"I was sad, of course, because it is my grandchild, right? I was really sad as to why this child turned like that… Those times when she cannot take medicine, I can feel very sad." – P2

"I shed tears at that time because when Dad returned from the doctor, he told us about Nuning's situation. I shed tears because he was so close to me… However, it is so painful to think about. This disorder is intentional by him; this disorder is intentional." – P3

"We do not have happiness. We are very sad at this time. It seems we are very down, and my father is always absent-minded while driving… When I, in those happenings, crying- I was crying, I will cry." – P5

Family caregivers living with schizophrenic members face tremendous stress and a high level of burden. These major responsibilities include physical discomfort, changed regular habits, tension, aggression, immense sorrow, enormous stigma, role changes, social withdrawal, and financial/career difficulties, typically with a lack of resources and support (Chen et al., 2019).

Pity and Sympathy

During the interview, it revealed a feeling of pity towards their family member with schizophrenia. The participants felt a deep collective sympathy as they saw their loved ones battling schizophrenia daily. Their emotions were deeply impacted as they knew the diagnosis and the sight of their family member's suffering elicited a painful feeling. The researchers gathered the following responses:

"*Well, in my case before, I feel sorry for my younger brother… I am looking at him, and he is pitiful because he is inside there. He cannot go outside, I feel sorry because he has been in the cage for several years.*" – P3

"*What we feel for our younger brother is pity, pity.*" – P5

Witnessing their loved ones suffering in pain and being locked up inevitably elicited sentiments of pity. This theme emphasizes the realization that their family member will not get better and will always be caged and hindered from exploring life. The weight of this emotion was evident to the family members as they carried the reality about the condition of their loved ones with schizophrenia.

Hopeful

The participants expressed a shared belief in God following the diagnosis, finding solace in prayer, and seeking spiritual guidance to support their family members during their illness. They hope their loved ones regain a sense of normalcy, as they perceive them as abnormal.

"*I asked God for help.*" – P2

"*Before, I just prayed to the Lord, hoping that he would help Nuning so that he would return to being a normal individual. I prayed I prayed that the Lord would help him to think that in his heart and mind, nothing is impossible to God with his plans for the person.*" – P3

In the lives of those families with family members who have mental disorders, faith can have a significant impact. Praying to a Supreme Being played a significant role in processing the emotions of families dealing with schizophrenic members as it gave a glimmer of hope in alleviating the condition of the affected family member.

3.3 Concerns The Participants Had About Their Schizophrenic Family Member

It is unavoidable for participants to have worries and concerns about their loved ones who have a mental disorder, especially schizophrenia, which causes hallucinations, delusions, and disorganized behavior and thinking. Upon bracketing the data gathered, the researchers developed three themes: Uncertainty of the Future, Propensity to Harm Self and Others, and Tendency to Leave Home.

Uncertainty of the Future

The ambiguity of the future life of individuals who have schizophrenia and their ability to live in a society in the absence of family members had caused many concerns among the participants.

"*What if.. we do not know the future.. for instance, we will no longer be around because we are already old.*" – P1

"*…his security in his life, it is unclear. I am concerned about him that his- his result in life.*" – P3

"*I am worried about him because of what might happen to him. I am worried about his future because he is a bachelor, and if he is already old, he has no child. He has no family. If his parents die, who will look after him? We have our own family, so I worry about his future. What will happen if he is all alone.*" – P4

During the interview, the participants shared common responses, such as uncertainty about what may come in the future for them and their loved ones. A participant who is the mother of a schizophrenic patient highlighted the thought of what will be the future of her daughter if the time comes when she will not be around anymore. Other participants were also worried about their siblings since they needed to prioritize building their own family.

Propensity to Harm Self and Others

People with schizophrenia act aggressively and have the possibility to cause harm to others and themselves. When left alone, people with this illness can see opportunities where they could hurt themselves.

"*She even took an action of… that necklace she keeps wearing. I noticed she was like that (choked herself using the necklace). It was a good thing I noticed. She tied it tightly on her neck.*" – P1

"*He wanted to commit suicide. Then, when he gripped the electricity, he thought that he did not have anything in his life and that he did not have any chance. Commit suicide. I said do not be like that because it is a sin when you take your own life, committing suicide.*" – P3

"*I was apprehensive that he would hurt other people because it was what he felt that he tended to harm. He burns his back with a candle.*" – P4

It has been observed that individuals with schizophrenia may try self-harm as a result of command hallucinations, catatonic excitement, or because of associated depression (Bhat et al., 2011). They also have a higher suicide risk than the general population (Jakhar et al., 2017). Although command hallucinations were not an independent risk factor, they did raise the risk in people who were already inclined to commit suicide (Pompili et al., 2007). These actions of their loved ones continue to worry the participants because there are times when they are at a loss for what to do, and their responsibilities as parents and siblings are constricted because they have to give full attention to their loved ones to avoid bad situations.

Tendency to Leave Home

The participants observed instances when their loved ones left their homes several times without asking for permission. This was reflected in their responses:

"*…that was the time when she suddenly walked away. She suddenly walks away bringing a bag.*" – P1

"*I worry. Sometimes, when their parents fall asleep, she may come outside. She had already gone to the road and waited for a car because she had said that someone would get her, and she would get in the truck. It was a good thing they noticed (her parents); the father went to the kitchen and went outside when he saw his daughter on the road… She goes out in the evening, so I was really scared. I can say to God, look after her.*"– P2

"*He is different when he is triggered. He will go anywhere. We have a hard time looking for him.*" – P4

Hallucinations were considered as one of the symptoms of schizophrenia. They were hearing voices instructing them to stray around. Any sense may trigger a hallucination, but hearing voices is the most common. When speech is disorganized, it develops disorganized thinking (Mayo Clinic, 2024). The participants continue to worry about the security and well-being of their loved ones because, if left unchecked, their frequent attempts to run away could result in serious circumstances.

3.4 Challenges Faced By The Participants Following Their Loved Ones' Diagnosis of Schizophrenia

It was not an easy journey for families with a schizophrenic member to navigate life. After the diagnosis of schizophrenia, their life path took an abrupt turn. This posed challenges for the person with the diagnosis and the people surrounding them, especially the family. These families faced many challenges as they dealt with complex emotions and adaptations. To support the individual who has been diagnosed with schizophrenia, family members must make their way through a new environment. The challenges they faced were numerous, and the researchers developed three themes: Financial hardships, communication difficulties, and deprioritization of other family members.

Financial Hardships

One of the challenges common to the participants shared was a lack of financial resources when caring for a schizophrenic member, as it can affect the well-being of their loved ones. Unavailability of funds could delay medication since it prevented them from acquiring the patient's prescribed medicines. Hence, it could affect the condition of the person with schizophrenia and could worsen the symptoms.

"There is a difficulty because he will also maintain a medicine, and then where do we find that? We also help them and provide support. It has a very big impact, especially in terms of finances. It was hard to seek money. It is really hard. You have to take his medicine first because it is important. If he is not able to drink it, he will be… triggered." – P4

"I look at the difficulty because there is nothing to buy medicine, nothing to go back to the hospital just to make him normal. That is what I feel of difficulty that I cannot help any because at that time, my job there at the barangay, the salary is very low." – P5

Living and caring for an individual with schizophrenia was a burden to the families, particularly if they were struggling financially. Struggling with the financial aspects of purchasing the medicine was quite challenging. In dealing with schizophrenia, financial capacity was critical as it played a big role in the treatment of the illness. The participants disclosed that, due to their limited financial resources, they faced difficulties in continuing their loved ones' medication after receiving the diagnosis.

Communication Difficulties

Schizophrenia often leads to cognitive impairments, which could affect a person's ability to process information, maintain a conversation, or express their thoughts clearly.

"At times when she cannot drink medicine, her symptoms would come out. She would just lie in her room. When you call her, she will not respond. Will not communicate with us. I am also sad because she does not respond when being called." – P2

"…when he is triggered, he will scream and scream." – P4

"He will not be able to talk to, then sometimes he is asked to talk, he will suddenly get angry." – P5

The participants disclosed that they are having difficulties talking with their loved ones because they will not receive any response or the patient will respond aggressively. Difficulty in communication can create barriers to expressing themselves effectively. Furthermore, the emotional expression difficulties and social withdrawal tendencies of those with schizophrenia can further complicate interactions.

Deprioritization of Other Family Members

Family members of a schizophrenic patient who has their own family frequently experience disruptions in their responsibilities to their own family because the schizophrenic patient requires constant care and attention. It is challenging for them to continually look after their loved ones with schizophrenia since they also have to look after the well-being of their own family.

"It is there that you cannot take care of your own family, to my children… because he is there… we will take care of him because he is pitiful if we neglect him… because he will be the priority. Just like when he was imprisoned, we give… food and water because he is pitiful if we neglect him. Our eyes are always on him." – P4

The participant revealed frustrations as they have to give more attention to the diagnosed family member than their own family. Supporting a family member who has schizophrenia entails assisting them in receiving necessary medical and psychological care. However, it also entails looking after oneself equally (WebMD, 2022). The familial dynamics surrounding the care of a schizophrenic patient often necessitate a shift in focus that can lead to the deprioritization of one's own immediate family. The constant care and attention required by the patient often overshadow the needs of the caregiver's family, leading to feelings of frustration and imbalance.

3.5 Participants' Coping Strategies For Living With Schizophrenic Family Member

Living with a schizophrenic member presents a unique set of challenges to their families that can significantly affect their well-being and their daily lives. Coping with these challenges requires resilience, understanding, and often a profound adjustment in one's perceptions and expectations. The participants' responses created three themes: Praying, Supporting One Another, and Having More Patience.

Praying

The importance of faith and spirituality emerged as a prominent theme throughout the statements. The families repeatedly turn to prayer, seek support from religious figures such as pastors and nuns, and rely on their belief in a higher power to navigate through difficult circumstances. They found solace and strength in their relationship with God, trusting in His guidance and finding comfort in the power of prayer.

"*All I do is to pray to God that he will help me get through the challenges I am facing.*" – P2

"*There is no one else. Only God can help us. We ask for his guidance so that he would give us an open heart and open mind and that he would answer when we call his name.*" – P3

"*For me, so I will not get stressed easily, I chose to strengthen my stewardship to God. Because if you stray away from God, you will easily get exhausted due to the stresses of life.*" – P4

"*Our faith in God had helped us overcome our challenges, and we managed to get through our problems.*" – P5

Spiritual coping (SC) can assist families that serve as caregivers to better deal with stress and emergencies by mobilizing beliefs and practices. The literature demonstrated a growing body of research that confirmed the relationship between SC and improved health outcomes among caregivers. Research also indicated that families or caregivers who do not employ spiritual coping mechanisms have an increased risk of depression and anxiety (Rohmi et al., 2023).

Supporting One Another

Supporting One Another. Another recurring theme was the significance of family support and unity in facing challenges. Despite the hardships the families encounter, there was a strong emphasis on coming together as a family and offering each other emotional, moral, and sometimes financial support. The families communicated openly, shared responsibilities, and worked together to overcome obstacles, demonstrating resilience and the power of open communication in strengthening family bonds.

"*We would help each other in supporting him. When he takes his medication, I always check on him to see whether he has been taking his medicines. In dealing with his issues, I always remind him to maintain his medication. Maintaining his medication will help his illness not reoccur.*" – P2

"*Of his needs? We would have a budget, a budget of the money, of our expenses to accommodate all his needs… If he needs anything, I will give it to him. I am the one who will lend him his medicines. I am also the one who is assigned to give him his food and water while he is imprisoned in his compartment… My spouse and one of his siblings take turns in watching and taking care of him.*" – P3

"*We help each other as a family so that no one would be pressured to take all the responsibilities. We would also conversate with him from time to time.*" – P4

"*We would collaborate through communication with my parents. We would still give our support even though we have a sibling who is like that, and we are still here, as well as their grandchildren, because if we do not support them, they will become weaker, knowing they are getting old. We will still support him, especially me, because I am his sibling. I am still going through a problem because it is something other people do not understand. All I did was make sure I could support myself financially, morally, and spiritually and pray for my family. So that we can overcome all our trials.*" – P5

Family members have an important role in providing care and support to relatives suffering from mental illnesses. This is especially true in Asian countries, where cultural norms lay the responsibility for providing care to the ill person's next of kin. Sociocultural expectations view the caregiving function as typically being discharged by parents, children, or the spouse and as a family obligation with morally binding undertones (Stanley et al., 2016). The study of Darban et al. (2021) also highlighted that when one family member is diagnosed with schizophrenia, the other family members actively engage in caring for the family member to alleviate the burden of the situation. This collective effort promoted a sense of shared responsibility and led to stronger family ties that reinforced the bonds among family members as they navigated the challenges together.

Having More Patience. Coping mechanisms and resilience were evident themes as families discussed strategies for managing stress, handling difficult emotions, and navigating tough times. The participants stated that having perseverance, patience, and determination were important to overcome obstacles, even when faced with overwhelming challenges. Through prayer, communication, and seeking professional help, they demonstrate a commitment to maintaining mental and emotional well-being amidst adversity.

"*A long patience because if you do not have patience, you will get bruised because you will get back at him and when you get hurt, always doing play fight so if she gets hurt, you will get hurt too… That is why I do my best so I can handle it.*" – P2

"*Lengthen your patience because if you do not have any patience, you will not understand. You need to understand him. You need to be understanding because if you do not have enough patience and understanding, you are going to lose attention for him because it will come to a time that you will have enough because of his attitude.*" – P3

One positive outcome that also became a coping mechanism for families with family members with schizophrenia is the cultivation of patience (Darban et al., 2021). In these families, caring for the individual with the illness fosters a deeper sense of patience that evolves over time. This growth in patience can enhance family dynamics and improve the overall supportive atmosphere within the household. Coping and resilience are one of the important aspects to be applied when caring for a schizophrenic member. The participants have reported having long patience and understanding of their family member with schizophrenia so that it would help them to endure the caregiving situation. Resilience and social support also mediate between the caregiving burden and positive aspects of caregiving (Wang et al., 2019).

4.0 Conclusion

The data gathered from this study revealed the different and authentic stories of lived experiences of families with schizophrenic members. The results highlighted the various experiences before the diagnosis and after the diagnosis of their loved ones. The participants experienced different emotions and challenges as they dealt with the mental disorders of their loved ones. In addition, the challenges unveiled the participants' hardships and their effects on their loved one's well-being. Furthermore, despite everything that happened to their family since the diagnosis, they were still hopeful to see their loved ones turning back to normal, and their faith in God became even stronger as time went by. They have been coping by thinking positively and putting trust in the Lord.

In the responses of the families and the related literature, it was implied that families are affected by the mental illness that their family members are experiencing. These were connected to Murray Bowen's Family Systems Theory, which suggested that families function as emotional units where individual behavior is intertwined with family dynamics. The theory also emphasized role flexibility and adaptation, as families with schizophrenic members experienced significant changes in roles as they navigated the illness. Emotional reactivity and fusion were also crucial aspects of the theory, as family members became emotionally entangled, making it difficult to maintain autonomy and boundaries. Upon examining these emotional dynamics, the study uncovered the emotional toll of schizophrenia on family members and identified coping strategies for fostering healthier emotional boundaries and coping mechanisms.

This study aimed to understand the struggles and fears faced by families caring for a member with schizophrenia and how society perceives these families. The implications of this study included understanding the families' concerns and coping strategies, helping patients understand interventions, and assisting educators and therapists in tailoring their approaches. Additionally, to equip mental health professionals with better interventions, advocate for better resources and support services for families with schizophrenic patients, and reduce stigma by raising public awareness.

Furthermore, the result of this study emphasized the substantial demands of caregiving of families and pointed out that it likely takes a toll on family members providing care to their loved ones with schizophrenia. Families also may benefit from additional support, such as in mental health, as this study has revealed that they are a population at risk for burnout if provided with inappropriate or no support at all. Therefore, mental health interventions should target both the needs of individuals with schizophrenia and the well-being of the family caregivers in order to deliver effective care. Lastly, this study's findings can contribute to the knowledge of the schizophrenia field and potentially influence practice and policy. They can also benefit advocacy organizations and support groups, reducing stigma and building a more welcoming social response to mental health.

5.0 Contributions of Authors

The authors confirm their contributions to the paper: Alfanta, JV and Rodrigo, JD—study conception, data collection, analysis and interpretation of the result, and draft manuscript writing and preparation. Guinea, JMR— manuscript editing, writing, and supervising.

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7.0 Conflict of Interests

The authors declare no conflict of interest with the publication of this paper.

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Structure, Modeling, Differentiation, and Assessment as an Instructional Approach to Teaching and Learning

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Abstract. Quality education is envisioned to result in higher individual income and is necessary for any country's long-term economic growth. Enhancing student satisfaction and knowledge retention and elevating teacher pedagogical knowledge and competence to new heights can be attained through Structure, Modeling, Differentiation, and Assessment (SMDA), a dynamic instructional approach reshaping the learning landscape in private sectarian schools in achieving quality education. The pilot study determined if SMDA can enhance student satisfaction and knowledge retention and improve teacher pedagogical knowledge and competence. This quantitative research, utilizing a descriptive-correlational research design through a one-group pretest-posttest, measured students' satisfaction and knowledge retention levels and teachers' pedagogical knowledge and competence levels before and after implementing SMDA. The samples included 43 English, Math, and Science teachers and 325 students chosen through stratified sampling from the Marbel Diocesan Notre Dame Schools in South Cotabato, Sarangani, and Koronadal City. The findings indicate that students' satisfaction and knowledge retention significantly improved after implementing SMDA. Teachers demonstrated an enhanced level of competence and pedagogical knowledge following SMDA implementation. Furthermore, the study reveals that student satisfaction is unrelated to knowledge retention, indicating that students learn regardless of approaches. Teachers' pedagogical knowledge is unrelated to their competence, proposing that teachers' pedagogical knowledge does not equate to their competence. The study concluded that SMDA is an intentional and rigorous instructional approach, leading to recommendations for continued implementation, professional development, evaluation, and research on SMDA to improve education quality in the Philippines.

Keywords: Instructional approach; Learning; Pilot study; Teaching.

1.0 Introduction

The World Bank (2019) reported a growing learning crisis in emerging economies, including the Philippines, highlighting a persistent global issue rooted in inadequate policy and curriculum implementation monitoring. Compounding this crisis, the COVID-19 outbreak has led to an international education emergency, severely impacting children's learning and well-being. Despite the Philippines' 1987 Constitution mandating the state to provide quality education at all levels and the passage of Republic Act 10533 (Enhanced Basic Education Act), aimed at reforming and improving the existing curriculum, significant progress remains elusive. Recent international assessments reveal low rankings for the Philippines, underscoring the urgent need to adjust educational standards and instructional methods to enhance quality and foster global competitiveness. In response to these challenges, the Department of Education has overhauled the K-12 curriculum through initiatives such as the MATATAG Curriculum to meet learners' needs better. However, private schools face difficulties adapting to these curricular changes and maintaining enrollment levels compared to public institutions. To avert widespread closures of private schools, these institutions must innovate and adapt, positioning themselves as preferred choices for parents and students.

To achieve the goal of quality education in public and private schools, teachers must possess the knowledge, skills, attitudes, and values they are expected to impart to students. However, effectively teaching today's diverse student population presents significant challenges (Department of Education, 2017). Several educational theories support the idea that effective teaching and learning rely on key elements such as structure, modeling, differentiation, and assessment. Skinner's operant conditioning emphasizes the importance of reinforcement, while Bandura's social learning theory highlights the power of modeling. Piaget's constructivism advocates differentiated activities to promote deeper learning. These approaches, combined with Sanders' competence theory, suggest that teacher effectiveness goes beyond knowledge and motivation, requiring the ability to make informed decisions in the classroom.

Additionally, there are recently published studies that examined the impact of classroom management, model-based learning approaches, differentiated instruction, and assessment on teaching styles, competencies, beliefs, and academic performance (Conriquez, 2020; Barni et al., 2021; Cunningham, 2022; Pearson et al., 2019; Grain et al., 2022; Kanya et al., 2021 and Roelofs & Sanders, 2007), but literature has yet to be published demonstrating how effectively combining different instructional strategies into one cohesive approach benefits both students and teachers (Dede, 2006). Furthermore, research on integrating structure, modeling, differentiation, and assessment into a single instructional framework is still lacking. This gap raises questions about its potential impact on the teaching-learning process, specifically regarding student satisfaction and knowledge retention, as well as teachers' pedagogical knowledge and teaching competence.

Thus, this pilot study on Structure, Modeling, Differentiation, and Assessment (SMDA) as an instructional approach was conducted in private diocesan schools. The aim was to provide a framework teachers can intentionally and consistently follow in their daily routines. Implementing the SMDA strategy involved temporarily halting the current instructional process, a step that might not have been viable in public schools. The study was conducted in private diocesan schools that are more adaptable and prepared to receive training in this new framework. This procedure is beneficial because it demonstrates the approach's effectiveness in a smaller setting while providing insights that may apply to larger contexts. The SMDA framework aims to improve instruction significantly, address the long-overdue issue of deteriorating educational quality, and offer a promising future for Filipino learners across the country.

2.0 Methodology

2.1 Research Design

The descriptive and correlational research designs using a one-group pretest-posttest were utilized to determine the effect of Structure, Modeling, Differentiation, and Assessment (SMDA) as an instructional approach to determining students' satisfaction and retention of knowledge and teachers' level of pedagogical knowledge and competence in the delivery of instruction in the classroom setting. In the study, the same group of students was given a pre-and post-implementation survey to determine their level of satisfaction and a pre-and post-test in Math, Science, and English to determine their knowledge retention before and after SMDA implementation, respectively. Similarly, the same group of teachers was given a pre-and post-implementation survey to determine their level of pedagogical knowledge and a pre-and post-implementation class observation by their principal before and after SMDA to determine their competence.

As descriptive research, it described the level of students' satisfaction and knowledge retention and teachers' pedagogical knowledge and competence in delivering instruction in the classroom setting. Moreover, the study delved into the significant differences that exist before and after the SMDA instructional approach implementation in the independent variables and dependent variables, including students' level of satisfaction and retention of knowledge, and teachers' level of pedagogical knowledge and competence. Also, the study determined the significant relationship between the student's level of satisfaction with knowledge retention and teachers' level of pedagogical knowledge to their competence in the delivery of instruction after SMDA implementation.

2.2 Research Locale

The study was conducted in the Marbel Diocesan Notre Dame Schools in Sto. Niño, Norala, New Iloilo, San Jose, Milbuk, Glan, Maasim, Kiamba, and Maitum, Philippines. These schools belong to one diocesan system, are led by the Bishop of Marbel, and are managed by the Superintendent of Schools. The schools, through their superintendent, positively accepted the researcher's proposal to train and use the SMDA instructional approach in their schools for the second quarter of the school year 2023-2024.

2.3 Research Participants

The study's respondents were forty-three (43) teachers and three hundred twenty-five (325) randomly selected students from the one thousand seven hundred twenty-eight (1,728) total number of Grade 7 to 10 students of the nine (9) identified Notre Dame schools under the Marbel Diocesan Schools in Region 12: ND Milbuk, ND San Jose, ND Glan, ND Norala, ND Maasim, ND Maitum, ND Kiamba, ND Sto. Niño and ND New Iloilo. The inclusion criteria for selecting the student-respondents include being currently enrolled in Grades 7 to 10 at one of the identified Notre Dame schools, being willing and available to participate in the study, and having the ability to provide valuable insights and perspectives related to the research objectives. The inclusion criteria for teachers include being currently employed as a teacher at one of the identified Notre Dame schools in Region 12, teaching English, Science, and Math to Grade 7 to 10 students at the school, willing and available to participate in the study and demonstrates a commitment to be trained and provide valuable insights and perspectives related to the research objectives. The students evaluated the extent of their satisfaction and knowledge retention before and after implementing the SMDA instructional approach. At the same time, the teachers assessed their pedagogical knowledge and competence before and after implementing the SMDA instructional approach.

2.4 Research Instrument

Four data sources were used in this study. The content of the researcher-developed instrument for evaluating students' satisfaction with teachers' teaching practices was validated using a five-panel validity test. Experts thoroughly reviewed and validated the research instrument's content to ensure it was applicable and accurately represented the intended construct for the specific goal. The findings of content validation showed that all item-level content validity indices (I-CVI) were acceptable, and the scale-level content validity index (S-CVI) was 1.00, indicating that all items were considered valid. A reliability test was also conducted to determine the research tool's consistency. The pilot test included thirty (30) non-respondents from the same student group. After the data were processed, an internal consistency analysis was conducted. Cronbach's Alpha was used to evaluate internal consistency. The study instrument had strong internal reliability, as indicated by the test findings, which showed that the questionnaire's Cronbach's Alpha was 0.863.

The second data source was taken from the second quarter's pretest (conducted before the SMDA implementation) and posttest (conducted after the SMDA implementation). The subject teachers created the tests, and the results in percentages for English, Science, and Math were converted to percentages and then transmuted following the Department of Education transmutation table and grading scale to determine students' knowledge retention levels.

The third data source was gathered using the DepEd's Results-Based Performance Management System (RPMS) Self-Assessment Tool for Teachers to determine their pedagogical knowledge before and after the SMDA implementation. The RPMS was a self-assessment tool that the teachers answered. They rated themselves as having a very high, high, moderate, and low level of implementation in terms of content knowledge and pedagogy, learning environment, diversity of learners, curriculum and planning, assessment reporting, community linkages and professional engagement, personal growth and professional development, and the plus factor for performing various work and activities.

The fourth and last data source was taken through classroom observation by the principal to determine teachers' level of competence in the delivery of instruction and the entire teaching-learning process. The class observation was conducted before and after implementing the SMDA instructional approach. The principals used the diocesan classroom observation tool during observation with the following verbal descriptors: 4 – very high, 3 – high, 2 – low, and 1 – very low.

2.5 Data Gathering Procedure

The following steps were undertaken to ensure the smooth conduct of the study. Initially, the proposal was discussed with the Marbel Diocesan Schools Superintendent and the Dean of the SKSU Graduate School. As part of the decision-making process of adopting the SMDA instructional approach implementation proposal, the Superintendent called for an initial meeting with the principals of the diocesan schools, with whom the researcher presented the proposal and answered clarification questions.

A follow-up meeting was conducted with principals and teachers for further clarification. When the diocesan schools' principals and teachers decided to embrace the approach, the researcher sought the approval of the Marbel Diocesan Schools Superintendent and the Dean of the Graduate School to proceed with the seminar workshop and the conduct of the study.

A two-day seminar workshop in June 2023 was undertaken to determine teachers' awareness of the instructional approaches and train them on how the SMDA instructional approach works in the classroom setting. Another series of seminar workshops was conducted in September and October 2023 to ensure that teachers fully understood the SMDA instructional approach and were ready to implement it in the classroom. Training and consultation before implementation at respective schools were done to ensure teachers' readiness for implementing the SMDA instructional approach.

The class adviser distributed and secured a consent form for parents' or guardians' signatures and an introductory letter containing the study's purpose and other important information before administering the survey questionnaire to the students. The school testing coordinator distributed a pre-implementation survey to student respondents before implementing the SMDA instructional approach in the second quarter. The unit pretest was prepared and conducted by their subject teachers. The same data-gathering process was followed at the end of the second quarter for students. All data needed were gathered by the school testing coordinator and submitted by the principals to the researcher through the Office of the Diocesan Schools Superintendent.

For teacher-respondents, the research instrument to determine teachers' pedagogical knowledge before the use of the SMDA instructional approach was distributed and retrieved during the seminar workshop by the researcher. The post-SMDA instructional approach survey was conducted and collected by the school testing coordinator at the respective schools. To determine the competence level of teachers of the instructional approaches before and after the SMDA implementation, their respective school principals conducted classroom observations. The teachers' data were gathered by the school testing coordinator and submitted by the principals to the researcher through the Office of the Diocesan Schools Superintendent.

Moreover, the respondents were assured that their answers would be kept entirely anonymous for ethical reasons and that the findings would be used only for research and professional development. After retrieving all data—pre- and post-implementation of SMDA instructional approach students' satisfaction surveys, pre- and posttests for the second quarter in English, Math, and Science of students; the RPMS Self-Assessment tool and the classroom observation results of teachers—the data collection, organization, and presentation using tables and figures followed. Data consolidation, statistical analysis, and interpretation were performed to find answers to the research problems.

2.6 Ethical Considerations

The respondents were assured that their answers would be kept entirely anonymous for ethical reasons and that the findings would be used only for research and professional development.

3.0 Results and Discussion

3.1 Students' Satisfaction of Structure, Modeling, Differentiation and Assessment (SMDA)

In terms of Structure

Table 1 shows the level of student satisfaction with structure before SMDA. Data reveals that students are highly satisfied with the various aspects of instructional approaches utilized by teachers that provide structure to the teaching-learning process (M=3.21, SD=0.68) before implementing the SMDA instructional approach. The structure provides students with clear procedures and expectations. It makes students confident and secure in their learning. Structure makes them engage, stay on task, and maximize learning time.

Table 1. Descriptive statistics of the students' satisfaction with the structure before SMDA

Indicators	Mean	SD	Description
1. Time allocation for teachers to teach and students to perform activities and work with classmates.	3.37	0.69	Very High
2. Clear classroom procedures and expectations at the school year's beginning.	3.32	0.58	Very High
3. Orientation and emphasis on what to learn at the beginning of each lesson.	3.32	0.65	Very High
4. Administration of pretests at the beginning of a new unit or topic to assess prior knowledge.	3.27	0.69	Very High
5. Posttests were administered at the end of the unit to check mastery and understanding.	3.26	0.64	Very High
6. Sequence of how the lessons are being presented.	3.25	0.68	Very High
7. Orientation and implementation of classroom procedures and expectations.	3.23	0.60	High
8. Lessons and activities completed at the end of the class period.	3.17	0.69	High
9. Appropriate and consistent consequences when procedures and expectations are not followed.	3.10	0.72	High
10. No learning time is wasted from misbehavior and other disruptions.	2.90	0.83	High
Mean	**3.21**	**0.68**	**High**

The findings align with previous research by Emmer et al. (2001), which suggests that clear classroom rules and structures foster a supportive, structured learning environment that boosts satisfaction and academic success. Another study by Yang et al. (2022) also confirms this result. When the teacher communicates clear expectations that structure the teaching-learning process, students experience greater self-confidence and competence satisfaction.

Furthermore, Table 2 shows that students are very satisfied with the SMDA instructional approach utilized by teachers, which provides structure to the teaching-learning process (M=3.38, SD=0.61) at post-SMDA implementation. This implies that the SMDA instructional approach provides students with explicit and consistent procedures and expectations that make students satisfied, engaged, and secure in their learning.

Table 2. Descriptive statistics of the students' satisfaction with the structure after the SMDA

Indicators	Mean	SD	Description
1. Clear classroom procedures and expectations at the school year's beginning.	3.52	0.53	Very High
2. Orientation and implementation of classroom procedures and expectations.	3.45	0.52	Very High
3. Time allocation for teachers to teach and students to perform activities and work with classmates.	3.44	0.56	Very High
4. Administration of pretests at the beginning of a new unit or topic to assess prior knowledge.	3.43	0.60	Very High
5. Posttests were administered at the end of the unit to check mastery and understanding.	3.43	0.56	Very High
6. Orientation and emphasis on what to learn at the beginning of each lesson.	3.39	0.59	Very High
7. Lessons and activities completed at the end of the class period.	3.38	0.63	Very High
8. Sequence of how the lessons are being presented.	3.34	0.65	Very High
9. Appropriate and consistent consequences when procedures and expectations are not followed.	3.23	0.71	High
10. No learning time is wasted from misbehavior and other disruptions.	3.15	0.75	High
Mean	**3.38**	**0.61**	**Very High**

This finding aligns with the research of Hyun et al. (2017), which found that active learning pedagogical activities significantly enhance students' satisfaction with their individual and group learning processes, regardless of the classroom setting. Their study further strengthens the conclusion that pedagogical practices promoting active learning positively impact students' satisfaction. The result of the study also supports the findings of Umbach and Wawrzynski (2005), who examined faculty practices, student engagement, and student perceptions and found that the more faculty interacted with the students, the more students were challenged and engaged in meaningful activities. With the SMDA instructional approach promoting structure, students have a high satisfaction level post-SMDA implementation, as shown in Table 2.

In terms of Modeling

Table 3 reveals that students were very satisfied with the different modeling aspects before the SMDA implementation (M = 3.33, SD = 0.65). This indicates that the modeling procedures, expectations, and teaching through examples and scaffolding have effectively met the students' needs and expectations. The high satisfaction level also implies that the students have positive perceptions and experiences with the modeling process, which can contribute to their satisfaction, engagement, and learning outcomes.

Table 3. Descriptive statistics of the students' satisfaction with modeling before SMDA

Indicators	Mean	SD	Description
1. Way of presenting the concepts to be learned in class.	3.44	0.58	Very High
2. Way of scaffolding (presents the lesson step by step) so they can understand them better.	3.42	0.65	Very High
3. Treatment of all students (with respect, fairness, and consistency, regardless of their background or behavior).	3.42	0.69	Very High
4. Clear, concise, easy-to-follow explanations.	3.39	0.62	Very High
5. Using relevant examples connecting with real life helped them understand the lesson better.	3.36	0.66	Very High
6. Model the concepts to be learned in class.	3.26	0.61	Very High
7. Immediate and positive feedback during the modeling of lessons.	3.25	0.67	Very High
8. Model the skills that need to be acquired.	3.21	0.71	High
9. Intentional questioning to determine their understanding and address misconceptions.	3.18	0.68	High
Mean	**3.33**	**0.65**	**Very High**

The finding parallels significant research (Gilmour et al., 2019) that highlights the positive effect of teachers' classroom management and teaching skills on academic performance and student-teacher relationships. This leads to satisfaction with classroom practices and teachers' pedagogical skills. Emphasizing explicit instruction, understandable demonstrations and teacher examples are critical for students to grasp concepts and achieve better learning outcomes (Darling-Hammond et al., 2017).

Table 4 shows that using the SMDA instructional approach indicates a high level of satisfaction across various modeling aspects (M = 3.47, SD = 0.58). This suggests that students found the SMDA instructional approach effective and engaging in enhancing their learning experience. Explicit modeling using the SMDA instructional approach can significantly affect the teaching-learning process. Explicit modeling involves demonstrating and explaining concepts, strategies, or processes to students. Modeling in the SMDA framework can improve satisfaction, retention, and application. The approach can have profound implications for improving learning outcomes and student experiences in the teaching-learning environment.

Table 4. Descriptive statistics of the students' satisfaction in modeling after the SMDA

Indicators	Mean	SD	Description
1. Way of scaffolding (presents the lesson step by step) so they can understand them better.	3.57	0.57	Very High
2. Way of presenting the concepts to be learned in class.	3.54	0.54	Very High
3. Treatment of all students (with respect, fairness, and consistency, regardless of their background or behavior).	3.52	0.66	Very High
4. Use of relevant examples connecting with real life helped them understand the lesson better.	3.47	0.57	Very High
5. Clear, concise, easy-to-follow explanations.	3.45	0.60	Very High
6. Model the concepts to be learned in class.	3.45	0.56	Very High
7. Intentional questioning to determine their understanding and address misconceptions.	3.42	0.58	Very High
8. Model the skills that need to be acquired.	3.39	0.56	Very High
9. Immediate and positive feedback during the modeling of lessons.	3.38	0.59	Very High
Mean	**3.47**	**0.58**	**Very High**

The study's results are like those of Alarcon et al. (2022), who concluded that students' satisfaction is due to teaching quality, attitude, and style. Learners are satisfied with modeling, teaching demonstration, and teaching quality. Similarly, the result supports the gradual release of responsibility in teaching where the teacher sets the lesson's goal and models thinking based on learning standards, thus improving performance and satisfaction (Pearson & Gallagher, 1983).

In terms of Differentiation

Table 5 shows that students were very satisfied with the different aspects of differentiation in the teaching-learning process before the SMDA implementation (M = 3.26, SD = 0.65). The result suggests that students were generally content with the varied approaches used in teaching and learning. The high mean score implies that students perceived differentiation positively, indicating that they found value in the diverse methods employed in the teaching process. The low standard deviation suggests a consistent level of satisfaction among the students, with minimal variability in their responses. Overall, these results highlight the effectiveness and acceptance of differentiation strategies in enhancing the teaching-learning experience before the SMDA implementation.

Table 5. Descriptive statistics of the students' satisfaction in differentiation before SMDA

Indicators	Mean	SD	Description
1. Activities that support their strengths and areas for improvement.	3.36	0.63	Very High
2. Different activities that help them learn more and improve their engagement in class.	3.36	0.61	Very High
3. Additional support and resources were given to help students who struggled to catch up with the class.	3.34	0.63	Very High
4. Group work that promotes cooperative learning among students with different abilities.	3.30	0.68	Very High
5. Different activities and assessments that help their retention and application of knowledge.	3.28	0.64	Very High
6. Different activities that help them connect with the topic and apply learning to daily life.	3.26	0.65	Very High
7. Different approaches that help them process and understand difficult lessons at first.	3.24	0.64	High
8. Intention to provide opportunities to students who can grasp the concepts faster.	3.19	0.65	High
9. Different activities to choose from based on their interests and needs.	3.17	0.71	High
10. Small group teaching and one-on-one teaching opportunities to address their individual needs.	3.13	0.68	High
Mean	**3.26**	**0.65**	**Very High**

The findings of the study support the idea of Tomlinson (2001) that differentiated instruction recognizes students' varied learning requirements, abilities, and interests. It involves personalizing teaching, content, and assessment for learning. Differentiation improves satisfaction, retention, and application by addressing students' readiness levels, learning preferences, and interests through tiered tasks, variable grouping, and teaching resources to meet individual learning needs. The result is also in line with the study of Westberg et al. (1993), which shows the positive impact of differentiated instruction on student engagement and learning outcomes.

Table 6 reveals that students are very satisfied with the different aspects of differentiation in the teaching-learning process after implementing the SMDA instructional approach (M = 3.43, SD = 0.61). The study's results suggest that the SMDA approach has effectively earned student satisfaction with differentiation in teaching-learning.

Table 6. Descriptive statistics of the students' satisfaction in differentiation after SMDA

Indicators	Mean	SD	Description
1. Additional support and resources were given to help students who struggled to catch up with the class.	3.53	0.59	Very High
2. Different activities that help them connect with the topic and apply learning to daily life.	3.46	0.60	Very High
3. Different approaches that help them process and understand difficult lessons at first.	3.45	0.60	Very High
4. Group work that promotes cooperative learning among students with different abilities.	3.45	0.63	Very High
5. Activities that support their strengths and areas for improvement.	3.45	0.56	Very High
6. Different activities and assessments that help their retention and application of knowledge.	3.42	0.58	Very High
7. Different activities to choose from based on their interests and needs.	3.41	0.60	Very High
8. Different activities that help them learn more and improve their engagement in class.	3.40	0.61	Very High
9. Intention to provide opportunities to students who can grasp the concepts faster.	3.34	0.63	Very High
10. Small group teaching and one-on-one teaching opportunities to address their individual needs.	3.34	0.68	Very High
Mean	**3.43**	**0.61**	**Very High**

This is consistent with research showing that differentiation can improve learning outcomes and student satisfaction. Differentiated education helps students connect with the topic, making learning more enjoyable and fruitful. As instructors use diversified strategies, student achievement, satisfaction, and learning outcomes improve (Gheyssens et al., 2023). Differentiated instruction increases students' interest and motivation, classroom productivity, and a sense of agency and self-worth. Teachers can use strategies like flexible grouping, tiered assignments, changing the learning environment, and implementing various instructional approaches to differentiate education in inclusive classrooms (Pasira, 2022).

In terms of Assessment

Table 7 reveal that students have a very high satisfaction level with the different aspects of assessment in the teaching-learning process before implementing the SMDA instructional approach (M = 3.26, SD = 0.66). The study's results showing high student satisfaction with assessment practices before the SMDA instructional approach implementation offer valuable insights for educators to reinforce effective teaching strategies, validate current assessment practices, focus on continuous improvement, prepare for instructional changes, and enhance student engagement in the teaching-learning process. These implications can guide educators in optimizing their teaching methods to create a more engaging and effective learning environment for students.

Table 7. Descriptive statistics of the students' satisfaction in assessment before SMDA

Indicators	Mean	SD	Description
1. Use various assessment forms (e.g., quizzes, tests, projects, activities, etc.) To assess their understanding of the subject matter.	3.36	0.66	Very High
2. Ways of providing feedback and practice when they struggle to understand the lesson.	3.34	0.66	Very High
3. Remediation and enrichment activities that help improve their assessment scores.	3.33	0.68	Very High
4. Way of providing an opportunity to reflect on their learning.	3.29	0.51	Very High
5. Additional support or intervention when they need it.	3.26	0.63	Very High
6. Use conferencing with them to talk about their goals and academic performance.	3.25	0.66	Very High
7. Timely feedback on assessments to help them improve their learning.	3.24	0.66	High
8. Way of adjusting lessons when their test scores are low.	3.20	0.66	High
9. Connecting to my parents/guardians about their strengths and weaknesses to support their academic growth.	3.17	0.74	High
10. Use of adjusted activities and assessments when their test scores are low.	3.14	0.74	High
Mean	**3.26**	**0.66**	**Very High**

The study's result is like that of the previous study of Hattie (2011), which defined assessment as an important factor for motivating instruction. Assessment practices provide feedback, inform instructional decisions, and significantly impact student achievement. Intentional assessment in the teaching and learning process helps improve educational outcomes. Additionally, the study of Brown (1989) explains the same process of using assessment in the teaching process in the pre-SMDA, which includes establishing clear learning expectations, evaluating students' performance against these expectations, and utilizing the results to adjust and drive instruction that resulted to a very high level of satisfaction to students.

Table 8 reveals that students are very satisfied with the different aspects of assessment in the teaching-learning process after implementing the SMDA instructional approach (M = 3.43, SD = 0.60). This indicates that students are highly satisfied with how teachers use different assessments, interventions, and connections to improve the teaching-learning process while implementing the SMDA instructional approach.

Table 8. Descriptive statistics of the students' satisfaction in assessment after the SMDA

Indicators	Mean	SD	Description
1. Use of various assessment forms (e.g., quizzes, tests, projects, activities, etc.) To assess their understanding of the subject matter.	3.52	0.58	Very High
2. Timely feedback on assessments to help them improve their learning.	3.46	0.56	Very High
3. Remediation and enrichment activities that help improve their assessment scores.	3.46	0.56	Very High
4. Way teachers provide feedback and practice when they struggle to understand the lesson.	3.44	0.57	Very High
5. Way teachers provide an opportunity to reflect on their learning.	3.43	0.59	Very High
6. Use of adjusted activities and assessments when their test scores are low.	3.43	0.61	Very High
7. The way teachers connect to their parents/guardians about their strengths and weaknesses to support their academic growth.	3.41	0.65	Very High
8. Use of conferencing with them to talk about their goals and academic performance.	3.41	0.63	Very High
9. Additional support or intervention when they need it.	3.39	0.58	Very High
10. Way teachers adjust lessons when their test scores are low.	3.35	0.66	Very High
Mean	**3.43**	**0.60**	Very High

The result is supported by the study of Khon (2000), which emphasized the importance of a more holistic and authentic approach to assessment, focusing on student development and understanding rather than just test scores. The SMDA instructional approach works the same way: it helps students grow and feel successful. Further, a previous study acknowledges the value of assessment but is cautious against misusing assessment data to guide instruction. He contends that a moderate focus on assessment can result in teaching to the test and a diminished emphasis on essential learning objectives. The study suggests that despite the value of assessment, educators should guarantee a balanced approach to avoid unintended adverse outcomes (Popham, 2011). The study's findings hold the same idea as those of SMDA, which ensures teachers will be careful not to teach to the test.

3.2 Students' Knowledge Retention

Table 9 reveals that students' knowledge retention in English, Science, and Math before implementing the SMDA instructional approach did not meet expectations (M = 69.61, SD = 4.22). The standard deviations suggest a significant variability in individual performance within each subject. Since concepts for the second quarter are new to students, these pre-test results for the teaching-learning process will help teachers plan accordingly and identify and address specific knowledge gaps in English, Science, and Math. Teachers can use this data to customize their teaching strategies to target areas where students struggle most. Understanding the variability in student performance can help implement differentiated instruction to cater to individual learning needs. Regular formative assessments can be used to monitor progress and adjust teaching methods accordingly.

Table 9. Descriptive statistics of students' knowledge retention before the SMDA

Subjects	Mean Rating	SD	Qualitative Description
English	70.65	4.76	Did Not Meet Expectations
Science	69.21	4.37	Did Not Meet Expectations
Math	68.98	3.54	Did Not Meet Expectations
Mean	**69.61**	**4.22**	**Did Not Meet Expectations**

Several studies have shown the transformative power of active learning. It enables students to construct deeper understandings and make meaningful connections, essential for long-term knowledge retention and application (Prince, 2004). Moreover, meaningful learning experiences, in which students can relate new knowledge to their prior experiences and real-world contexts, substantially impact retention and application. When students find value in their learning, they are more likely to retain and effectively implement the information in various contexts (Novak & Gowin, 1984). Thus, it will be essential to utilize research-based strategies to help students improve their knowledge retention.

Table 10 indicates that the student's performance in all three subjects is fairly satisfactory. At the same time, the standard deviation for English and Science is lower, suggesting a more consistent level of performance (M = 77.27, SD = 19.58). The result indicates that the SMDA approach has successfully gained students' understanding and application of English, Science, and Math concepts. The approach's emphasis on active learning, critical thinking, and problem-solving has enabled students to understand the subjects. The findings suggest that the SMDA instructional approach is a promising strategy for improving students' learning outcomes in English, Science, and Math.

Table 10. Descriptive statistics of students' knowledge retention after the SMDA

Subjects	Mean Rating	SD	Qualitative Description
English	78.15	9.23	Fairly Satisfactory
Science	76.53	8.44	Fairly Satisfactory
Math	77.13	41.07	Fairly Satisfactory
Mean	**77.27**	**19.58**	**Fairly Satisfactory**

Several studies and frameworks suggest the potential benefits of the approach's key components. For instance, the I do, we do, you do model of instruction, central to the SMDA approach, effectively teaches complex skills (Cleaver et al., 2021). The model emphasizes the importance of introducing skills through lectures and discussions, demonstrating the skills, and then allowing learners to practice and perform the skills independently with feedback from a coach (Pearson & Gallagher, 1983; Duke & Pearson, 2008). Similarly, using varied instructional strategies, such as those employed in the SMDA approach, effectively promotes learning and retention.

3.3 Teachers' Pedagogical Knowledge

Table 11 shows that teachers have highly implemented the different domains of pedagogical knowledge in the teaching-learning process (M = 2.69, SD = 0.54), which is described as high implementation, except for the aspect of Assessment and Reporting (M = 2.40, SD = 0.51), which is described as moderate implementation. This indicates that teachers recognize that their assessment and reporting domain implementation was not as well implemented as the other domains before implementing the SMDA instructional approach.

The results support the study of Abrams et al. (2016), which states that teachers align instruction and assessments with the state curriculum to improve student performance. Teachers employ informal daily evaluations, which are essential to shaping instruction. They also use periodic formal assessments to monitor student progress and remediation efforts. The study of Darling-Hammond et al. (2017) also supports this idea. Teachers' awareness of various teaching strategies and approaches is crucial for engaging and effective learning environments. The research shows that providing teachers with opportunities for professional development and training in different teaching strategies positively affects student engagement and teacher competence. The high implementation of instructional approaches in the pre-SMDA results from the vast opportunities for professional development undergone by teachers.

Table 11. Descriptive statistics of teachers' pedagogical knowledge before the SMDA

Domains	Mean Rating	SD	Qualitative Description
1. Content Knowledge and Pedagogy	2.75	0.45	High
2. Learning Environment	2.89	0.52	High
3. Assessment and Reporting	2.40	0.51	Moderate
4. Community Linkages and Professional Engagement and Personal Growth and Professional Development	2.78	0.46	High
5. Plus Factor (performed various work/activities that contribute to the teaching-learning process)	2.65	0.78	High
Mean	**2.69**	**0.54**	**High**

Table 12 shows a very high pedagogical knowledge in implementing the different domains in the teaching-learning process (M = 3.25, SD = 0.48. This indicates that teachers have a high level of implementation of the different domains using the SMDA instructional approach.

Table 12. Descriptive statistics of teachers' pedagogical knowledge after the SMDA

Domains	Mean Rating	SD	Qualitative Description
1. Content Knowledge and Pedagogy	3.28	0.41	Very High
2. Learning Environment	3.34	0.47	Very High
3. Assessment and Reporting	3.07	0.50	High
4. Community Linkages and Professional Engagement and Personal Growth and Professional Development	3.24	0.45	High
5. Plus Factor (performed various work/activities that contribute to the teaching-learning process)	3.34	0.57	Very High
Mean	**3.25**	**0.48**	**Very High**

The result of this study can add to the research-based information that utilizing the SMDA instructional approach addresses all the domains of the teaching-learning process. The emphasis on structure, modeling, differentiation, and assessment in the teaching-learning process has resulted in high and very high implementation of the various domains required in the DepEd's RPMS for Teachers. The study's findings supported the idea of Hanushek and Rivkin (2006), which describes teachers who are equipped with a higher level of education and have access to relevant training as better prepared with the pedagogical knowledge and instructional strategies necessary to deliver practical lessons. This, in turn, enhances their teaching skills and fosters a sense of professional growth and value. Teachers feel competent when they master and present the subject meaningfully to engage students and facilitate learning (Shulman, 1987).

3.4 Teachers' Competence

Table 13 shows that teachers are highly competent in the delivery of instruction, as observed by their school principal in a class observation conducted before the implementation of the SMDA instructional approach. This implies that teachers highly implemented the necessary components under Teachers Actions and Student Learning Actions, with an overall mean of 3.07 and a standard deviation of 0.52.

Table 13. Descriptive statistics of teachers' competence before the SMDA

Domains	Mean Rating	SD	Qualitative Description
Teacher Actions	3.13	0.56	High
Student Learning Actions	3.01	0.49	High
Overall Mean	**3.07**	**0.52**	**High**

The results indicate that teacher and student learning actions have high means and low standard deviations, suggesting a high level of consistency in using practical instructional approaches. The mean of 3.13 for teacher actions indicates that teachers consistently implement competent teaching practices. In addition, the mean of 3.01 for student learning actions suggests that students are actively engaged in the learning process. The high mean for teacher actions implies that teachers are effectively using different instructional approaches to meet the needs of their students. The high mean for student learning actions suggests that students are actively engaged in learning and taking responsibility for their learning. The high level of student engagement is likely a result of the teachers' effective teaching practices.

The findings support the study of Hanushek and Rivkin (2006), which states that teachers with a higher level of education and access to relevant training are better endowed with the pedagogical knowledge and instructional strategies required to deliver practical lessons, resulting in greater competence in their teaching. In addition, teachers who cultivate supportive and trusting relationships with their students are more likely to feel adequate in their duties and motivated to continue enhancing their teaching techniques (Roorda et al., 2011).

Table 14 shows a very high level of competence among teachers in the teaching-learning process after the implementation of the SMDA instructional approach. The result further implies that the combination of structure, modeling, differentiation, and assessment in the SMDA instructional approach helps teachers deliver instructions with a very high level of competence. The implementation of SMDA has provided a structure that supports teachers in planning and delivering lessons, which has increased teacher competence. The modeling component of SMDA has enabled teachers to demonstrate and model student skills, which has helped increase student competence. The differentiation component of SMDA helped teachers meet individual student's needs, which has increased student engagement and learning. The assessment component of SMDA has provided teachers with the tools to assess student learning and adjust their teaching accordingly. This study's results demonstrate the SMDA approach's positive impact on teachers' competence and students' engagement in the teaching-learning process. Implementing SMDA can lead to improved teaching practices and increased student learning outcomes.

Table 14. Descriptive statistics of teachers' competence after the SMDA

Domains	Mean Rating	SD	Qualitative Description
Teacher Actions	3.41	0.46	Very High
Student Learning Actions	3.35	0.44	Very High
Overall	**3.38**	**0.45**	**Very High**

The study's findings support several previous studies. Teachers' pedagogical content knowledge, which entails understanding how to teach specific subject matter effectively, is a crucial predictor of competence. Teachers feel competent when they master and present the subject meaningfully to engage students and facilitate learning (Shulman, 1987). In addition, effective classroom management is correlated with teachers' competence in dealing with various student behaviors and preserving a positive learning environment. Strong classroom management skills enable teachers to create a safe and organized environment conducive to learning, resulting in greater confidence in their classroom leadership (Marzano et al., 2009).

3.5 Comparative Analysis of Students' Satisfaction Before and After SMDA Implementation

Table 15 unequivocally demonstrates a significant improvement in student satisfaction with structure, modeling, differentiation, and assessment, with a pre-mean of 3.26 and a post-mean of 3.43, a significant difference of -6.554, and a p-value of 0.000. The analysis reveals a significant difference between the level of student satisfaction before and after the SMDA implementation—the alternative hypothesis is accepted. These compelling findings confirm the effectiveness of SMDA implementation and instill optimism about the potential of these measures to influence student success and outcomes positively.

Table 15. T-test result of the comparative analysis of students' satisfaction before and after SMDA implementation

Measures		Mean	SD	df	t-stat	p-value
Structure	Pre	3.21	0.68	324	-6.111	0.000
	Post	3.38	0.61			
Modeling	Pre	3.33	0.65	324	-5.308	0.000
	Post	3.47	0.58			
Differentiation	Pre	3.26	0.65	324	-5.779	0.000
	Post	3.43	0.61			
Assessment	Pre	3.26	0.66	324	-6.117	0.000
	Post	3.43	0.60			
Overall	**Pre**	**3.26**	**0.66**	**324**	**-6.554**	**0.000**
	Post	**3.43**	**0.60**			

Note: $p<0.05$, significant

The study's findings conform with several studies that explain how structure, differentiation, modeling, and assessment, when implemented in class, can improve students' satisfaction levels. Integrating practical examples, hands-on experiences, and real-world problem-solving activities into the curriculum can increase student engagement and impart a sense of purpose (Harackiewicz & Hulleman, 2010). Positive learning experiences of mastery and success are potent motivators and sources of student satisfaction. Teachers can encourage better experiences by establishing attainable objectives, providing constructive feedback, and celebrating students' progress and achievements (Bandura, 1997). Teachers' intrinsic interest and curiosity also influence students' motivation and satisfaction with a subject. When students' natural curiosity and desire to investigate are stimulated by learning activities, they become more engaged and eager to learn (Renninger & Hidi, 2016).

3.6 Comparative Analysis of Students' Knowledge Retention Before and After SMDA Implementation

Table 16 shows the mean and standard deviation of students' transmuted English, Science, and Math scores before and after an SMDA implementation used to determine students' knowledge retention. The overall knowledge retention measure shows a significant improvement, with a pre-implementation mean of 69.91 and a post-implementation mean of 77.27, representing a difference of 7.36 points. The standard deviation for the pre-implementation scores is 4.22, while the post-implementation scores are 19.58. The t-statistic for the overall knowledge retention measure is -14.655, with a p-value of 0.000, indicating that the improvement in overall knowledge retention is statistically significant. Thus, the alternative hypothesis is accepted.

Table 16. T-test result of the comparative analysis of students' knowledge retention before and after SMDA implementation

Measures		Mean	SD	df	t-stat	p-value
English	Pre	70.65	4.76	324	-12.906	0.000
	Post	78.15	9.23			
Science	Pre	69.21	4.37	324	-14.159	0.000
	Post	76.53	8.44			
Math	Pre	68.98	3.54	324	-12.291	0.000
	Post	77.13	41.07			
Overall	**Pre**	**69.91**	**4.22**	**324**	**-14.655**	**0.000**
	Post	**77.27**	**19.58**			

Note: $p<0.05$, significant

The results suggest that the novel instructional approach has successfully improved students' knowledge retention across all three subject areas. This is an important finding, as knowledge retention is critical to students' academic success. Further research could explore the specific components of the novel instructional approach that are most effective in promoting knowledge retention and the potential for adapting this approach for use in other subject areas or educational contexts. The result of the study is consistent with Mansilla (2010), which emphasizes providing students with feedback that guides them toward a better comprehension of the material and encourages them to reflect on their learning experiences, improve retention, and promote efficient application. Integrating multiple disciplines and subject areas enables students to recognize the interconnectedness of knowledge, resulting in improved retention and application. Interdisciplinary learning experiences foster a holistic understanding that allows students to apply their knowledge to complex, real-world situations more effectively. Such mechanisms are components of the SMDA instructional approach that contribute to increased knowledge retention of students.

Furthermore, the study's results align with existing research, indicating that incorporating active learning strategies, such as discussions, problem-solving activities, and hands-on experiences, enhances knowledge retention and application. This approach improves academic performance and provides students with a more engaging and rewarding learning experience (Prince, 2004). The SMDA instructional approach, with its focus on differentiated instructions and active learning, can significantly enhance students' academic performance and test scores (Rizalda & Prado, 2022), as demonstrated by the results of this study.

3.7 Comparative Analysis of Teachers' Pedagogical Knowledge Before and After SMDA Implementation

As shown in Table 17, the overall implementation of the instructional approaches domain saw a significant improvement, with the mean score increasing from 2.69 to 3.25. This resulted in a t-stat of -7.279 and a p-value of 0.000, indicating a highly significant improvement. Thus, the alternative hypothesis is accepted. The results indicate a significant improvement in all domains after the implementation of SMDA.

Table 17. T-test result of the comparative analysis of teachers' pedagogical knowledge before and after SMDA implementation

Domains	Before	After	t-stat	p-value
Content Pedagogy	2.75	3.28	-6.696	0.000
Learning Environment	2.89	3.34	-4.314	0.000
Assessment and Reporting	2.4	3.07	-7.415	0.000
Community Linkages and Professional Engagement and Personal Growth and Professional Development	2.78	3.24	-5.053	0.000
Plus Factor	2.65	3.34	-3.665	0.000
Overall	**2.69**	**3.25**	**-7.279**	**0.000**

Note: $p<0.05$, significant

The study's results corroborate the study of Bransford (2000), which explains how adopting student-centered approaches like inquiry-based and project-based learning increases student engagement, teacher confidence, and competence. In implementing SMDA, students are engaged in different activities, which increases their engagement and teachers' competence. Brookfield (1995) added that teachers shift from a predominantly lecture-based to a student-centered approach, students become more actively engaged, and teachers feel empowered as facilitators of learning. Teachers who engage in reflective teaching practices, such as self-evaluation and requesting feedback, are more likely to be aware of their instructional strengths and areas for improvement. This self-awareness contributes to a teacher's increased competence and confidence as they refine their instructional strategies to engage their students better. The current study provides research-based evidence that the SMDA instructional approach helps teachers improve their results-based performance.

3.8 Comparative Analysis of Teachers' Competence Before and After SMDA Implementation

As shown in Table 18, the data comparing teachers' competence before and after the implementation of the SMDA reveals significant improvements across various domains. The t-statistics for Teacher Actions (-4.709), Student Learning Actions (-6.401), and Overall Level of Teachers' Competence (-6.739) all demonstrate statistically significant improvements with p-values of 0.000. Thus, the alternative hypothesis is accepted. Before the implementation of the SMDA, the mean scores for Teacher Actions, Student Learning Actions, and the Overall Level of Teachers' Competence were 3.13, 3.01, and 3.07, respectively. During the post-implementation, these scores increased to 3.41, 3.35, and 3.38, indicating a notable enhancement in teacher performance and effectiveness.

Table 18. T-test result of the comparative analysis of teachers' competence before and after SMDA implementation

Domains	Before	After	t-stat	p-value
Teacher Actions	3.13	3.41	-4.709	0.000
Student Learning Actions	3.01	3.35	-6.401	0.000
Overall	**3.07**	**3.38**	**-6.739**	**0.000**

Note: $p<0.05$, significant

These results suggest that the SMDA has positively impacted teachers' competencies, particularly in their instructional practices and student interactions. The findings underscore the effectiveness of student-centered approaches in enhancing overall teaching quality and fostering a more engaging and effective learning environment. Various studies support the implementation of the SMDA and highlight the significance of positive teacher-student relationships and teachers' competence. Roorda et al.'s (2011) research revealed that supportive and trusting relationships between teachers and students significantly influence teachers' competence. Teachers who cultivate such relationships are more likely to feel adequate in their duties and motivated to enhance their teaching techniques.

Furthermore, Guskey (2002) found that teachers who reflect on their teaching methods, solicit feedback, and adjust based on student requirements are more likely to feel competent about meeting their students' learning objectives. This suggests that teachers who engage in reflective practice and are willing to modify their instructional strategies are likelier to be competent and effective in their roles. Therefore, the SMDA approach, which emphasizes student motivation and engagement in the differentiation process, will likely enhance teachers' competence and improve student learning outcomes.

3.9 Relationship Between Students' Satisfaction and Knowledge Retention

The study examines the relationship between students' satisfaction and knowledge retention in the instructional approaches utilized in the teaching-learning process. The correlation between students' satisfaction and knowledge retention is very low, with an R-value of 0.059 and a p-value of 0.291, greater than the typically used significance level of 0.05. In this case, the alternative hypothesis is rejected. It indicates that students' satisfaction has no significant relationship with their knowledge retention post-SMDA implementation.

Table 19. Correlation analysis between students' satisfaction and retention of knowledge

Domains		r	p-value
Students' Satisfaction Students' Knowledge Retention	Post-SMDA	0.059	0.291

Note: $p<0.05$, significant

These findings have implications for understanding the role of students' satisfaction in promoting knowledge retention in educational settings. While satisfaction may contribute to better knowledge retention, it may be less crucial to maintain it after the SMDA. Therefore, educators and administrators should consider other factors, such as teaching methods, course content, and assessment strategies, to enhance students' knowledge retention in the post-SMDA phase. Moreover, the study's results align with previous research on student satisfaction and how it is closely tied to students' emotional experiences within the educational environment (Schuhmacher & Markham, 2001).

Contemporary institutions understand the significance of monitoring student satisfaction, which is essential to the overall educational experience (Nair et al., 2010). Similarly, in online education, previous research highlights the importance of course structure, active learning, and the teacher's presence in fostering students' perceived satisfaction and learning (Gray & DiLoreto, 2016). Furthermore, students' satisfaction is heavily influenced by their connection to teachers and program quality, emphasizing the importance of these factors in the educational setting (Jedvaj & Skrbinjek, 2022).

3.10 Relationship Between Teachers' Pedagogical Knowledge and Teaching Competence

The data provided the relationship between teachers' pedagogical knowledge and their competence in post-SMDA settings. The correlation coefficient (r) is 0.262, indicating a moderately low positive relationship. Additionally, the p-value is 0.090, which is still greater than the significance level of 0.05. Thus, the alternative hypothesis is rejected, and further investigation is needed. It suggests that the observed relationship may not be statistically significant. Further investigation is needed to confirm these findings.

Table 20. Correlational analysis between teachers' pedagogical knowledge and competence

Domains		r	p-value
Teachers' Pedagogical Knowledge Teachers' Competence	Post-SMDA	0.262	0.090

Note: $p<0.05$, significant

The study's results support the study of McCarthy and Lambert (2015), which suggests that teachers' competence is influenced by the support they receive from school administrators and the school environment. Schools that value and invest in their teachers' professional development provide feedback and recognition and cultivate a collaborative culture to increase educators' competence in implementing instructional resources. Furthermore, teachers with solid efficacy beliefs are likelier to set ambitious objectives, persevere through obstacles, and maintain a positive outlook on their teaching abilities, thus improving competence (Tschannen-Moran & Hoy, 2001).

4.0 Conclusion

This study presented key findings on the SMDA instructional approach, demonstrating its effectiveness in enhancing student satisfaction, knowledge retention, and teachers' pedagogical knowledge and competence. The SMDA approach significantly improved the structure, modeling, differentiation, and assessment in the teaching-learning process, creating a conducive learning environment and empowering students to take ownership of their learning while creating a more intentional and supportive setting. Moreover, the SMDA approach positively impacted teachers' pedagogical knowledge, improving teaching and learning outcomes. The approach also significantly enhanced teachers' competence, particularly in instructional practices and student interactions. However, it revealed no significant relationship between students' satisfaction and knowledge retention, suggesting that SMDA as an instructional approach may seem structured and repetitive but still result in better retention.

Similarly, there was no significant relationship between teachers' pedagogical knowledge and competence. Teachers may explore different methods and approaches, but this may not necessarily determine their competence level. Therefore, similar study in a bigger private or public school is suggested to confirm these findings and explore the underlying factors contributing to these relationships. Nonetheless, the study's findings provide a promising solution to addressing the deteriorating quality of education in the Philippines through the continuous, intentional, and consistent implementation of the SMDA approach. The SMDA approach offers a student-centered approach that enhances overall teaching quality and fosters a more engaging and effective learning environment, ultimately leading to improved student success and outcomes.

5.0 Contributions of Authors

Author 1 played a pivotal role in the conduct of the study, overseeing all aspects from inception to completion. This included writing and editing the manuscript, performing thorough data analysis, and encoding the findings for clarity and accuracy. Author B contributed significantly by meticulously checking the technical details of the research. Their insightful suggestions and constructive comments were instrumental in enhancing the overall quality of the study, ensuring that the final manuscript met the highest standards of rigor and relevance. Their collaborative efforts have resulted in a comprehensive and well-rounded research output.

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7.0 Conflict of Interests

There is no conflict of interest.

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Embracing Humility: A Case Study on the Transition of Former School Leaders to Subordinate Roles

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Abstract. This study explores former school leaders' experiences and coping mechanisms transitioning to subordinate roles within educational settings. Using a qualitative case study design, data were collected through in-depth interviews with three purposively selected participants who previously held leadership positions and are now employed in subordinate roles within schools. Participants were licensed educators who met specific inclusion criteria, including prior leadership experience. Thematic analysis of the interview data revealed that these individuals faced emotional challenges, such as identity shifts and feelings of loss, but also demonstrated growth through humility and adaptability. Key coping mechanisms included building support networks, sharing knowledge, and managing time effectively. The findings emphasize the role of flexibility and resilience in navigating role transitions, highlighting their importance in promoting a collaborative and enriching educational environment.

Keywords: Coping mechanisms; Emotional challenges; Leadership transition; Resilience; School leaders.

1.0 Introduction

Shifting from a leadership role to a subordinate position represents a profound professional and personal transformation, often fraught with emotional, social, and identity-based challenges. Although much research has explored the ascent into leadership, less attention has been devoted to the experiences of individuals who step down from such positions and transition into subordinate roles. This gap in the literature is particularly significant for school leaders, as their experiences of redefining professional identity and renegotiating their contributions within their educational communities remain underexplored. Understanding this transition is crucial to ensuring smooth leadership shifts and enabling former leaders to maintain positive and impactful roles within their institutions.

Scholars have begun to acknowledge the complexity of this transition. For example, Maxwell and Riley (2016) observed that former school leaders at Mountain Valley High School in Canada encountered emotional and professional difficulties when adapting to subordinate positions. Similarly, Colbert et al. (2015) noted that school leaders at Bangkok Patana School in Thailand faced significant challenges when transitioning to subordinate roles due to the high expectations and authority associated with their leadership positions. Leaders in such settings are often seen as visionaries and key decision-makers, complicating their ability to step back into supporting roles. In

Bukidnon, Philippines, Amakyi (2017) identified similar struggles among former school leaders in adjusting to the follower role, emphasizing the importance of trust, collaboration, and perception management in ensuring successful transitions. The need to relinquish control while navigating new team dynamics highlights the complexities of moving from leadership to followership in diverse educational contexts.

Moreover, cultural and contextual factors significantly shape former school leaders' challenges. Cansoy and Parlar (2018) identified the disempowerment and frustration that former Turkish school principals experienced as they struggled with diminished authority and limited resources after transitioning from leadership roles. This loss of influence can make it difficult for them to adapt to the follower role, especially in environments where decision-making power is concentrated in leadership. In International Baccalaureate (IB) schools, Gibson (2024) emphasized the balancing act between local and global perspectives, further complicating former leaders' transition. These individuals, accustomed to fostering cultural competence and global mindedness, may find it particularly challenging to adapt to less authoritative roles while managing the conflicting demands of their school environments.

Gender also plays a significant role in shaping these transitions. Setlhodi and Ramatsui (2024) highlighted the resilience required by women leaders in challenging school environments, particularly in contexts lacking adequate structural support. For such leaders, stepping back from leadership positions might expose them to lacking the necessary resources and social support that enabled their success, making the transition to a follower role especially daunting. Similarly, Kuzmanic et al. (2024) illustrated the administrative tensions faced by school principals in Chile, where leaders must balance regulatory compliance, resource management, and stakeholder expectations. Transitioning to a follower role in such contexts could lead to difficulties reconciling their new responsibilities with their past experiences of high-stakes decision-making.

Emotional resilience and stress management are critical in navigating this transition. (Casimiro, 2019) found that the stress and burnout experienced by school leaders in Lebanon and Uganda underscored the need for coping strategies such as shared responsibilities and strong support systems. For former leaders, the emotional toll of stepping down from leadership may be alleviated by developing collaborative networks and engaging in sense-making and sense-giving processes. Olanrewaju and Omeghie (2024) noted that former leaders could effectively use these processes to align their actions with their schools' values and cultural orientation, thus easing their transition into subordinate roles.

As studied by Norman and Pahlawati (2024), the concept of adaptive control offers an intriguing metaphor for this transition. Just as adaptive control systems respond flexibly to changing conditions, former school leaders must adjust their behaviors and expectations to align with new organizational goals. By embracing adaptability and role clarity, as emphasized by Zettna et al. (2024), former leaders can mitigate feelings of disempowerment and frustration, ensuring that they contribute meaningfully in their new roles. Similarly, Eidson (2024) argued that building supportive networks and embracing mentorship opportunities can provide former leaders with the security and confidence necessary for a smoother transition, helping them regain their professional footing and resilience.

Despite the growing body of research on leadership transitions, there remains a lack of comprehensive studies that compare how school leaders navigate the shift to subordinate roles across various cultural and organizational contexts. The literature highlights numerous challenges, but there is a need for further investigation into how cultural differences, institutional frameworks, and leadership structures shape the effectiveness of these transitions. By examining best practices and strategies across diverse environments, future research can help identify ways to support former leaders in managing trust, collaboration, and shared leadership complexities.

This research seeks to address the gaps in the literature by exploring how school leaders transition from leadership to subordinate roles across different cultural and organizational contexts. Specifically, it examines the influence of cultural, institutional, and leadership structures on the challenges and opportunities former school leaders face in this transition. The findings of this study will provide valuable insights for educational institutions, policymakers, and practitioners, offering strategies for fostering smoother leadership transitions and supporting the ongoing contributions of former leaders to their schools.

2.0 Methodology

2.1 Research Design

This study adopted a qualitative research approach, specifically employing a case study design to explore the experiences of former school leaders transitioning to subordinate roles within educational settings. Qualitative research is well-suited for this inquiry as it facilitates an in-depth understanding of participants' lived experiences and captures the emotional, cognitive, and professional complexities encountered during such transitions (Creswell, 2013). A case study design was selected to allow for a detailed exploration of individual narratives and the multifaceted dynamics of their professional experiences (Gustafsson, 2024). This design enabled the researchers to probe into the nuanced motivations, adaptive strategies, and identity shifts experienced by former leaders, thereby contributing to a broader theoretical understanding of leadership transitions within education.

2.2 Research Participants

The study employed purposive sampling, targeting participants who could provide rich, information-dense insights into the phenomenon of interest (Wan, 2019). The inclusion criteria were as follows: (1) former school leaders who had transitioned to subordinate roles within the last year, (2) individuals who had held leadership positions for a minimum of five years, and (3) participants willing to engage in detailed reflection and discussion about their experiences. A sample of three participants was deemed appropriate for this case study, which is in line with Creswell (2007) recommendation for qualitative research involving in-depth, context-rich data. The small sample size was intentional to allow for a detailed exploration of each participant's experience, ensuring the generation of comprehensive qualitative data. Individual, semi-structured interviews were conducted with each participant to elicit detailed, descriptive accounts of their transition experiences.

2.3. Research Instruments

In this study, the researchers utilized an adapted online interview question. The researchers employed an open-ended interview guide in gathering the data which allowed the participants to express their experiences and perspectives in detailed. This method provided rich qualitative insights into the process of transitioning from leadership to subordinate roles and emphasized their personal reflections on humility and adaptation within educational settings.

2.4 Data Collection Procedure

Data collection commenced following the acquisition of informed consent from all participants. Semi-structured interviews, guided by an interview protocol, were conducted to facilitate focused yet flexible discussions (Creswell, 2013). This approach allowed for exploring key themes while enabling participants to introduce new insights organically. Interviews were audio-recorded with the participant's consent and transcribed verbatim to ensure accuracy and facilitate in-depth analysis. Follow-up interviews were conducted, where necessary, to clarify or expand upon emergent themes. This iterative process enhanced the richness of the data and allowed for a deeper exploration of participants' transition experiences. Data triangulation through multiple interviews supported the depth and validity of the findings of the study (Denzin & Lincoln, 2011).

2.5 Data Analysis

The transcribed interview data were analyzed using Colaizzi's Descriptive Phenomenological Method (King, 2015). This method involved a systematic, seven-step process, beginning with thoroughly reading the transcripts to gain familiarity with the content. Significant statements about participants' transition experiences were then identified and extracted. These statements were subsequently grouped into meaning clusters and further refined into common themes. The essence of each participant's experience was distilled into a rich, descriptive narrative that encapsulated their motivations, challenges, and adaptive strategies. The final phase of analysis involved synthesizing these narratives into a comprehensive understanding of the phenomenon, thereby offering theoretical insights into leadership identity transitions within educational contexts.

2.6 Ethical Considerations

Ethical principles were rigorously adhered to throughout the research process to ensure the protection and rights of participants. Before participation, all individuals were thoroughly informed about the study's purpose, their rights as participants, and the significance of their contributions in advancing knowledge on leadership transitions. Participation was entirely voluntary, and participants were made aware that they could withdraw from the study at any stage without penalty. Anonymity and confidentiality were guaranteed, with all personally identifiable information being anonymized in the data. Informed consent was obtained through a formal consent form outlining the study's objectives and participants' rights, including the right to withdraw. Furthermore, member checking enabled participants to review and verify their interview transcripts, ensuring that the data accurately represented their perspectives and experiences (Lincoln & Guba, 1985).

2.7 Rigor of the Study

To enhance the trustworthiness and rigor of the study, the researchers employed several strategies aligned with established qualitative research standards. Credibility was ensured through member checking, allowing participants to validate the researchers' interpretations of their experiences, thereby enhancing the accuracy and authenticity of the findings (Vella, 2024). Dependability was addressed by maintaining a detailed audit trail documenting all methodological decisions, including data collection and analysis procedures, ensuring transparency and replicability (Twycross & Shields, 2005). Confirmability was prioritized by minimizing researcher bias through reflective journaling and by engaging participants in iterative dialogues about their narratives, ensuring that the findings reflected the participants' lived experiences rather than the researchers' preconceptions (Soysal & Türkmen, 2024). This participant engagement process also enriched the analysis by incorporating multiple layers of meaning, deepening the study's interpretive insights.

2.8 Role of the Researchers

The researchers assumed the role of primary instruments for both data collection and analysis. To mitigate bias and maintain objectivity, the researchers disclosed the absence of any pre-existing relationships with the participants prior to conducting the interviews. This disclosure fostered trust and encouraged open, candid communication. During the interviews, the researchers adopted a non-directive, attentive listening approach, allowing participants to articulate their thoughts, feelings, and experiences without interruption. Reflexive practices, including maintaining reflective journals, were employed to continuously monitor and critically evaluate the researchers' positionality, thus minimizing potential influences on the data interpretation.

3.0 Results and Discussion

3.1 Experiences of Former School Leaders Adapting to Subordinate Roles

Leadership transitions were pivotal moments in the professional lives of individuals, particularly for those who experienced the shift from being leaders to followers. This case study explored the experiences of former school leaders as they navigated the complexities of adapting to subordinate roles after stepping down from leadership positions. The research delved into their challenges and adjustments and how their previous leadership experiences influenced their approach to their new roles. By examining these transitions, the study provided insights into the dynamics of role adaptation, identity reconstruction, and the broader implications for organizational culture and leadership development in educational settings.

Harnessing Identity Shifts

The first contribution to teachers' significant experiences is that leadership is often associated with authority, but effective leadership can also be harnessed within subordinate roles (Bundy et al., 2016). In organizational dynamics, particularly in educational settings, individuals transitioning from leadership positions to subordinate roles often bring valuable skills to influence the group positively. They can offer guidance, share insights, and support current leaders while remaining mindful of their new responsibilities (Chatzipanagiotou & Katsarou, 2023). This shift requires a deep understanding of leadership and followership, recognizing that the roles are complementary rather than opposing. Participants from in-depth interviews have shared their responses. They mentioned:

"… when we become followers, it feels like everything has flipped. It is hard, and sometimes there are, you know, misunderstandings. You might feel inferior because you used to be the one giving orders, but now it is the other way around, and you are the one following." – P1

"… shifting from the role of a leader to a follower would not be very easy because of some standards, but following the idea of being a follower, I still must humble myself, and the experiences are not easy; it means following time management. It is in the time management that I see some difficulties." – P2

"… when I was in the public school as a school head, I was a leader from public to private. In private, I am only an assistant, a lower position than before. So, during this time, I feel so hard. I struggle too much because the employees of the public and private have the same…or…different attitude." – P3

Former leaders in subordinate roles can understand the complexities of decision-making, strategic thinking, and team management from their past experiences. They can use these skills to contribute to a collaborative environment, where they can support the vision of the current leaders and work towards shared goals (Randles & Finnegan, 2021).

However, this process also involves a period of adjustment, as former leaders must learn to balance their prior authority with their new role, adapting to follow directions while offering valuable contributions without overstepping boundaries.

Struggle with Authority Compliance

Struggling with authority compliance often arises when individuals transition from leadership roles to follower positions, as they are used to giving orders rather than following them. This shift can create a sense of discomfort and even inferiority, as they now must take direction from others. Misunderstandings can happen when they try to adjust to their new role, especially when their previous habits of leading clash with the expectations of following. Learning to comply with authority becomes challenging, as it requires adapting to a new dynamic, letting go of control, and finding balance in their responsibilities (Tomascik et al., 2021). Participants from in-depth interviews have shared their responses. They stated:

"… since you become a leader, you will know it is difficult if your followers do not follow. That is why when I became a follower, of course, I made sure that I obeyed my leader so that I would not give them a headache; that is one of the advantages if you were once you are a leader: you know how to adjust, and you can adapt directly so you try to be your best not to hurt your leader or not to disobey them." – P1

"… the significant experiences I encountered were before; I did not mind my time as a leader; I could go anywhere I liked. So, this time, I must take some responsibilities as an instructor, and so I have to follow their schedules, but their schedules are not similar as mine, so that is one the biggest experiences that I had." – P2

"… that is the problem… In the public sector, you are there for good once you have a permanent position. Even if the situation is not too bad or the issue is not serious, in public service, you can get kicked out quickly if people start talking about you or gossiping. They will immediately look for reasons to get rid of you." – P3

The process of adjusting to a follower role is often accompanied by misunderstandings, particularly when former leaders unintentionally resist authority or struggle to align with the expectations set by current leaders. Their previous experiences might influence their behavior, making it difficult to fully embrace the follower position. The internal conflict between wanting to lead and needing to follow can result in miscommunication or friction, as they may unknowingly challenge the authority they are now meant to support (Fürstenberg et al., 2023).

Managing Expectations and Role Clarity

Managing expectations and role clarity is crucial when transitioning between positions, especially when moving from leadership to subordinate roles. In any organization, clearly defined roles help ensure smooth functioning and reduce misunderstandings. When someone steps into a new role, they need to clearly understand what is expected of them and how their responsibilities fit within the larger organizational framework. Without this clarity, confusion and frustration can arise, leading to difficulties in fulfilling their duties effectively (Howard & Dhillon, 2021). Participants from in-depth interviews have shared their responses. They mentioned:

"… the feeling of being inferior is there, especially because you used to be the one on top, with your colleagues following you. Now, you are following them, which is a big change. One of the challenges is adapting to this new role while ensuring you do your tasks properly. It cannot be easy if you disobey your superiors. It is also hard to adjust to the school's culture, so you need to be adaptable and think of new ways to handle things." –P1

"… another challenge is the accomplishment of the implementation of some plans. Before, everything was there, all I needed to is to make up the plans being implemented, but this time, I am the one to implement it, and it is more specific." – P2

With the responses of participants 1 and 2 as former leaders, managing expectations can be particularly challenging. They may still be urged to assert control or offer guidance based on their experiences. However, to succeed in their new position, they must learn to adapt to the expectations of their follower role, and this means understanding the boundaries of their authority and knowing when to step back and follow the directives of current leaders (Karam & Kitana, 2020). Clear communication about their new responsibilities is key to easing this transition and avoiding potential conflict.

Restructuring Time Management and Autonomy

Restructuring time management and autonomy is essential for individuals transitioning from leadership to subordinate roles. As leaders, they may have had more control over their schedules and decisions, managing their time based on personal priorities and broader organizational goals (Leithwood et al., 2020). However, once they move into subordinate roles, their autonomy decreases, and they must follow the schedules, deadlines, and instructions set by others. This shift can create challenges in managing time effectively, as they must now balance their tasks within someone else's leadership framework. Participants from in-depth interviews have shared their responses. They mentioned:

"… the hardest part is getting along with your bosses, and it is also tough to connect with your colleagues, especially when you quickly switch from being a leader to a follower. However, as teachers, we need to be very adaptable and flexible, which makes it a challenge." – P1

"… the most difficult was time management and adjustment because sometimes I did certain functions that are not supposed to be mine kasi I am already in the follower role." – P2

In these new dynamic responses of the participants, their context as individuals must learn to restructure their approach to time management. They need to adapt to a more reactive role, where they prioritize tasks assigned to them rather than setting the agenda themselves. This requires discipline and flexibility, as they may no longer have the same freedom to decide how and when to complete tasks. By developing better organizational skills and learning to follow timelines established by others, they can maintain productivity while adjusting to their new level of autonomy (Odumeru & Ogbonna, 2013). Moreover, successful time management in a follower role does not mean losing the ability to work independently. While autonomy may be reduced, individuals can still take initiative within the boundaries of their tasks, demonstrating reliability and efficiency. By restructuring their mindset, they can find ways to stay proactive, manage their time wisely, and contribute meaningfully to the organization, even in a less autonomous position. This approach helps them perform well and ensures smoother collaboration with the current leaders (Raza & Sikandar, 2018).

Emotional and Psychological Adjustments

Emotional and psychological adjustments are significant challenges for individuals transitioning from leadership to follower positions. The shift can evoke a range of feelings, including loss, frustration, and even anxiety. Former leaders may struggle with their new identity, as they must redefine their self-worth and purpose within the organization. This change can lead to feelings of inferiority and self-doubt as they grapple with their place in the team and how to contribute effectively (Osaysa, 2020). Individuals need to acknowledge these emotions as valid and seek support from colleagues or mentors during this transitional period. Participants from in-depth interviews have shared their responses. They mentioned:

"… sometimes, we might disagree with our leader, and there are rules that we think should be different. However, we are now followers, so we must follow what they say. This can be not easy, especially if you are not used to being a follower. However, as I mentioned, in different jobs, there will always be people who lead and those who follow. We also need to accept our role in this." – P1

… it seems very easy, but if you are doing it, it is not easy because you must weigh yourself and ask your boss for permission on the things to do. So, you need to follow within the goals and standards of the school." – P2

The responses of participants 1 and 2 navigate this emotional landscape; individuals must also focus on developing resilience and coping strategies. Self-reflection can help them understand their feelings and adjust their mindset to embrace their new role. Building a strong support network within the organization can provide the encouragement and guidance needed to adapt to the changes (Jacobs & Keegan, 2022). Open communication with peers and supervisors can also facilitate a smoother transition, allowing former leaders to express their concerns and receive constructive feedback. By actively working on their emotional well-being, they can mitigate anxiety and build a more positive outlook on their new responsibilities (Brown et al., 2021).

Furthermore, emotional and psychological adjustment is crucial for maintaining motivation and job satisfaction. By learning to accept their new role and embracing the opportunity to grow, individuals can find fulfillment in their work as followers. This transition period can lead to personal and professional development as they gain new skills and perspectives that enhance their contributions to the team. With time and effort, they can transform their initial challenges into valuable experiences, fostering a sense of belonging and purpose within the organization (Balasubramanian & Fernandes, 2022).

3.2 Coping Mechanisms of Former School Leaders Adapting to Subordinate Roles

Transitioning from a leadership position to a follower role presents a complex and challenging journey for educators. This process necessitates a substantial shift in mindset, emotional resilience, and a willingness to embrace humility. In today's educational landscape, adaptive leadership is particularly vital, as it equips educators to navigate the rapid technological advancements and dynamic social changes defining the millennial era (Sartini et al., 2024). Former school leaders must often lower their pride and let go of their previous status to effectively adapt to their new roles. Respondents expressed the importance of humility, indicating that it is crucial to acknowledge one's place in the hierarchy and to embrace a supportive role.

Being Humble

This involves recognizing and setting aside personal ego or superiority to foster humility and collaboration. This includes acknowledging the value and expertise of colleagues and understanding that leadership is not solely about authority but about contributing to a collective effort.

"I usually do my task without any murmuring or complaints if I can do it and usually accept the task as a follower, so I made set adjustments. The thing is, you need what do you call this, humility; if you are given a task, do not take it as a punishment or a burden, accept it and do your part professionally." -P1

"I think it is innate to us; our value system is very important, and that is the value of humility. Even though I became once a leader of DepEd, I bring the value of humility. It means being humble, knowing that somebody already knows better than you do; you must accept that. It helped me to become more productive because I saw all these instructions when I was a leader, but this time, I am the one who is doing the instructions." -P2

"we must lower down our pride. ngano man maghunahuna pa ta ug pataas nga under nata then ang atong purpose is to help. dili ta pa pride, walaon nato ang pride." -P3

Transitioning from leadership to subordinate roles in educational settings requires former school leaders to redefine their identities, which is crucial for mitigating feelings of inadequacy and fostering collaboration (Carrington et al., 2024). This process involves recognizing the influence of past roles and embracing new identities that prioritize collective growth over individual status. By doing so, these educators can contribute positively to school culture, enhancing the educational experience for colleagues and students alike (Sarong, 2024).

Moving on from a former position entail transitioning from previous leadership roles to embrace new identities as followers in educational settings. This journey requires individuals to reflect on past experiences, acknowledge their evolving roles, and adapt to new responsibilities.

"I have to accept my role so, for that, it would be very difficult since we always have this as our motivation, and we have to focus on our purpose, what would be our part so really for the good of our students and for the good of the institution that keeps me motivated and aside from that we should always put in mind that the work that we are having now is the dream of

others, so we need to be inspired to that as long as we are still here, we need to do our task, and we need to set goals, and we need to see to it our journey has focus." – P1

"My experience as a teacher before had helped me adapt and adjust to my new role. At this time, I realized that I needed to be at the bottom and meet other teachers where they were. I need to go down with their level." – P2

"During this time, I realized I needed to step down and meet other teachers where they were. I needed to lower myself to their level." – P3

Former school leaders transitioning to administrative roles often encounter significant challenges, including feelings of isolation from their peers and the necessity of establishing new professional relationships. These difficulties need self-reflection and personal growth as they adapt to new roles (Cassar et al., 2020). Similarly, transitioning from practitioner to scholar, particularly for former school leaders moving into academia, involves adjusting to unfamiliar organizational structures while redefining their professional identity. This process necessitates a thorough reflection on past experiences and the development of new skills and connections vital for success in an academic environment (Kaiser & Bailey, 2022).

Accepting New Roles and Responsibilities

This involves embracing the transition from leadership to follower positions within educational environments. This process requires educators to recognize their changed status and adapt to the dynamics of their new roles. By accepting these responsibilities, former leaders can cultivate a collaborative atmosphere that values input from all team members.

"for me, I usually do my task without any murmuring or any complaint as long as I can do it and usually accept the task as a follower, so I made set adjustments." – P1

"I always consider time management and flexibility as a form of personal adjustment para hindi mahirapan sa mga changes lalo na sa new job description na ibinigay." – P2

Educators can effectively navigate role changes by developing strategies that align with the evolving educational landscape. This includes adopting innovative pedagogical approaches and fostering a culture of collaboration and shared leadership within educational settings. Research indicates that teachers can successfully respond to environmental changes and role transformations throughout their career development (Garger et al., 2022). Understanding the dynamics of role transition through interdisciplinary theorizing can further support educators as they navigate these changes. This involves recognizing the complexity of the reorientation process and the steps associated with moving from leadership to followership (Geels, 2021).

Seeking support and building relationships with colleagues is vital for former leaders transitioning to subordinate roles. Establishing a network of support fosters an environment where collaboration thrives, allowing individuals to share knowledge and experiences.

Asking for Help

This refers to recognizing one's limitations and actively seeking assistance from colleagues or peers to navigate challenges. For former school leaders, this practice becomes essential as they transition away from leadership positions and embrace new responsibilities. Educators can share their experiences and insights by reaching out for support and fostering a collaborative environment that enhances personal and professional growth.

"we should not take it as our responsibility; we should also ask help from our colleagues, and if there is collaboration, our work will become light, and we need not pretend that we do not need help because it is a good way of making your work light and you will not be burden with if there are many tasks that have been given to you. If you have what we call the technique of asking collaboration from your colleagues, everything would be running smoothly, especially with your responsibilities." – P1

"It is important that you know somebody to ask, especially if they are also ahead of you because I had some colleagues ahead of me. So, I asked them, and they helped me align my way of acting, kasi hind mo maaalis yung position mo noon, but I need

to come up myself, and I said no because I realized na hindi na pala ako leader. It is my confidant or close person who reminded me of this role, and if I have some clarifications or questions, I ask them." – P2

"You have to be friends with them if possible, kailangan e friend nimo sila tanan kay they will also teach you how to do things, and mo volunteer na jud na sila mam, basta you are friendly, you are kind with them." – P3

Asking for help involves recognizing one's limitations and embracing vulnerability, which can be particularly challenging in cultures prioritizing self-reliance. Despite this difficulty, seeking assistance is a courageous act that can lead to substantial personal and professional growth (Hopp et al., 2024). In educational contexts, actively seeking help can facilitate sharing experiences and insights, fostering a collaborative environment that benefits all stakeholders. This culture of collaboration enhances not only individual development but also the overall effectiveness of the educational community (Zhang et al., 2022). Addressing and overcoming this stigma is crucial for cultivating a supportive culture where individuals feel comfortable seeking assistance (Lilley, 2023).

Building Friendships

This involves fostering genuine connections and rapport with colleagues in educational settings. For former school leaders transitioning to subordinate roles, cultivating these relationships is crucial for creating a supportive and collaborative environment. Educators can share insights, seek assistance, and enhance communication by engaging with peers personally, ultimately enriching the learning community.

"So, let us not be shy to ask, and let us not be proud; I noticed this because I have become a leader. Now there is already a big transition, so we need to accept that you need your colleagues and that they will help to do our work well." – P1

"It is important that you know somebody to ask, especially if they are also ahead of you because I had some colleagues ahead of me. So, I asked them, and they helped me in aligning my way of acting." – P2

"you have to be friends with them, if possible, kailangan e friend nimo sila tanan kay they will also teach you how to do things, and mo volunteer na jud na sila mam, basta you are friendly, you are kind with them." – P3

Former school leaders can effectively adopt coping strategies such as sharing leadership responsibilities and fostering a culture of trust to enhance collaboration and alleviate stress. These approaches have been successfully implemented in diverse cultural contexts, including Lebanon and Uganda, where school leaders have utilized them to manage burnout and improve work environments (Nehme, 2019). Building friendships plays a vital role in this process, as it involves cultivating genuine connections and rapport with colleagues within educational settings. For former school leaders transitioning to subordinate roles, nurturing these relationships is essential for creating a supportive and collaborative atmosphere (Bailey et al., 2023).

Sharing of Knowledge

This involves exchanging skills, insights, and experiences among colleagues, fostering professional growth and collaboration. For former school leaders transitioning to subordinate roles, this process is essential in helping others learn from their expertise while adapting to new responsibilities. By sharing their knowledge, former leaders contribute to a continuous improvement and teamwork culture within educational settings.

"My experience as a teacher before helped me adapt and adjust to my new role. I realized I needed to step down and meet other teachers where they were. By sharing my insights, I can support their growth as well." – P2

"It is important to build friendships with everyone. When you are kind and friendly to all, people will help you voluntarily. You learn a lot from these interactions, and it enhances the collaborative spirit." – P3

Former school leaders transitioning to subordinate roles can profoundly enrich educational settings by sharing their knowledge, skills, and experiences. This collaborative process promotes professional growth, fosters teamwork, and cultivates a culture of continuous improvement within the institution (Upadhyaya, 2024). By leveraging their expertise, former leaders not only facilitate the learning of their colleagues but also adapt to their new responsibilities more effectively. Their insights can inspire innovation and best practices, ultimately contributing to a more effective educational environment (Kasau et al., 2022).

Managing Time Effectively
It allows school leaders to balance the demands of teaching, new responsibilities, and personal commitments. Your study on former school leaders adapting to subordinate roles found that time management is crucial in ensuring a smooth transition.

"I always consider time management and flexibility as forms of personal adjustment so that I do not struggle with the changes, especially with the new job description that has been given to me." - P2

Adaptability and effective time management are closely connected, particularly when transitioning into new roles, such as moving from a leadership position to a follower role. Just as adaptability helps expatriate teachers navigate unfamiliar environments and maintain psychological well-being (Ocampo et al., 2022), managing time effectively allows individuals to cope better with changing responsibilities. By allocating time wisely, former school leaders can prioritize tasks, reduce stress, and prevent burnout, enhancing their overall job satisfaction and positive functioning (Davis et al., 2024).

Being Flexible
This refers to adapting to changing circumstances and new information in a dynamic environment. In educational settings, flexibility is crucial for leaders and teachers, as it allows them to respond effectively to unexpected challenges, diverse student needs, and evolving institutional demands. Embracing flexibility fosters resilience and encourages innovation, enabling educators to adjust their approaches, curricula, and strategies to enhance learning outcomes.

"For me, I usually do my task without any murmuring or any complaint as long as I can do it and usually accept the task as a follower, so I made set adjustments." – P1

"It has always been my passion in teaching to do better and train those new to the field. And I also need to be flexible and accept the changes." – P2

Flexibility in educational leadership is important for adapting to different environments, addressing diverse student needs, and fostering innovation. This adaptability enables leaders and educators to respond effectively to unexpected challenges and evolving institutional demands, ultimately enhancing learning outcomes. The following sections explore the importance of flexibility in educational leadership, strategies for fostering adaptability, and the challenges faced in implementing flexible leadership (Niemeyer-Rens et al., 2022).

Practicing Adaptability
This involves cultivating the ability to adjust one's thoughts, behaviors, and strategies in response to new challenges and environmental changes. This adaptability allows them to navigate their new identities, embrace different responsibilities, and contribute effectively within the school community.

"It is trying to have a harmonious relationship with your colleagues, especially with your leaders. It might be very difficult to adapt, but we need to be adaptive, and as a follower, we need to be set for the good of our institution." – P1

"I had support from my colleagues when I was in my leadership role. They did not give advice but said, "Wait until you experience it." So, the keywords here are adjustment, adaptability, and flexibility for the changes." – P2

Adaptability is the ability to adjust cognitive, behavioral, and emotional responses in the face of change and uncertainty. This concept is closely linked to psychological flexibility, which encompasses accepting negative thoughts and feelings while actively pursuing goal-oriented actions that align with one's values (Waldeck et al., 2020). The development of adaptability involves learning from experiences and interactions with the environment, and it can be assessed through various competencies, strategies, and priorities. Cultivating this adaptability is essential for achieving personal and professional goals, enabling individuals to navigate challenges effectively and maintain resilience in dynamic contexts (Nejad et al., 2021).

3.3 Lessons and Insights of Former School Leaders Adapting to Subordinate Roles

A lesson is a valuable insight and experience gained by former school leaders as they transition from leadership roles to follower positions. These lessons often involve humility, adaptability, and the importance of collaboration. Former leaders learn to navigate their new responsibilities by reflecting on past experiences, managing their time effectively, and embracing new roles. These lessons help them contribute meaningfully to their educational environment, fostering personal growth and supporting the institution's overall success.

Showing Humility

This refers to the ability of former school leaders to set aside their previous authority and embrace their new roles as followers within educational environments. This involves recognizing that leadership is now in the hands of others, accepting guidance, and being open to learning from colleagues.

"*It is important not to be proud of having been a leader. Instead, you must be humble enough to approach and work harmoniously with your colleagues.*" – P1
"*Nothing is impossible if you humble yourself. The knowledge and skills I had as a leader may not fully apply now, and by humbling myself, I have been able to build better relationships and continue contributing.*" – P2

When leaders practice humility in a cultural or professional context, they strengthen the bonds within their teams, promoting inclusivity and shared growth, both essential for personal and organizational success. These traits help former leaders transition smoothly into subordinate roles, making meaningful contributions while supporting an inclusive and cooperative work environment (Black et al., 2024).

Adapting to Change

This involves adjusting to new circumstances, roles, or environments, especially when transitioning from familiar leadership to subordinate roles. In educational settings, this adaptation requires individuals to embrace new responsibilities, modify their behavior, and adopt a flexible mindset.

"*I adapted by learning from younger colleagues, especially regarding technology. This openness to change allowed me to grow even in my new role as a follower.*" – P1

"*I needed to adjust to my new work schedule and job description. Certain skills from my leadership role no longer applied, and I had to shift my mindset to follow rather than lead.*" - P2

Adaptive leadership is essential for navigating the evolving demands of millennial students and integrating technology. Leaders must engage in continuous professional development and revise curricula to stay aligned with modern needs. Singh (2020) emphasizes that these strategies are critical for fostering a collaborative, inclusive school culture that supports educators and students. Through effective adaptation, former leaders can thrive in subordinate roles, contributing positively to their educational environments while promoting collective growth.

Maintaining Professionalism

This involves consistently upholding ethical standards, demonstrating respect, and exhibiting a commitment to excellence, even transitioning from leadership to subordinate roles. In educational settings, former leaders must continue to set a positive example for colleagues and students, honoring their responsibilities while supporting their new leaders.

"*Even though I am no longer a leader, I maintain a professional attitude. I always perform my duties diligently and never allow my work to embarrass my reputation.*" – P1

"*I follow the rules and job description closely, ensuring I fulfill my responsibilities without comparing myself to others. Professionalism is important, no matter what position you hold.*" – P2

Professionalism is deeply intertwined with integrity, which extends beyond mere legal compliance to encompass ethical and moral conduct. This connection is essential in building and maintaining public trust and confidence in any profession (Baciu, 2024). Integrity involves upholding political and institutional values in the public sector while ensuring legal and transparent practices in the private sector. It forms the foundation of ethical professional behavior and decision-making (Chen, 2024).

Insights refers to the deep understanding and realizations that former school leaders gain as they transition into subordinate roles within educational settings. These insights often revolve around humility, collaboration, and adaptability. These insights also help them navigate new challenges, manage time efficiently, and build stronger relationships, ultimately enhancing their professional growth and the success of the educational environment.

Embracing Lifelong Learning

It reflects a commitment to personal and professional growth, adapting to new challenges, and staying current with advancements in one's field. In educational settings, lifelong learning enables educators, especially those transitioning from leadership to subordinate roles, to remain relevant, improve their practices, and contribute meaningfully to their teams and institutions (Niyomves et al., 2024).

"I have realized that nothing is permanent in this world because you may be a leader at one time, but you cannot always stay the same. Whatever your future, sometimes they will not always materialize." - P1

"Now that I am working as an instructor, I realize that there were many loopholes that I did not recognize when I was once in a higher position. This experience also made me realize that we need to go down so that we ourselves could also experience their role." – P2

Lifelong learning is crucial in the context of educators transitioning from leadership to subordinate roles, as it fosters a growth mindset that encourages continuous knowledge and skill acquisition (Owusu-Agyeman, 2024). Embracing lifelong learning means recognizing the need to adapt to new challenges and remain current with educational advancements. This commitment enhances their professional capabilities and enables them to contribute more effectively to their teams and institutions (Eikeland et al., 2024).

Recognizing Diverse Perspectives

This practice is essential for fostering an inclusive atmosphere where everyone feels respected and heard. Acknowledging diverse perspectives enables collaboration and promotes empathy among colleagues, especially in educators transitioning from leadership to subordinate roles.

"You can still treat your colleagues as friends despite holding a higher position than them. You should not be proud of it because life is not constant; it is only temporary." - P1

"I communicate with them and tell them they can see it better at their level. I also realized that theories are far different from actual practice as a teacher." – P2

The professional image of a leader is pivotal in shaping perceptions and determining the effectiveness of an educational institution. Leaders who project a positive image through their expertise, strong leadership qualities, and strategic thinking can significantly impact the institution's development and its interactions with the community (Kovalchuk, 2023).

Embracing Change with Resilience

This helps school leaders develop the ability to adapt positively to new circumstances and challenges, particularly when transitioning from leadership roles to follower positions within educational settings. This resilience enables individuals to face uncertainties and obstacles with a constructive mindset, facilitating personal growth and professional development.

"You must adapt to the situation and avoid doing things that could destroy your image and profession. It would be best if you handled your profession professionally." – P1

"This transition has improved my professional growth and personal development because it made me realize that age does not matter. That nothing is too late for me to improve the educational system." – P2

Resilience is the ability to effectively cope with, absorb, recover from, and adapt to changes or stressors while ensuring desired outcomes. This involves enhancing anticipatory, absorptive, adaptive, and transformative capacities, which are crucial for educators navigating role transitions (Shackleton et al., 2024). In challenging contexts, such as during times of conflict, resilience empowers teachers to manage emotional stress and continue delivering high-quality education despite adversities. Developing resilience requires identifying factors that influence it and implementing effective models to strengthen it, which is essential for maintaining psychological well-being and fostering a positive learning environment (Hackey, 2023).

4.0 Conclusion

The experiences of former school leaders transitioning to subordinate roles reveal that their motivation and coping mechanisms are important to their successful adaptation. This study indicates that these individuals are driven by a desire to remain impactful within the educational system, even when their roles change. Their level of motivation significantly influences their ability to navigate the challenges associated with their new positions. While highly motivated former leaders are likely to engage deeply and adapt effectively, those who struggle with their identity may face difficulties in their transition.

Furthermore, the findings suggest that emotional satisfaction is needed when personal values are aligned with professional responsibilities. Former leaders who find joy in collaboration and mentorship may derive greater satisfaction from their roles than those focused solely on authority or recognition. The study emphasizes that the motivations behind these transitions are complex and multifaceted, shaped by different factors, including previous leadership experiences.

Future research may explore the longitudinal effects of such transitions on educational outcomes and the workplace. Exploring the experiences of a larger and more diverse sample of former leaders across various educational contexts could enrich the findings and allow for more comprehensive conclusions. Moreover, investigating the support structures and professional development opportunities available to former school leaders may inform strategies that enhance their transition experiences. By focusing on the significance of mentorship and peer support, educational institutions may foster a more collaborative and resilient environment for all teachers, ultimately benefiting the entire school community.

5.0 Contributions of Authors

Cedar Agua was responsible for the conceptualization and design of the study, as well as the collection and analysis of data. He took the lead in drafting the manuscript and provided final approval for the version to be published. Princes Joy G. Arambala and Meralou Idulsa contributed significantly by conducting a thorough literature review and assisting in the data analysis and interpretation. They also played a role in critically revising the manuscript and approving the final draft. Dr. Edroslyn J. Fernandez focused on the methodology design and supervised the research process. She also reviewed and edited the manuscript, ensured its quality, and gave the final approval for publication.

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7.0 Conflict of Interests

There is no conflict of interest in this research

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Effectiveness of Laboratory Worksheet with Problem-Based Learning Approach for Enriching the Least-Learned Competencies in Life Science

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Abstract. The study aimed to address gaps in life science literacy by developing a laboratory worksheet tailored to the least learned competencies of students. A quasi-experimental design with a non-equivalent group approach was used, involving 21 students as the experimental group and 11 as the control group. A standardized test was initially administered to identify the students' least learned competencies, followed by creating a pretest and post-test questionnaire validated by experts. The laboratory worksheet was then developed based on these identified competencies and administered to the experimental group. Results indicated that the worksheet was highly effective, with the experimental group's proficiency level increasing from 30.00 to 69.68, more than double the initial score. Statistical analysis revealed a significant difference between the scores of the control and experimental groups, confirming the laboratory worksheet's efficacy in improving student proficiency in life science. The findings imply that targeted instructional materials, such as the developed worksheet, can significantly enhance learning outcomes, suggesting their broader application in educational settings to address specific competency gaps.

Keywords: Life science; Laboratory worksheet; Quasi-experimental design; Competencies, Proficiency level.

1.0 Introduction

Inclusive education ensures that no student is left behind and is a central objective of the K-12 primary education curriculum established by the Department of Education in the Philippines (De Jesus, 2019). Central to this objective is the idea that all learners should progress at their own pace, facilitated by diverse learning activities. Biology education shapes societal literacy by fostering an understanding of scientific concepts, ideas, and principles essential for informed citizenship (Delos Santos et al., 2021). However, delivering effective science education presents ongoing challenges, especially in equipping students with the core competencies necessary for global competitiveness and scientific literacy (Delos Santos et al., 2021).

In the context of the Philippine educational system, significant barriers hinder the effective teaching of science, particularly in public schools. These barriers include a shortage of science laboratories, insufficient laboratory materials, inadequate teacher training, and a lack of preparedness to ensure safety during laboratory experiments (Borja et al., 2020). These issues are exacerbated by the country's low performance in international assessments. For instance, the Programme for International Student Assessment (PISA) highlights a significant learning gap, with Filipino students scoring below the global average in science and mathematics, reflecting nearly a full academic year's deficit in learning (Azevedo et al., 2021; Kaffenberger et al., 2021). Furthermore, the Trends in

International Mathematics and Science Study (TIMSS) data reveal that many students fail to meet the minimum achievement benchmarks in these subjects, underscoring the urgent need for educational reforms (DiRanna et al., 2008). The challenges science education faces in the Philippines have been further compounded by the COVID-19 pandemic. During the 2020-2021 school year, there was a marked decline in support for science education, with only 60% of the usual supplemental instructional materials being provided (Holquist et al., 2020; Morrar, 2020). Many students, especially those in underprivileged areas, lacked access to essential resources such as reliable internet, technology, and instructional materials, which are critical for effective science learning (DiRanna et al., 2008).

In addition to these logistical challenges, the content and delivery of science education face significant issues. Appropriate textbooks and classroom resources are limited, and science teachers need better preparation and training. Moreover, there is resistance, often rooted in political and religious beliefs, to teaching certain scientific concepts, which further hampers the development of scientific literacy (Anderman et al., 2018). Specific topics within the biology curriculum, such as Mendelian genetics, the nervous system, and cellular processes like mitosis and meiosis, have been identified as particularly challenging for students (Delos Santos et al., 2021; Etobro & Fabiru, 2017). This is reflected in the consistently low scores in science on the National Achievement Tests (NAT), indicating a critical need for improved facilities, equipment, and teaching strategies (Bajana, 2019).

The K-12 curriculum in the Philippines is designed to present science concepts and skills in a spiral progression, where topics such as Life Science, Physics, Chemistry, and Earth Science are introduced at progressively higher levels of complexity (De Jesus, 2019). This approach aims to deepen students' understanding of core concepts over time. To achieve this, science teachers are encouraged to adopt varied teaching methods that actively engage learners and promote exploration and understanding (Dagang & De Mesa, 2017). However, achieving these educational goals requires more than just a well-structured curriculum; it also demands that students access the necessary instructional materials and laboratory experiences integral to learning (Eviota & Boyles, 2022). Laboratory work is vital in science education as it provides students with hands-on experience in observing and manipulating scientific materials, which is essential for developing a deeper understanding of scientific principles (Pareek, 2019). However, the availability of laboratory resources is often limited, particularly in public schools. Instructional materials facilitate effective teaching and enhance students' learning outcomes by engaging their interest, improving memory retention, and helping them apply theoretical knowledge to practical situations (Asrizal et al., 2019; Amos et al., 2022).

Constructivist learning models, which emphasize the active role of students in constructing knowledge through experience, have been shown to positively impact science learning (Tuerah, 2019). Problem-based learning (PBL), a constructivist approach that involves students in solving real-world problems, has gained widespread recognition for its effectiveness in promoting deep learning and critical thinking (Funa & Prudente, 2021). PBL encourages students to take responsibility for their learning, work collaboratively, and apply their knowledge to complex situations, preparing them for real-life challenges (Bispo et al., 2018). Given the critical role of laboratory work in science education and the demonstrated benefits of problem-based learning, this research aims to address the gaps in science education within the local context. Specifically, the study focuses on developing a laboratory worksheet as an intervention tool to support teaching the least-learned competencies in Life Science. The worksheet is designed to scaffold student learning by providing structured opportunities for inquiry and experimentation, aligned with the principles of problem-based learning. By addressing the inadequacies in laboratory resources and instructional materials, this research seeks to enhance students' understanding of key biological concepts and their ability to apply this knowledge in real-world contexts, thereby contributing to the overall goal of improving scientific literacy in the Philippines.

2.0 Methodology

2.1 Research Design

This study employed a quantitative quasi-experimental design utilizing a non-equivalent group pretest-posttest approach. The primary objective was to enhance the least-learned competencies in Grade 11 Life Science by implementing a laboratory worksheet incorporating a problem-based learning approach. Two participants were involved: the experimental group, which utilized the developed problem-based laboratory worksheet, and the control group, which did not. Both groups were administered a pretest and a posttest to assess learning outcomes (Mertler & Charles, 2011; Bajana, 2019).

2.2 Research Participants

The participants comprised 32 Grade 11 Senior High School learners: 21 students (12 females and 9 males) as the experimental group and 11 students (7 females and 4 males) as the control group. The participants' ages ranged from 15 to 20 years. The selected participants represented the entire population of Grade 11 learners enrolled in the Earth and Life Science subject under the Technical-Vocational and Livelihood (TVL) Track curriculum. The participants were chosen to evaluate their current learning levels in Life Science and assess the potential improvement in proficiency resulting from the intervention. This study employed a purposive sampling technique. These students were enrolled in Earth and Life Science as part of their curriculum, necessitating assessing their basic skills in this subject area.

2.3 Research Instruments

Two primary research instruments were used. The Department of Education-Caraga Standardized Test Questionnaire and Table of Specifications were employed to identify the least-learned competencies. The experimental and control groups utilized the same test questionnaire, with item analysis conducted to determine these competencies. A validated and quality-assured 30-item test questionnaire was administered as the pretest and posttest for both groups. This questionnaire underwent validation using the Survey Instrument Validation Rating Scale. The test focused on competencies related to evolutionary processes and the concept of descent with modification, as specified in the curriculum (S11/12LT-IVfg-26).

The laboratory worksheet developed followed the 4A's Model of Learning—Activity, Analysis, Abstraction, and Application—integrated into all activities, serving as supplementary intervention material targeting the least-learned competencies. The data gathered were analyzed and interpreted accordingly.

2.4 Data Collection Procedures

Data collection commenced with obtaining permission from the respective school heads and securing informed consent from parents and students. The least-learned Earth and Life Science competencies for the school year 2022-2023 were identified using the DepEd Caraga 50-item Standardized Test and analyzed through item analysis. Upon validation, the laboratory worksheet was implemented with the Grade 11 learners. Both groups underwent pretesting and post-testing, with all collected data kept confidential and used solely for research purposes.

The students' proficiency levels were assessed using the criteria outlined in DepEd Order No. 31, s. 2012. Table 2 provides the proficiency levels, their corresponding numerical values, and verbal descriptions used to interpret the students' pretest and posttest scores. The proficiency levels ranged from "Beginning" (74% and below) to "Advanced" (90% and above), reflecting the students' abilities to understand and perform authentic tasks independently or with minimal assistance.

2.5 Statistical Analysis

The data collected from the test questionnaires were systematically tallied, tabulated, and organized. Descriptive statistics were used to analyze the students' scores and the laboratory worksheet's validation ratings, including frequency, mean, and percentage. An independent t-test was conducted to determine the statistical significance of the differences between the two groups' pretest and post-test scores.

3.0 Results and Discussion

3.1 Least-Learned Competencies of Grade 11 Life Science Students

Following the administration of the standardized test by DepEd Caraga, the scores of the two groups were compiled, and an item analysis was conducted to identify the least mastered competencies. The competencies are aligned with the K to 12 Basic Education Curriculum for Senior High School, specifically within Earth and Life Science as a core subject (Department of Education, K to 12 Basic Education Curriculum Senior High School—Core Subjects, 2016).

The pretest results revealed that the least mastered competencies primarily involve moderate and higher-order thinking skills, as indicated in Table 1. Seven competencies were identified as least learned, with a common challenge being the ability to explain how populations of organisms have changed and continue to change over time. This demonstrates patterns of descent with modification from common ancestors, which produce the diversity of organisms observed today (S11/12LT-IVfg-26). This competency will serve as the foundation for developing the laboratory worksheet.

Table 1. Least-learned competencies of Grade 11 Life Science students

	School A	School B
Least Learned Competencies, Code, Item Number	Explain how populations of organisms have changed and continue to change over time, showing patterns of descent with modification from common ancestors to produce the organismal diversity observed today. (S11/12LT-IVfg-26) (Item #41, MOTS)	Explain how populations of organisms have changed and continue to change over time, showing patterns of descent with modification from common ancestors to produce the organismal diversity observed today. (S11/12LT-Ivfg-26) (Item #39, MOTS)
	Describe the general and unique characteristics of the different organ systems in representative animals. (S11/12LT-IIIaj-21)	Describe the process of genetic engineering. (S11-12LT-IIIej-17
	Describe how unifying themes (e.g., structure and function, evolution, and ecosystems) in the study of life show the connections among living things and how they interact with each other and their environment. (S1112LT-Iia-3)	Describe how the present system of classification of organisms is based on evolutionary relationships. (S11/12LT-Ivfg-27)
	Explain the evolving concept of life based on emerging pieces of evidence. (S11-12LT-Iia-1)	Categorize the different biotic potential and environmental resistance (e.g., diseases, availability of food, and predators) that affect population explosion)

According to Bloom's taxonomy (Krathwohl et al., 1964), moderate and higher-order thinking skills require learners to apply knowledge, solve problems, identify connections, make inferences, and find evidence to support generalizations. Developing higher-order thinking skills enables students to enhance their ability to construct structures or patterns and critically evaluate information and its validity. Addressing the learners' needs in these areas will foster the development of their cognitive skills and potentially improve their proficiency in the subject matter. Furthermore, transferring learning to new contexts by explaining concepts consistent with firsthand information provided by the teacher is a crucial lifelong learning skill (Ichsan, 2019).

Learning life sciences emphasizes an educational approach that prioritizes methodical and logical thinking. The development of 21st-century biology education should focus on understanding fundamental concepts and fostering analysis and critical thinking skills. Ideally, all life sciences topics and materials should cultivate these aspects (Song, 2016). However, challenges arise as reports indicate that teachers often concentrate on lower-order thinking skills in science education (Rahman, 2018). Therefore, teachers must design assessments that promote higher-order thinking skills. Such assessments and instructional materials should enhance students' critical thinking, problem-solving, metacognition, communication, collaboration, information literacy, and creative innovation abilities. The importance of assessment in fostering these skills cannot be overstated (Van Der Zanden et al., 2020). Teachers can effectively support skill development by crafting assessments that engage students in these higher-order thinking processes (Heyck-Williams, 2017; McCormick et al., 2015; Ferlazzo, 2021b).

It is essential to recognize the challenge highlighted by reports showing that teachers often prioritize lower-order thinking skills in science education (Idulog et al., 2023). This highlights the need for a pedagogical shift towards a more balanced focus on higher-order thinking skills (Kim et al., 2019; Cappiali, 2023). By integrating assessments and instructional materials that target these skills, educators can create learning environments that effectively develop students' abilities to analyze, evaluate, and synthesize information (Liu et al., 2023; Azid, 2022). This approach enhances students' mastery of the subject matter and equips them with the essential lifelong learning skills needed for success in the 21st century.

3.2 Assessment of the Effectiveness of the Laboratory Worksheet Developed

The effectiveness of the laboratory activity is determined by how accurately the assessment tool reflects students' learning outcomes. This process allowed the researcher to review and make necessary revisions to various aspects of the laboratory worksheet, including its content, format, presentation, organization, accuracy, and relevance.

The laboratory worksheet was quality assured by Department of Education Order No. 018, s. 2020 (Department of Education, 2020) and the guidelines outlined in the Department of Education’s "Guidelines and Processes for LRMDS Assessment and Evaluation" (2009), using Enclosure 1 by the Master Teachers responsible for science subjects. The summary table of the evaluation ratings for the laboratory worksheet includes the areas of assessment, mean scores, and verbal descriptions, all of which indicate that the assessment areas are rated as very satisfactory (Table 2).

Table 2. Summary of the evaluation rating of the laboratory worksheet in four areas of assessment

Area of Assessment	Mean	Verbal Description
1. Content	4.0	Very Satisfactory
2. Format	3.9	Very Satisfactory
3. Presentation and Organization	4.0	Very Satisfactory
4. Accuracy and up-to-datedness	3.9	Very Satisfactory
MEAN	**3.95**	**Very Satisfactory**

Content

Science educators have long emphasized the numerous benefits of involving students in laboratory activities. These activities have traditionally occupied a central and essential role in the science curriculum (Dori et al., 2006; Hofstein, 2004). Therefore, it is critical to design instructional materials and assessments that align with students' needs and meet the objectives or learning competencies of the subject matter. The results in Table 2 reflect the laboratory worksheet's content evaluation. The overall score of 4.0 indicates that the worksheet's content is rated as very satisfactory, according to the guidelines established by the Department of Education Order No. 018, s. 2020, and the Department of Education's Guidelines and Processes for LRMDS Assessment and Evaluation, 2009, using Enclosure 1.

Two significant factors impede students' ability to achieve a deep understanding of the subject. First, students often spend excessive time verifying the correctness of their answers. Second, the design of the laboratory activity sheets tends to promote only lower-order thinking skills. The content of the activities is a crucial tool for formative assessment (Andrade & Zuin, 2023). Given these considerations, it is noteworthy that the laboratory worksheet's content is rated very satisfactory, suggesting that the assessment objectives, associated learning competencies, and higher-order thinking skills are effectively addressed. This implies that the content appropriately evaluates learning outcomes and aligns with the holistic assessment process emphasized in DO No. 31, s. 2012, Section H (Department of Education, 2012), which underscores the developmental purpose of student learning. The content of the laboratory worksheet is essential for understanding students' learning levels and identifying potential interventions to enhance their learning. A problem-based learning approach catalyzes students to develop and acquire higher-order thinking skills (Ali, 2019).

Format

The structure of the laboratory worksheet was also evaluated in terms of formatting, including print quality, illustrations, design and layout, and paper and binding. Proper formatting is crucial as it significantly influences the reader's perception and comprehension of a document's content. Effective formatting involves dividing the material into sections with appropriate headings, emphasizing key ideas through bold or italicized text, and ensuring a polished appearance with a suitable font (Wahlin, 2023). The laboratory worksheet received an overall formatting score of 3.94, indicating that the printing, illustrations, design, layout, and paper binding are appropriate for student use. Worksheets should be easily accessible to students and designed with low reading difficulty. Initial questions should cater to students with lower reading abilities, with subsequent questions progressively increasing in complexity. Proper control of material organization, syntax, word and sentence length, word frequency, typeface, and line spacing can improve student engagement and on-task behavior during activities (Lee, 2016).

Presentation and Organization

Effective communication of ideas and content requires well-organized and structured presentation skills, which are vital across all fields. A well-presented idea or content facilitates the creation of learning materials that are both comprehensible and engaging for students (Swathi, 2015). The laboratory worksheet achieved an average score 4.0 for presentation and organization, indicating a very satisfactory rating. This suggests that the worksheet is well-presented and organized in an engaging, understandable, and comprehensive manner for students. The relationship between worksheet use and science achievement is consistent regardless of students' reading abilities when teachers carefully manage content elements, use readability algorithms to reduce reading load, or provide oral explanations of worksheet terms (Lee, 2014).

In the context of online learning, it is increasingly important to design instructional materials that are accessible across various platforms. Well-organized instructional materials enhance content understanding and improve lessons or competencies delivery. Notably, 56% of online college students use smartphones or tablets for at least some course-related activities (Clinefelter et al., 2019). The quality of teaching is also reflected in the use of instructional materials, including textbooks and publisher-provided resources, as well as the adaptation of materials to meet specific student needs. Teachers may also develop their instructional materials when existing resources do not align with students' cultural experiences or educational requirements (Sowers & Rahim, 2019).

Accuracy and Currency

The accuracy and currency of learning materials are crucial for effectively delivering and presenting learning objectives. The laboratory worksheet received an average score of 3.94, with a very satisfactory rating for accuracy and up to date (Table 2). This indicates that the worksheet is accurate regarding its concepts, syntax, and facts. Textbooks must contain up-to-date information to remain relevant. The currency of textbooks can be determined by examining the publication dates of the literature referenced. Staying current with relevant literature is essential for understanding developments in each discipline (Afidah et al., 2023).

The results further suggest that the laboratory worksheet includes content relevant to the least learned competencies, leading to a high composite mean reflecting the educational materials' quality. Using established worksheets, visual aids, and text styles allows effective teaching beyond conventional classroom delivery methods (Buniel & Monding, 2021). Worksheets foster positive classroom engagement and demonstrate cognitive benefits related to student motivation and retention (Estacio, 2015). Incorporating competencies that address the least learned skills provides teachers with a valuable tool for effectively communicating subject matter and enhancing the teaching and learning process.

The evaluation results in terms of content, format, presentation and organization, and accuracy and currency indicate that the laboratory worksheet is rated overall as very satisfactory. This implies that the laboratory worksheet is effective according to these criteria. As a teaching support material, the worksheet reflects the role of teachers in fostering student growth and providing a facilitative mechanism that encourages students to exceed their current capabilities. It motivates learners to fully engage with the activities and achieve the desired learning objectives (Torrefranca et al., 2017).

3.3 Proficiency Level of Students After Using the Laboratory Worksheets

Performance requirements that integrate science procedures, cross-cutting concepts, and core subject knowledge are essential for defining proficiency in science. These definitions of scientific understanding and practice pose challenges for assessment design and implementation, both at the systemic level for monitoring the advancement of scientific education and at the instructional level within classrooms (Pellegrino, 2019).

Two groups of students were assessed to evaluate the improvement in student proficiency. As illustrated in Table 3, the experimental group demonstrated a notable increase in proficiency. The scores on the pretest and posttest indicate a twofold improvement, rising from 30.00% to 69.68%. The posttest, which utilized the laboratory worksheet, likely contributed to this significant increase in proficiency. Although this level of proficiency remains below the criteria set by the Department of Education (2012) for student proficiency levels, the observed improvement is substantial. This is attributed to the use of laboratory worksheets. According to Pellegrino (2019), effective assessment implementation should involve valid, useful, and applicable tools and be integrated into the pedagogical process to enhance educational outcomes.

Table 3. Pretest and posttest scores of the control and experimental groups

Descriptive statistics	Control		Experimental	
	Pre-test	Post-test	Pre-test	Post-test
Mean	7.91	7.46	9.00	20.91
SD	2.39	1.64	3.15	4.68
Min	4.00	5.00	2.00	11.00
Max	11.00	10.00	16.00	28.00
Proficiency level (%)	26.4	24.8	30.00	69.68

One of the challenges highlighted by (Pellegrino, 2019) is the design and use of valid and reliable assessments in reflecting the integration of practices and core ideas in science. This challenge can be met by using evidence- and data-based assessment tools so that students can construct the integrated knowledge that problem-based learning approach integrated assessments can attain (Ali, 2019). Statistical results in Table 3 revealed that the experimental group significantly differed ($p<0.05$) from the control group, which did not use the instrument. This notable significant difference leads to the conclusion that the effectiveness of the learning material used is evident.

Table 4. Analysis of the difference in pretest and post-test scores of the control and experimental group

Groups	Mean	Std. Deviation	Min	Max	p-value	Remark
Control	7.46	1.64	5	10	0.000	Significant
Experimental	20.9	4.68	11	28		

Tested at 0.05 level of significance using an independent t-test

These results support the conclusion that the learning material is effective and may have contributed to the increased proficiency observed in the experimental group, in contrast to the control group, which exhibited a decline in proficiency, as shown in Table 4. Using instructional materials has been shown to improve student learning outcomes to a degree equal to or greater than other interventions. Effective and high-quality instructional materials enhance classroom organization and enable students to achieve substantial learning gains over a relatively short period. Such materials provide a clearer understanding of the subject matter, aligning with the curriculum's objectives and fostering a deeper comprehension of the standards the subject area aims to meet (Allan & Leifer, 2023). Well-designed inquiry-based tasks in science textbooks are particularly important for supporting students' engagement with scientific inquiry and developing their understanding of scientific concepts (Liu & Yang, 2016; Acosta, 2020). The results indicate that the developed Laboratory Worksheet is effective in content, format, presentation and organization, accuracy, and up-to-date. The study participants' post-test scores improved, demonstrating the material's effectiveness in fulfilling its intended purpose. This improvement in student proficiency suggests that well-crafted instructional materials can significantly enhance understanding of the subject matter and better align with the curriculum's goals (Tseng et al., 2022).

4.0 Conclusion

In conclusion, this study highlights the significant impact of well-developed laboratory worksheets on student proficiency, particularly in moderate and higher-order thinking skills. The results indicate that these worksheets were evaluated positively in content, format, presentation, and accuracy—scoring between 3.94 and 4.0—this notes that the crafted worksheets effectively enhanced the student learning outcomes and supports the effectiveness of the problem-based learning approach and the quality of the instructional materials. Furthermore, the observed increase in student proficiency, with posttest scores rising from 30.00% to 69.68%, underscores the effectiveness of the worksheets in fostering deeper understanding and skills development. Future research could explore the long-term impacts of such instructional materials on student learning and proficiency across different subjects and educational settings. Additionally, investigating the integration of similar worksheets in diverse learning environments could provide further insights into their broader applicability and effectiveness.

5.0 Contribution of Authors

The authors confirmed equal contributions in each part of this work and reviewed and approved the final version.

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The author declares that they have no conflicts of interest.

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Analysis of the Alignment of K to 12 Most Essential Learning Competencies, Instruction, and Assessment Tools in Statistics and Probability

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Abstract. Curriculum alignment is vital in realizing educational goals. However, predicaments in the teaching and learning process challenge the alignment. Hence, this paper aims to determine students' academic performances in the years 2022-2023 and 2023-2024, analyze the alignment of the curriculum, instruction, and assessment in Statistics and Probability, and propose recommendations to ensure the alignment of curriculum, instruction, and assessment. A document analysis of the teaching and learning tools was conducted to gain in-depth results. Descriptive statistics, such as frequency, percent, mean, and standard deviation, were employed to describe further the results. Results showed that the students' average academic performance in Statistics and Probability for 2022-2023 was 86.80 and 87.46 for 2023-2024, both indicating a very satisfactory level. The teacher's instructions in the six (6) contents of Statistics and Probability were aligned with the curriculum or the K to 12 Most Essential Learning Competencies. Assessment tools were aligned with the teacher's instructions or strategies. The 21st-century skills commonly integrated among learners were critical thinking, information, media, and technology. As the teacher's instructions indicated, students gained an average mastery level (57%). The most common cognitive domain used in the students' assessments was remembering. Findings revealed that the teacher attained good proof of transfer, lesson outlines, and assessments or graded activities aligning curriculum, instruction, and assessment. The teacher obtained an excellent level of objectives. Overall, the teacher aligned the curriculum, instruction, and assessment well. Based on the document analysis, the alignment of teaching and learning resources to the curriculum was evident. This study proposed the following recommendations - implement assessment of standards-based curriculum, effective pedagogy, and achievable assessments, provide teacher support, strengthen evaluation of teaching and assessment, and contextualize assessments catering to the 21st-century skills of the learners.

Keywords: Curriculum alignment; K to 12; Bloom's Taxonomy; Pedagogy; Probability and Statistics.

1.0 Introduction

The curriculum aims to improve learning outcomes, and students' achievement of these objectives is aided by teachers' alignment of their teaching objectives with the instructional activities they participate in. Students must know their places in the curriculum to avoid the adverse effects of misalignment (Alfauzan & Tarchouna, 2017). There are three components in the Alignment Triangle: curriculum, instruction, and assessment. According to

Bunch (2012), these three components are interactive; any of the three can and should inform the other two. For example, in addition to curriculum-driving instruction and assessment, it is also possible that instruction can provide feedback for improving curriculum and refining the format of test items. Similarly, assessment can identify weaknesses in instruction that can be corrected and detect holes in the curriculum that can be filled.

Attaining alignment allows classroom assessments to be included in the curriculum, directing teacher instruction and student learning (Hamstra & Bell, 2019). To encourage student learning, curriculum, instruction, and classroom assessments should all align. However, instructional inconsistencies will occur if the instruction is not geared toward what is intended in the curriculum (Nevenglosky et al., 2018). Similarly, if the assessments are not aligned with the instruction or curriculum, it could undermine students' ability to comprehend the lessons and their motivation to learn. Notwithstanding, the alignment of teaching objectives and assessments can help students grasp what they are learning, uncover key elements of their learning process, and advance the attainment of learning objectives (Zhao et al., 2023). Lastly, based on Meng (2023), effective instructional practices directly contribute to improved student outcomes, and by aligning instructional practices with education quality standards, educators can ensure that their teaching is in line with the desired outcomes and standards of excellence.

One major challenge of the Philippines regarding education is its low rank in international assessments. According to the 2003 Trends in International Mathematics and Science Studies (TIMSS) results, Filipino students struggle to flourish in mathematics and science. Based on the 2022 Programme for International Student Assessment (PISA) study covering 690,000 students from 81 countries, the Philippines' performance in the three subjects "was about the same" as in 2018, when it first took part in the assessment. For the 2022 assessment, the Philippines ranked sixth to the last in reading and mathematics, while science ranked third to the last among 81 countries. This implies that there was no significant improvement in the average scores of Filipino students in reading, mathematics, and science, which remained low compared to students from other countries that participated. As a result, DepEd employed the Enhanced Basic Education Act of 2013, officially known as Republic Act 10533, instructing all instructors to standardize the country's educational system. This status has been the basis for policymakers and implementers who want to change the country's education curriculum. However, it can be deduced that the education sector has undergone a rapid change in curriculum over the years. Results of the study of Choudhary (2023) revealed that curriculum reforms affect students' learning outcomes. On the other hand, keeping the curriculum responsive to changes is necessary to upgrade the quality of education.

The mathematics curriculum in the Philippines underwent several revamps due to the country's low rank in international mathematics assessments. Developing the new mathematics curriculum focuses on critical thinking and problem-solving of learners. However, achieving this goal is not simple, especially when learners are not familiar with the concepts of some areas of mathematics. Statistics and Probability are two core curriculum subjects offered in senior high school. It contains content that helps students become more statistically literate in describing and analyzing data to prepare them for research and future related courses. Thus, investigating the learners' performance in statistics and probability is important to determine the attainment of the curriculum's objectives.

The findings of Kandeel (2019) revealed that students' difficulties in statistics and probability were determined by their weak statistical background and low skills in solving problems involving probability. The study of Dumale and Gurat (2023) disclosed that students have poor retention in statistics and probability as determined by repeated measures ANOVA. Studies have shown that several factors influence students' performance. A study by Retutas & Rubio (2021) was conducted to determine whether there are significant differences between the determinants, gender, type of school, parent's educational level, family monthly income, family size, and Senior High School track preference to students' self-efficacy beliefs, attitudes towards Statistics, and performance in Statistics. The findings revealed that among the demographic factors, only the type of school significantly differs in the self-efficacy beliefs, attitudes towards Statistics, and performance of senior high students in Statistics. According to the multinomial logistic regression model, age, gender, employment status, choice of own study field, getting the right direction, previous academic result, consultation with teachers, father's annual income, family status, and relationship with parents are found to be statistically significant determinants of academic performance (Rahman et al., 2023). Meanwhile, a study by Oliveira Junior et al. (2018) showed that students lack confidence in solving problems in statistics and probability. These findings suggest that educators reflect on their instructions and assessment tools to undertake remedial measures to improve students' academic performance in statistics and probability.

Curriculum change in the Philippines is predetermined by societal issues and needs, which may be a response to past curriculum reviews and evaluations. In 2013, the Enhanced Basic Education Curriculum was implemented to offer higher-quality education among Filipino learners. Based on the profound analysis of Magno (2011), the Philippines shifted to the K to 12 Curriculum to improve the aims of education, access and progression, teacher-pupil ratio, and medium of instruction while the curriculum described structure, framework, design, duration/time allotment, content, alignment, and assessment. However, de la Fuente (2020) disclosed the challenges faced in the implementation of K to 12, which include the high number of essential learning competencies (LCs) and the challenges it may pose during implementation, along with some issues with the sequencing and expression of the pre-requisites of these learning competencies, weak pedagogy in terms of 21st-century skills, overloaded teaching loads, mismatched student interests, misalignment of learning outcomes and instructional objectives, and so on. The inconsistencies between assessments and instructional activities in the classroom during the K to 12 Curriculum made it difficult for teachers to quickly determine what the students have learned and modify their lesson plans in a way that helps the students truly comprehend the lesson's objectives and apply core literacy.

Curriculum, instruction, and assessment are linked indistinguishably and crucial for an effective teaching and learning process in the Philippines. The alignment of these three foundational principles ensures that students are taught with the necessary knowledge and skills and can demonstrate their academic achievements. It also manifests the quality of teaching and learning in classrooms. Subsequently, Meng (2023) suggests that developing instructional frameworks, fostering a supportive and collaborative school culture, encouraging teacher reflection and self-assessment, and establishing mentorship programs and peer observations underscore the potential of aligning instructional practices with education quality standards. In teaching Statistics and Probability, Mendez (2022) suggests that problem-based learning significantly improves student learning. In line with this, students are more engaged in the learning process and think critically about the concepts of Statistics and Probability. Additionally, Dumale and Gurat (2023) recommend integrating blended and cooperative learning to help students better understand the lessons.

With the above-given information, it is outlined that instructions and assessments are indispensable in guaranteeing student success. Notwithstanding, there is limited research regarding the alignment of curriculum, instruction, and assessment in Statistics and Probability. Thus, the researcher was prompted to investigate the instructional and learning resources in Statistics and Probability. Specifically, this research aimed to 1) determine the academic performances of students in school years 2022-2023 and 2023-2024, 2) determine the alignment of the curriculum (MELCs) and teacher instructions, 3) determine the alignment of teacher’s instructions and assessments and the revised Bloom’s Taxonomy, 4) analyze the alignment of the curriculum, instruction, and assessment in Statistics and Probability, and 5) propose recommendations to ensure the alignment of curriculum, instruction, and assessment.

2.0 Methodology

2.1 Research Design

This study utilized a qualitative document analysis to review or evaluate the instructional resources and assessments of the teacher in teaching Statistics and Probability. Descriptive statistics, such as frequency and percent, were computed to determine the learners’ performances and the curriculum alignment, instruction, and assessment.

2.2 Research Participants

The participants in this study are the students from previous school years and the teacher. There were 65 Grade 11 students involved in this study. Since this research deals with evaluating the instruction and assessments administered by the teacher, the teacher was also counted as a participant.

2.3 Sources of Data

The documents used in this study are the K to 12 Curriculum Guide, Most Essential Learning Competencies (MELCs), teacher's Daily Lesson Logs (DLLs), Quarter Examinations, Table of Specifications (TOS), Written Outputs, Performance Tasks, Item Analysis, and Grade Sheets in Statistics and Probability for the school year 2022-2023. The Most Essential Learning Competencies (MELCs) in the K to 12 Curriculum serve as the learning outcomes of the learners and objectives of the teacher for instruction. Furthermore, the teacher's instructional strategies were gathered from the Daily Lesson Logs (DLLs), while the assessment for the learners was reflected in the Grade Sheets or Teacher's Class Record. The Item Analysis, Table of Specifications, and Quarter Examinations were also used as a reflection for the teacher to improve the instruction and quality of tests. Meanwhile, the content standards and performance standards of statistics and probability were included to further assess the alignment of the curriculum, instruction, and assessment. Additionally, 21st-century skills, as shown in the K to 12 Curriculum Framework, were included in the analysis to better understand the alignment.

2.3 Data Analysis

The academic performances of the learners in Statistics and Probability were calculated using descriptive statistics such as frequency, percent, mean, and standard deviation. To determine the existence of the alignment of the curriculum, instruction, and assessment, the researcher constructed a binary scale (Evident or Not Evident), indicating that the teaching and learning materials are coherent with the curriculum. Moreover, a criterion from La Marca, Redfield, and Winter (2000) was utilized to determine the extent of alignment of the learning assessments, and an alignment rubric comprising the indicators anchored with the K to 12 Curriculum was adopted. Alignment of the curriculum, instruction, and assessment can be measured if the objectives are met, instructional activities are classified, and activities for assessment are present. Furthermore, Bloom's Taxonomy was used as a checklist to ensure that all levels of a domain were assessed. It was also used to evaluate the alignment of assessment methods and instructional methodologies.

2.4 Ethical Considerations

This research strictly followed ethical guidelines. Learners' identities and information were secured and kept confidential following the Data Privacy Act of 2012. Additionally, the researcher only used self-made teaching and learning tools needed for the analyses, and adopted materials in any parts of this paper were given proper references.

3.0 Results and Discussion

3.1 Performance of Students in Statistics and Probability

Descriptive statistics assessed students' academic performance in statistics and probability. Table 1 shows the qualitative description of the students' performances as stipulated in DepEd Order no. 8, s. 2015.

Table 1. Descriptors and grading scale

Descriptor	Grading Scale
Outstanding	90-100
Very Satisfactory	85-89
Satisfactory	80-84
Fairly Satisfactory	75-79
Did Not Meet Expectations	Below 75

Tables 2 and 3 show students' performance in Statistics and Probability for the 3rd and 4th Quarters of the school years 2022-2023 and 2023-2024. Out of 27 students, 12 students (44.44%) performed outstandingly in the 3rd quarter, while 4 students (14.81%) achieved the same level in the 4th quarter. However, in the 4th quarter, many students obtained a very satisfactory level. Students' performance in the 3rd quarter was higher (m=88.22, SD=5.65) than in the 4th quarter (m=85.37, SD=5.36). Based on the assessments, as recorded by the teacher, students gained lower scores in the 4th quarter because of low marks in their examinations and activities. However, the decrease in their grade could be described by other factors like classroom disturbances, teacher's strategies, and declined motivation of students to learn.

Table 2. Academic performance of students in Statistics and Probability (2022-2023)

Descriptor	Grading Scale	3rd Quarter		4th Quarter	
		f	%	f	%
Outstanding	90-100	12	44.44%	4	14.81%
Very Satisfactory	85-89	10	37.04%	15	55.56%
Satisfactory	80-84	2	7.41%	4	14.81%
Fairly Satisfactory	75-79	3	11.11%	4	14.81%
Did Not Meet Expectations	Below 75	0	0%	0	0%
	Mean	**88.22** (Very Satisfactory)		**85.37** (Very Satisfactory)	

Table 3 presents students' performance in Statistics and Probability during the School Year 2023-2024. Of 44 students, 21 performed outstandingly in the 3rd quarter, while 18 achieved the same level in the 4th quarter. However, in the 4th quarter, two (2) students did not meet expectations because they failed to pass the subject. Failure in the subject indicates students' withdrawal from school, constant absences, and no participation in class. On the other hand, students' performance in the 3rd quarter is higher (m=87.92, SD=4.50) than in the 4th quarter (m=87.00, SD=6.61).

Table 3. Performance of students in Statistics and Probability (2023-2024)

Descriptor	Grading Scale	3rd Quarter		4th Quarter	
		f	%	f	%
Outstanding	90-100	21	47.73%	18	40.91%
Very Satisfactory	85-89	15	34.09%	12	27.27%
Satisfactory	80-84	6	13.64%	9	20.45%
Fairly Satisfactory	75-79	2	4.55%	3	6.82%
Did Not Meet Expectations	Below 75	0	0%	2	4.55%
	Total	**44**	**100%**	**44**	**100%**
	Mean	**87.92** (Very Satisfactory)		**87.00** (Very Satisfactory)	

Based on the assessments, as recorded by the teacher, students gained lower scores in the fourth quarter because of low marks in their examinations and activities. However, the decrease in their grade could be described by other factors like classroom disturbances, teacher strategies, and declining motivation of students to learn. Students' grades in the fourth quarter are more dispersed than in the third quarter. Students' mean performance in 2023-2024 is higher than in 2022-2023. However, both groups obtained a very satisfactory level. The performance difference could indicate several factors, such as changes in the teacher's instruction, availability of resources, type of school, and more. The results also represent the teacher's performance in teaching Statistics and Probability.

The findings of Retutas and Rubio (2021) disclosed that the level of student performance in statistics is fairly satisfactory, indicating that most students possess the minimum knowledge, skills, and core understanding of statistics but need help throughout the performance of tasks. Similarly, Mendez (2022) showed that students' pretest performance in Statistics and Probability was average, but their post-test performance was higher due to the interventions administered to the students. Davaatseren, Myagmar, and Dulamsuren (2024) revealed that students' academic performances were affected by their attitudes, family support, socio-economic status, time spent studying and hobbies, career choices, institutional environment, and friends' characteristics. Meanwhile, findings of the study of Ullah and Ahmani (2022) stated that the factors that greatly influenced students' academic performances were insufficient teachers, lack of reading and teaching materials in school, untrained teachers, learning environment, inadequate classrooms, and weak school management.

3.2 Analysis of the Alignment of the Curriculum and Instruction

Table 4 analyzes the alignment of the teacher's instructions and the K to 12 Curriculum Most Essential Learning Competencies. Based on the table, the teacher's instructions or strategies vary by the lessons' content, performance standards, and objectives. Using varied instructions to cater to the learners' interests or learning styles is effective in teaching (Aranda & Zamora, 2016).

Table 4. Alignment of teacher's instructions and the Most Essential Learning Competencies (MELCs) in the K to 12 Curriculum

Content	Content Standards	Performance Standards	Most Essential Learning Competencies The learner…	Instructions/ Strategies	Evident or Not Evident
Random Variables and Probability Distributions	The learner demonstrates an understanding of key concepts of random variables and probability distributions.	The learner can apply an appropriate random variable for a given real-life problem (such as decision-making and games of chance).	1. Illustrates a random variable (discrete and continuous).	Concept Map Picture Analysis Recitation on real-life examples of random variables.	Evident
			2. Distinguishes between a discrete and a continuous random variable.	Lecture Tabular Chart Recitation	Evident
			3. Find the possible values of a random variable.	Lecture Think-Pair-Share Use of Manipulatives	Evident
			4. Illustrates a probability distribution for a discrete random variable and its properties.	Group Activity Exploratory Activity Use of Manipulatives and Worksheets Reporting	Evident
			5. Computes probabilities corresponding to a given random variable.	Lecture Individual Activity (Use of Problem Sets)	Evident
			6. Illustrates the mean and variance of a discrete random variable.	Group Activity Use of Manipulatives and Worksheets Exercises	Evident
			7. Calculates the mean and the variance of a discrete random variable.	Think-Pair-Share Use of contextualized learning material	Evident
			8. Interprets the mean and the variance of a discrete random variable.	Group Activity Exploratory Activity Use of contextualized learning material Worksheets Reporting	Evident
			9. Solves problems involving mean and variance of probability distributions.	Individual Activity (Use of Problem Sets)	Evident
Normal Distribution	The learner demonstrates an understanding of key concepts of normal probability distribution.	The learner can accurately formulate and solve real-life problems in different disciplines involving normal distribution.	10. Illustrates a normal random variable and its characteristics.	Think-Pair-Share Picture Analysis Student practice illustrating a normal random variable	Evident
			11. Identifies regions under the normal curve corresponding to different standard normal values.	Picture Analysis Socratic Method Use of Guided Examples	Evident
			12. Converts a normal random variable to a standard normal variable and vice versa.	Exploratory Activity Use of Worksheets Group Activity Reporting	Evident
			13. Computes probabilities and percentiles using the standard normal table.	Outdoor Activity Game on computing probabilities and percentiles using z-table	Evident
Sampling and Sampling Distributions	The learner demonstrates an understanding of key concepts of sampling and sampling distributions of the sample mean.	The learner can apply suitable sampling and sampling distributions of the sample mean to solve real-life problems in different disciplines.	14. Illustrates random sampling.	Pop-corn Recitation/ Socratic Method Use of technology to show the frequency distribution of learners' responses	Evident

				to the teacher's questions	
			15. Distinguishes between parameter and statistic.	Use of localized/ contextualized material Use of a Venn Diagram	Evident
			16. Identifies sampling distributions of statistics (sample mean).	Group Activity Exploratory Activity Use of Worksheets Exercises	Evident
			17. Finds the mean and variance of the sampling distribution of the sample mean.	Problem-based Design Learning Use of Problem Sets	Evident
			18. Defines the sampling distribution of the sample mean for a normal population when the variance is: (a) known; and (b) unknown.	Think-Pair-Share Use of Concept Organizer	Evident
			19. Illustrates the Central Limit Theorem.	Picture Analysis Group Activity Exploratory Activity Use of Worksheets Exercises	Evident
			20. Defines the sampling distribution of the sample mean using the Central Limit Theorem.	Problem-based Design Learning Popcorn Recitation	Evident
			21. Solves problems involving sampling distributions of the sample mean.	Think-Pair-Share Problem-based Design Learning	Evident
Estimation of Parameters	The learner demonstrates an understanding of key concepts of estimation of population mean and population proportion.	The learner can estimate the population mean and proportion to make sound inferences in real-life problems in different disciplines.	22. Illustrates the t-distribution.	Lecture Picture Analysis Individual Practice on Illustrating T-distribution	Evident
			23. Identifies percentiles using the t-table.	Group Activity Use of t-table Completing the Table (Worksheet) Exercises	Evident
			24. Identifies the length of a confidence interval.	Group Activity Exploratory Activity Use of Worksheets Exercises	Evident
			25. Computes for the length of the confidence interval.	Lecture Individual Activity Use of Worksheets	Evident
			26. Computes for an appropriate sample size using the interval length.	Lecture Use of Problem Sets Cooperative Learning	Evident
			27. Solves problems involving sample size determination.	Guided Learning	Evident
Tests of Hypothesis	The learner demonstrates an understanding of key concepts of tests of hypotheses on the population mean and population proportion.	The learner can perform appropriate tests of hypotheses involving the population mean and population proportion to make inferences in real-life problems in different disciplines.	28. Illustrates: (a) null hypothesis, (b) alternative hypothesis, (c) level of significance, (d) rejection region, and (e) types of errors in hypothesis testing.	Use of Chart Think-Pair-Share Picture Analysis Individual Practice	Evident
			29. Identifies the parameter to be tested given a real-life problem.	Presentation of statistical symbols/ notations Use of localized materials/ examples	Evident
			30. Formulates the appropriate null and alternative hypotheses on a population mean.	Group Activity Exploratory Activity Use of Worksheets Reporting	Evident

			31. Identifies the appropriate form of the test statistic when: (a) the population variance is assumed to be known; (b) the population variance is assumed to be unknown; and (c) the Central Limit Theorem is to be used.	Think-Pair-Share Use of Guided Examples	Evident
			32. Identifies the appropriate rejection region for a given level of significance when: (a) the population variance is assumed to be known; (b) the population variance is assumed to be unknown; and (c) the Central Limit Theorem is to be used.	Lecture Socratic Method Individual Practice	Evident
			33. Computes for the test-statistic value (population mean).	Lecture Use of Problem Sets Cooperative Learning	Evident
			34. Draws a conclusion about the population mean based on the test-statistic value and the rejection region.	Exploratory Activity	Evident
			35. Solves problems involving the test of hypothesis on the population mean.	Lecture Use of Problem Sets Cooperative Learning	Evident
			36. Formulates the appropriate null and alternative hypotheses on a population proportion.	Problem-based Design Learning Popcorn Recitation	Evident
			37. Identifies the appropriate form of the test statistic when the Central Limit Theorem is to be used.	Problem-based Design Learning Think-Pair-Share	Evident
			38. Identifies the appropriate rejection region for a given level of significance when the Central Limit Theorem is to be used.	Exploratory Activity Use of Guided Examples	Evident
			39. Computes for the test-statistic value (population proportion).	Lecture Think-Pair-Share Use of Problem Sets	Evident
			40. Draw a conclusion about the population proportion based on the test-statistic value and the rejection region.	Group Activity Exploratory Activity Use of Worksheets Reporting	Evident
			41. Solves problems involving the test of hypothesis on the population proportion.	Problem-based Design Learning Think-Pair-Share	Evident
Correlation and Regression Analyses	The learner demonstrates an understanding of key concepts of correlation and regression analyses. The learner can perform correlation and regression analyses on real-life problems in different disciplines.	The learner demonstrates an understanding of key concepts of correlation and regression analyses. The learner can perform correlation and regression analyses on real-life problems in different disciplines.	42. Illustrates the nature of bivariate data.	Math Analogy Lecture Socratic Method	Evident
			43. constructs a scatter plot	Group Activity Game-based Instruction	Evident
			44. Describes shape (form), trend (direction), and variation (strength) based on a scatter plot.	Individual Activity Exploratory Activity	Evident
			45. Calculates the Pearson's sample correlation coefficient.	Lecture Think-Pair-Share	Evident
			46. Solves problems involving correlation analysis.	Use of Problem Sets Cooperative Learning	Evident

	47. Identifies the independent and dependent variables.	Group Activity Exploratory Activity Use of Worksheets Reporting	Evident
	48. Calculates the slope and y-intercept of the regression line.	Use of GeoGebra (graphing software) Demonstration teaching	Evident
	49. Interprets the calculated slope and y-intercept of the regression line.	Socratic Method	Evident
	50. Predicts the value of the dependent variable given the value of the independent variable.	Group Activity Exploratory Activity Use of Worksheets	Evident
	51. Solves problems involving regression analysis.	Cooperative Learning	Evident

It can be gleaned from Table 4 that the teacher's instructions in the six (6) contents of Statistics and Probability were evidently aligned with the curriculum or the K to 12 Most Essential Learning Competencies. This finding indicates that the teacher's instructions or strategies were anchored with the objectives of the lessons in the curriculum. It can also be said that before implementing these instructions to the class, the teacher selected appropriate activities for learners to meet the purposes or goals of the lessons in Statistics and Probability.

Yang (2023) studied the curriculum standards and classroom instructional practices which were represented using sets of two-dimensional matrices that comprised content themes and five learning domains: Cognitive, Affective, Psychomotor, Social, and Cultural (the CAPSCt model). The results showed an overall high level of alignment (0.81–0.90) since the intended learning goals covered the said learning domains. Teaching strategies were aligned with the curriculum. However, several factors hinder the delivery of these instructions to the learners (Urbano, 2020). Despite the challenges in teaching, teachers were able to construct materials aligned with the curriculum objectives.

3.3 Analysis of the Alignment of the Instruction and Assessment

Teacher's assessment tools were classified as written outputs and performance tasks. Written outputs comprised of students' formative test scores, worksheets, summative tests or unit quizzes, and problem sets. Furthermore, performance tasks consisted of group reports and individual outputs required by the performance standards of the content of MELCs and these often had greater percentages. Since the teacher's instructions or strategies were aligned with the K to 12 Curriculum Most Essential Learning Competencies (MELCs), the teacher's assessment tools, and their alignment with the teacher's instructions were also analyzed. Table 5 shows the existence of alignment of the teacher's instructions and assessment tools. Moreover, the objectives were categorized according to the learning domains in Revised Bloom's Taxonomy. This enabled the researcher to further assess the cognitive levels required by the curriculum objectives.

Table 5. Alignment of teacher's instructions and assessments and the revised Bloom's Taxonomy

Most Essential Learning Competencies	Learning Domain	Instructions	Assessments		Evident or Not Evident
			Written Output	**Performance Task**	
1. MELCs 01	Applying	Concept Map Picture Analysis Recitation on real-life examples of random variables.	Formative Test		Evident
2. MELCs 02	Understanding	Lecture Tabular Chart Recitation	Formative Test		Evident
3. MELCs 03	Remembering/ Understanding	Lecture Think-Pair-Share Use of Manipulatives	Formative Test		Evident
4. MELCs 04	Applying	Group Activity Exploratory Activity Use of Manipulatives and Worksheets	Worksheet	Group Report	Evident

			Reporting			
5.	MELCs 05	Applying	Lecture Individual Activity (Use of Problem Sets)	Unit Quiz/ Summative Test	Self-Evaluation	Evident
6.	MELCs 06	Applying	Group Activity Use of Manipulatives and Worksheets Exercises	Formative Test		Evident
7.	MELCs 07	Applying	Think-Pair-Share Use of contextualized learning material	Formative Test		Evident
8.	MELCs 08	Understanding	Group Activity Exploratory Activity Use of contextualized learning material Worksheets Reporting	Worksheet	Group Report	Evident
9.	MELCs 09	Applying	Individual Activity (Use of Problem Sets)	Problem Set		Evident
10.	MELCs 10	Applying	Think-Pair-Share Picture Analysis Student practice illustrating a normal random variable	Unit Quiz/ Summative Test	Mosaic Arts	Evident
11.	MELCs 11	Remembering	Picture Analysis Socratic Method Use of Guided Examples	Formative Test		Evident
12.	MELCs 12	Understanding	Exploratory Activity Use of Worksheets Group Activity Reporting	Worksheet	Group Report	Evident
13.	MELCs 13	Applying	Outdoor Activity Game on computing probabilities and percentiles using z-table	Formative Test		Evident
14.	MELCs 14	Applying	Pop-corn Recitation/ Socratic Method Use of technology to show the frequency distribution of learners' responses to the teacher's questions	Formative Test		Evident
15.	MELCs 15	Understanding	Use of localized/ contextualized material Use of a Venn Diagram	Formative Test		Evident
16.	MELCs 16	Remembering	Group Activity Exploratory Activity Use of Worksheets Exercises	Formative Test		Evident
17.	MELCs 17	Applying	Problem-based Design Learning Use of Problem Sets	Formative Test		Evident
18.	MELCs 18	Remembering	Think-Pair-Share Use of Concept Organizer	Formative Test		Evident
19.	MELCs 19	Applying	Picture Analysis Group Activity Exploratory Activity Use of Worksheets Exercises	Formative Test		Evident
20.	MELCs 20	Remembering	Problem-based Design Learning Popcorn Recitation	Formative Test		Evident
21.	MELCs 21	Applying	Think-Pair-Share Problem-based Design Learning	Unit Quiz/ Summative Test	Journal Writing	Evident
22.	MELCs 22	Applying	Lecture Picture Analysis Individual Practice on Illustrating T-distribution	Formative Test		Evident
23.	MELCs 23	Remembering	Group Activity Use of t-table Completing the Table (Worksheet) Exercises	Formative Test		Evident

24.	MELCs 24	Remembering/ Understanding	Group Activity Exploratory Activity Use of Worksheets Exercises	Formative Test		Evident
25.	MELCs 25	Applying	Lecture Individual Activity Use of Worksheets	Formative Test		Evident
26.	MELCs 26	Applying	Lecture Use of Problem Sets Cooperative Learning	Formative Test		Evident
27.	MELCs 27	Applying	Guided Learning	Unit Quiz/Summative Test		Evident
28.	MELCs 28	Applying	Use of Chart Think-Pair-Share Picture Analysis Individual Practice	Formative Test		Evident
29.	MELCs 29	Remembering/ Understanding	Presentation of statistical symbols/ notations Use of localized materials/ examples	Formative Test		Evident
30.	MELCs 30	Understanding	Group Activity Exploratory Activity Use of Worksheets Reporting	Worksheet	Group Report	Evident
31.	MELCs 31	Remembering/ Understanding	Think-Pair-Share Use of Guided Examples	Unit Quiz/ Summative Test		Evident
32.	MELCs 32	Remembering/ Understanding	Lecture Socratic Method Individual Practice	Formative Test		Evident
33.	MELCs 33	Applying	Lecture Use of Problem Sets Cooperative Learning	Formative Test		Evident
34.	MELCs 34	Analyzing	Exploratory Activity	Formative Test	Drawing Conclusions from Word Problems	Evident
35.	MELCs 35	Applying	Lecture Use of Problem Sets Cooperative Learning	Unit Quiz/ Summative Test		Evident
36.	MELCs 36	Understanding	Problem-based Design Learning Popcorn Recitation	Formative Test		Evident
37.	MELCs 37	Remembering/ Understanding	Problem-based Design Learning Think-Pair-Share	Formative Test		Evident
38.	MELCs 38	Remembering/ Understanding	Exploratory Activity Use of Guided Examples	Formative Test		Evident
39.	MELCs 39	Applying	Lecture Think-Pair-Share Use of Problem Sets	Formative Test		Evident
40.	MELCs 40	Analyzing	Group Activity Exploratory Activity Use of Worksheets Reporting	Worksheet	Group Report	Evident
41.	MELCs 41	Applying	Problem-based Design Learning Think-Pair-Share	Unit Quiz/ Summative Test		Evident
42.	MELCs 42	Applying	Math Analogy Lecture Socratic Method	Formative Test		Evident
43.	MELCs 43	Applying	Group Activity Game-based Instruction	Formative Test	ICT Integration	Evident
44.	MELCs 44	Understanding	Individual Activity Exploratory Activity	Formative Test		Evident
45.	MELCs 45	Applying	Lecture Think-Pair-Share	Formative Test		Evident
46.	MELCs 46	Applying	Use of Problem Sets Cooperative Learning	Unit Quiz/ Summative Test		Evident

47.	MELCs 47	Remembering/ Understanding	Group Activity Exploratory Activity Use of Worksheets Reporting	Worksheet	Group Report	Evident
48.	MELCs 48	Applying	Use of GeoGebra (graphing software) Demonstration teaching	Formative Test	Developing GeoGebra Skills	Evident
49.	MELCs 49	Analyzing	Socratic Method	Formative Test		Evident
50.	MELCs 50	Creating	Group Activity Exploratory Activity Use of Worksheets	Worksheet	Essay Writing	Evident
51.	MELCs 51	Applying	Cooperative Learning	Unit Quiz/ Summative Test		Evident

It can be gleaned from Table 5 that assessment tools were aligned with the teacher's instructions or strategies. Although the number of performance tasks was less than the written outputs, the teacher made sure that these tasks would cater to the needs of the learners to meet the 21st-century skills and were anchored with the performance standards. Aligned instruction and assessments with the curriculum can improve student performance (Abrams et al., 2016). Subsequently, well-aligned assessments provide valuable insights into student understanding, allowing educators to reflect on the learning outcomes and craft instructional materials to address specific needs and lapses.

In addition, based on the table, the lessons required lower-order thinking skills according to Bloom's Taxonomy. However, the teacher gave assessments not on the same level to allow learners to think deeply about problems in mathematics. Lastly, critical thinking skills were mostly developed among learners in Statistics and Probability. According to Johnson, Boon, and Thompson's (2020) research, there appears to be a particular issue with the way the curriculum's prescribed and implemented cognitive skills line up. The curriculum as provided incorporates cognitive abilities into learning objectives through the use of cognitive verbs like justifying, analyzing, and so on. Educational taxonomies, which facilitate conscious attempts to improve curriculum alignment and aid in the interpretation of the prescribed curriculum, can be used to classify those learning objectives into discrete cognitive categories.

Table 6 presents the distribution of developed 21st-century skills in the instruction and assessments. It was clear that critical thinking was commonly used in learning mathematics. In line with the K to 12 Mathematics Curriculum, critical thinking is one of the skills and attitudes that learners must achieve as they need to correctly assess information and successfully present arguments not just in mathematics, but also in real-life contexts. This also suggests that learners who are encouraged to think critically in mathematics can improve their learning process and be equipped with good decision-making as they relate mathematics to their lives (Sachdeva & Eggen, 2021).

Aside from critical thinking, information, media, and technology were commonly integrated among learners. This indicates that students show satisfaction and interest in learning through active teaching and learning methods that incorporate ICT tools. Moreover, this helps them improve their critical-thinking skills (Pramasdyahsari et al. (2023). Based on these findings, educators are encouraged to foster critical thinking skills in students through inquiry-based learning, real-world applications, collaborative work, and assessment reform (Zhu, 2023).

Table 6. Developed 21st century skills in instruction and assessments

21st Century Skills	Most Essential Learning Competencies	Frequency	Percent
1. Learning and Innovation			
a. Critical Thinking	1- 51	51	100.00%
b. Creativity	4, 5, 10, 14, 21, 43, 50	7	13.73%
c. Problem-Solving	3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 16, 17, 21, 23, 24, 25, 26, 27, 30, 32, 33, 34, 35, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 48, 49, 50, 51	37	72.55%
d. Collaboration	3, 4, 6, 7, 8, 10, 12, 13, 16, 18, 19, 21, 23, 24, 26, 30, 31, 33, 35, 37, 39, 40, 41, 43, 45, 46, 47, 50, 51	29	56.86%
2. Information, Media, and Technology	1-51	51	100.00%
3. Communication Skills	4, 21, 30	3	5.88%
4. Life and Career	5, 50	2	3.92%

Table 7. Student Outcomes in the Alignment of Instruction and Assessment

MELCs	Mastery Level	Description	Evident or Not Evident
MELCs 01	22%	Low	Not Evident
MELCs 02	28%	Low	Not Evident
MELCs 03	72%	Moving Towards Mastery	Evident
MELCs 04	48%	Average	Evident
MELCs 05	26%	Low	Not Evident
MELCs 06	43%	Average	Evident
MELCs 07	30%	Low	Not Evident
MELCs 08	30%	Low	Not Evident
MELCs 09	7%	Very Low	Not Evident
MELCs 10	43%	Average	Evident
MELCs 11	51%	Average	Evident
MELCs 12	67%	Moving Towards Mastery	Evident
MELCs 13	58%	Average	Evident
MELCs 14	81%	Moving Towards Mastery	Evident
MELCs 15	87%	Closely Approximating Mastery	Evident
MELCs 16	83%	Moving Towards Mastery	Evident
MELCs 17	84%	Moving Towards Mastery	Evident
MELCs 18	75%	Moving Towards Mastery	Evident
MELCs 19	72%	Moving Towards Mastery	Evident
MELCs 20	68%	Moving Towards Mastery	Evident
MELCs 21	76%	Moving Towards Mastery	Evident
MELCs 22	74%	Moving Towards Mastery	Evident
MELCs 23	61%	Average	Evident
MELCs 24	78%	Moving Towards Mastery	Evident
MELCs 25	69%	Moving Towards Mastery	Evident
MELCs 26	72%	Moving Towards Mastery	Evident
MELCs 27	50%	Average	Evident
MELCs 28	70%	Moving Towards Mastery	Evident
MELCs 29	54%	Average	Evident
MELCs 30	62%	Average	Evident
MELCs 31	42%	Average	Evident
MELCs 32	40%	Average	Evident
MELCs 33	59%	Average	Evident
MELCs 34	56%	Average	Evident
MELCs 35	70%	Moving Towards Mastery	Evident
MELCs 36	85%	Moving Towards Mastery	Evident
MELCs 37	69%	Moving Towards Mastery	Evident
MELCs 38	35%	Average	Evident
MELCs 39	65%	Average	Evident
MELCs 40	52%	Average	Evident
MELCs 41	33%	Low	Not Evident
MELCs 42	93%	Closely Approximating Mastery	Evident
MELCs 43	52%	Average	Evident
MELCs 44	74%	Moving Towards Mastery	Evident
MELCs 45	61%	Average	Evident
MELCs 46	37%	Average	Evident
MELCs 47	89%	Closely Approximating Mastery	Evident
MELCs 48	24%	Low	Not Evident
MELCs 49	20%	Low	Not Evident
MELCs 50	33%	Low	Not Evident
MELCs 51	91%	Closely Approximating Mastery	Evident
	57%	**Average**	**Evident**

Table 7 shows students' mastery of the learning competencies as indicated by the teacher's instructions. It can be gleaned from the table that the students achieved an average mastery of the competencies with 57%, despite having challenges in some learning competencies. Estrellado (2021) studied the analysis of the notable variation in the mastery level when categorized based on preferred learning methods. Using a descriptive survey, results showed that respondents' performance improved from the Pretest Mean of 12.27 and 31. 35% MPS to 30.82 as the mean and 75.40% MPS.

Inconsistencies in the alignment of instruction and assessments indicate that the teacher is encouraged to conduct reforms that can increase students' mastery of the learning competencies. This also suggests that the teacher needs to review the questions of the examination if they target the objectives of the learning competencies. Hence, Figure 1 shows the distribution of items in the 3rd and 4th quarter examinations as categorized using Bloom's Taxonomy.

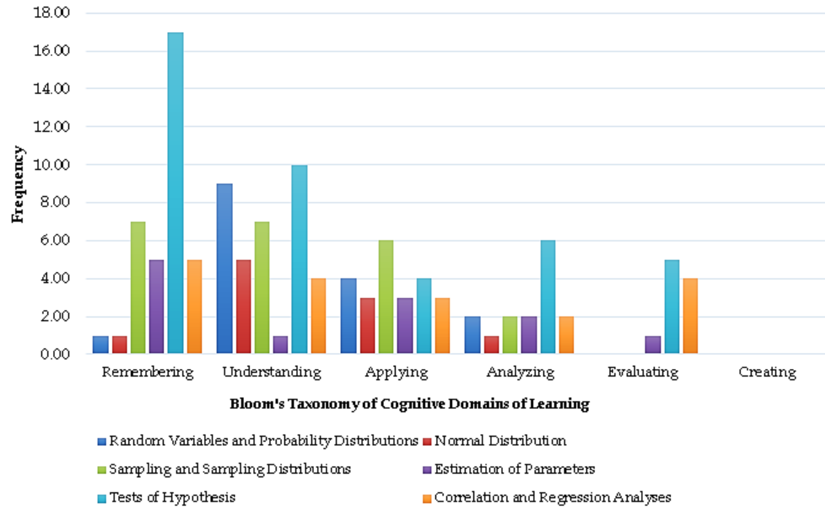

Figure 1. Item Distribution in the 3rd and 4th Quarter Examinations

It can be deduced from the figure that six (6) of the contents of Statistics and Probability have reached lower to higher-order thinking skills. However, the evaluating domain was only covered by the estimation of parameters, the tests of Hypotheses, and correlation and regression analysis. The highest cognitive domain was not covered by any of the contents of Statistics and Probability, while the most common domain was Remembering. This indicates that Statistics and Probability examinations cater to more questions in the lower-order thinking skills. This also suggests that students must improve their higher-order thinking skills, especially in the Evaluating and Creating parts. The study of Saido et al. (2015) revealed that students' lower level of cognitive skills was influenced by their learning environment and the nature of the subject curriculum.

3.4 Analysis of the Alignment of the Learning Assessments According to a Criterion

As shown in Table 8, materials used by the teacher in teaching Statistics and Probability are aligned with the indicators in the criterion of La Marca et al. (2000). Worksheets, Summative Tests, Activities or Problem Sets, Quarter Examinations, and Performance Tasks matched with the content, depth, emphasis, performance, and accessibility. This finding implies that despite the number of learning competencies in Statistics and Probability, the teacher constructed assessment tools that allowed students to target the lesson objectives. Appropriate learning assessments evaluate whether students have achieved the learning goals, and matching them with the objectives can better assess their abilities and attitudes towards the subject (Umar, 2018).

Table 8. The extent of alignment of learning assessments, according to La Marca et al. (2000)

Indicators	Materials Used in Statistics and Probability				
	Worksheets	**Summative Tests**	**Activities/ Problem Sets**	**Quarter Examinations**	**Performance Tasks**
1. Content match	Evident	Evident	Evident	Evident	Evident
2. Depth match	Evident	Evident	Evident	Evident	Evident
3. Emphasis	Evident	Evident	Evident	Evident	Evident
4. Performance match	Evident	Evident	Evident	Evident	Evident
5. Accessibility	Evident	Evident	Evident	Evident	Evident

3.5 Analysis of the Alignment of the Curriculum, Instruction, and Assessment According to Rubric

Table 9 shows the modified alignment rubric for the curriculum, instruction, and assessment.

Table 9. Alignment Rubric

Criteria	Excellent	Good	Needs Improvement
Proof of Knowledge Transfer How do you meet your broad, course-level goals? What activities will students complete?	Each course activity or assignment has at least one course-level objective identified for alignment. The connection between the activity and objectives is clear.	Some activities are aligned to course-level objectives. Some activities do not seem to align well with the identified course-level objectives.	Most course-level activities or assignments are not identified in the alignment table.
Lesson Outline How do you envision the course subject path for students?	All lessons are listed in order and contain a title. The lessons flow logically.	Some lessons or titles are missing from the outline.	The majority of the lessons are missing from the outline.
Objectives What is the goal of each lesson? What should students leave each lesson with?	Each lesson has at least one learning objective associated with it.	Some lessons are missing learning objectives.	The majority of lessons are missing learning objectives.
Assessments and Graded Activities Does your assessment show evidence that students have met the lesson's objective(s)?	The assessment descriptions show a clear connection with the lesson's learning objectives. Each assessment is tied to at least one objective.	Some assessments are not aligned with a lesson objective. While identified for alignment with an objective, how the assessment connects with the learning objective is unclear.	The majority of assessments are missing from the lessons. There is not enough assessment information to determine alignment with lesson objectives.
Resources Do your resources allow students to complete the aligned assessment?	Every assessment has a resource aligned to it. The alignment between the resource and assessment is clear.	Some assessments do not have resources that align with them. Some of the identified alignments between assessments and resources appear clear.	The majority of lessons are missing learning resources.

Table 10 presents the alignment of the teacher's instructions and assessments with the curriculum according to the above-given rubric, which includes 1) Proof of Knowledge Transfer, 2) Lesson Outline, 3) Objectives, 4) Assessments and Graded Activities, and 5) Resources.

Table 10. Checklist of alignment of the curriculum, instruction, and assessment

Indicators		Excellent	Good	Needs Improvement
I.	Proof of Knowledge Transfer		✓	
II.	Lesson Outline		✓	
III.	Objectives	✓		
IV.	Assessments and Graded Activities		✓	
V.	Resources	✓		

It can be seen in Table 10 that the teacher's instruction and assessment tools are aligned with the curriculum in the following indicators: Proof of Knowledge Transfer, Lesson Outline, Objectives, Assessment and Graded Activities, and Resources. On the other hand, the proof of knowledge transfer obtained a good level. Though each course activity or assignment has at least one course-level objective identified for alignment, some assessments are aligned to course-level objectives, as discussed in Table 8. One reason is that the teacher was new to teaching the subject, and some competencies required a review to be implemented properly in class. Another thing is that the teacher had limited resources in teaching the subject since the school was situated in a remote area where access to the internet was also limited. However, the students' assessment scores support the idea that they still gained knowledge from the teacher. Obtaining a good level in this indicator suggests that the teacher needs to fill the missing gaps to achieve excellent performance in teaching Statistics and Probability.

All lessons are listed in order and flow logically for the lesson outlines, but some are missing from the outline. Thus, the teacher's lesson outline reached a good level. This suggests that lesson outlines are important to keep the discussions flowing smoothly. Admittedly, the teacher did not usually follow the daily lesson log in teaching the subject since it was more time-consuming. So, the teacher implemented the lesson with strategies parallel to the outline or plan while following the lesson's objectives. Although following the DLL is important, having good lesson outlines indicates that the teacher is prepared to teach the subject.

Since each lesson has at least one learning objective, the objectives of the teacher's instructions and assessments achieved an excellent level. Moreover, though each assessment is tied to at least one objective, some assessments are not aligned with a lesson objective. While identified for alignment with an objective, how the assessment connects with the learning objective is unclear. Hence, assessments and graded activities attained a good level of alignment. Finally, every assessment has a resource aligned to it, and the alignment between the resource and assessment is clear. This indicates that resources obtained an excellent level of alignment. Furthermore, the teacher anchored her assessments to the objectives of the learning competencies, although some lesson objectives were not realized. Furthermore, an excellent level of resources signifies that the teacher ensures that the resources for the lessons are prepared and adequate. However, the assessment or graded activities need additional attention since the teacher's record on the students' assessments reflects low mastery of learners in some of the learning competencies.

4.0 Conclusion

The research findings indicate a positive alignment between curriculum, instruction, and assessment in the Statistics and Probability courses for 2022-2023 and 2023-2024. Key insights highlight that students achieved a consistently high level of academic performance, reflected by satisfactory average scores of 86.80 and 87.46, demonstrating effective teaching strategies and curricular alignment with K to 12 standards. The study shows that teacher instructions and assessment tools were carefully aligned with the curriculum and strategies to develop 21st-century skills, specifically critical thinking and technological literacy. Students achieved an average mastery level of 57%, with a predominant focus on the "remembering" level of Bloom's taxonomy, indicating potential areas for deeper engagement in higher-order thinking skills. The teacher demonstrated strong instructional planning, with high ratings in transfer, lesson outlines, and assessment practices, ensuring that the curriculum, instruction, and assessment were well-coordinated.

Moreover, the alignment of teaching and learning resources with curriculum standards reinforces the overall effectiveness of the instructional approach. However, to enhance student mastery and engagement with complex cognitive tasks, the study recommends a multi-faceted approach: implementing standards-based assessments, fostering effective teaching methods, offering teacher support, strengthening evaluation practices, and contextualizing assessments to promote 21st-century skills further. These findings underline the efficacy of the current educational strategies and provide actionable insights to refine and optimize the alignment of curriculum, instruction, and assessment, thereby supporting continuous improvement in student outcomes and skills development.

5.0 Contributions of Authors

The author solely prepared and finished this academic endeavor.

6.0 Funding

There is no specific grant or external funding source for this research, but the researcher utilized her resources for it.

7.0 Conflict of Interests

The author declares that this undertaking has no conflict of interest.

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Insiders' Voices: The Case of Informal Teacher Leaders in Lanao del Sur, Philippines

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Abstract. As part of the continuing efforts to contribute to the literature and studies on informal teacher leadership, this study aimed to explore and investigate the case of informal teacher leaders in Lanao del Sur and proposed an informal teacher leadership model generated from the findings. This study utilized a qualitative approach and employed a case study design. To holistically understand the case, twenty-four informal teacher leaders from different secondary schools were purposively identified and recommended to participate in the study. The data were gathered through focused-group interviews, personal narratives, and observations and were analyzed through Thematic Analysis. The findings unveiled that leadership and informal teacher leadership are defined as a skill or a process of mobilizing people toward attaining goals. The findings also discovered developed leadership attitudes and skills essential for effective and successful leadership. Besides, these informal teacher leaders encountered conditions that encouraged or discouraged them from taking leadership roles and accepting additional duties and responsibilities. From these findings, an informal teacher leadership model was generated. This model could be adopted and properly implemented to formally recognize and increase informal teacher leaders, nurture and harness their potential, and motivate them to take leadership roles because they foster a culture of collaboration, innovation, and continuous teaching and learning improvement in schools.

Keywords: Case study; Informal teacher leaders; Teacher leadership; Philippines.

1.0 Introduction

The Governance of Basic Education Act of 2001 states that principals are expected to be instructional leaders and administrative managers. They are responsible for administrative and instructional supervision of the schools. Republic Act 9155 specifies that the duties and responsibilities of the principals are creating an environment within the school that is conducive to teaching and learning, implementing the school curriculum, being accountable for higher learning outcomes, and encouraging staff development (Official Gazette of the Republic of the Philippines, 2001). Republic Act 9155 further explains that principals are accountable for the outcomes of the school operations, programs, and projects. They have the authority, responsibility, and accountability to manage all school affairs (Official Gazette of the Republic of the Philippines, 2001). With this, school principals are overwhelmed by work demands and challenged to engage in planning to find innovative solutions to school problems. Hence, they need assistance to balance and fulfill all their work and teachers are the untapped sources of leadership who can assist and help them.

Consequently, various studies (York-Barr & Duke, 2004; Fairman & Mackenzie, 2012; Oracion, 2017) on teacher leadership were conducted to help principals in their daily work and to develop the leadership potential of teachers. Teacher leadership is viewed as a powerful position in the educational system for its immense influence on improving school, teaching, and learning. Several studies (Wenner & Campbell, 2017; Fairman & Mackenzie, 2012; York-Barr & Duke, 2004; Sabatini, 2002; Crowther & Olsen, 1997) attested to it. Barth (2001) argued that the students, teachers, and principals immensely benefit from teacher leadership when it is practiced and supported in the school. This means teacher leadership is a position that makes change happen (Lieberman & Miller, 2004), and this kind of leadership is associated with the improvements of the school, school democracy, teacher learning, and the development of collaborative culture (Mujis & Harris, 2006, York-Barr & Duke, 2004).

However, teacher leadership is not totally recognized and acknowledged in the Philippines because of the three critical problems. First, the phrase "I am only a teacher" is why teachers refuse to accept leadership roles and assume duties and responsibilities (Helterbran, 2010). Second, school leadership is centered on principals. Schools are run by hierarchical leadership structures that leave teachers out of the decision-making process and fail to provide adequate instructional leadership (Elmore, 2000; Fullan, 2001). Lastly, teacher leadership is limited to formal titles or positions. Thus, there is a need to understand that teacher leadership consists of two kinds: formal and informal teacher leadership. Formal teacher leaders are teachers who have forgone all or part of their teaching loads to take leadership roles (Ross, 2019). They are designated by the school and receive time and monetary compensation. In contrast, informal teacher leaders are full-time classroom teachers who engage in leadership work (Wenner & Campbell, 2017) even without formal leadership titles to designate their roles or time and money compensation (Oracion, 2017).

Both formal and informal teacher leaders have an impact on school improvement and teaching-learning. However, informal teacher leaders might be even more influential (Berg et al., 2019). Likewise, numerous studies (Dami, 2021; Ross, 2019; Martin, 2018; and DeMore-Palmer, 2011) supported that informal teacher leaders have a more significant impact or influence on teaching and learning than formal leadership (Fairman & Mackenzie, 2012; Lieberman & Friedrich, 2007; Mangin, 2005) Though it may be less visible, informal teacher leadership is indispensable as a force for change. These premises open the door to exploring informal teacher leaders due to their impact and influence (Ross, 2019). However, there appear to be few published international and local studies on informal teacher leadership. Though many studies advocate for teacher leadership, they were focused on formal teacher leaders (Cruz, 2018; Wenner & Campbell, 2017; Fitzgerald & Gunther, 2008; York-Barr & Duke, 2004). Only a few studies were engrossed in informal teacher leaders. Informal teacher leaders are undefined, and more needs to be written from the perspectives of the informal teacher leaders.

In the Philippines, specifically in Lanao del Sur, few studies on informal teacher leadership have been published. Therefore, this study aimed to explore and investigate informal teacher leadership as part of the continuing efforts to contribute to the literature and studies. Besides, it gathered rich, detailed, and in-depth data from the viewpoints of informal teacher leaders who accept leadership roles, duties, and responsibilities to generate an informal teacher leadership model contextualized to the Bangsamoro community. This serves as guide for the principals and administrators to This serves as one of the bases to challenge educational policy-makers to review and reform school leadership policies that recognize informal teacher leadership roles and promote the inclusion of teachers in leadership.

2.0 Methodology

2.1 Research Design

This research study utilized a qualitative approach. Creswell (2014) stressed that a qualitative approach is best suited for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. Specifically, it employed a case study design. Creswell (2007) stated that a case study is the preferred strategy when 'how' or 'why' questions are asked, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within a real-life context. The use of a case study is deemed appropriate to the aim of this study and to gain a concrete, contextual, and in-depth understanding or insight of the knowledge and experiences of the informal teacher leaders as they practice or perform leadership in their school contexts.

2. 2 Research Locale
This study was conducted in selected secondary schools in Lanao del Sur (Lanao del Sur 1, Lanao del Sur 2, and Marawi City). Lanao del Sur was chosen as the locale of the study because there are few existing studies about informal teacher leadership that have been conducted or published and studies that aim to design an informal teacher leadership model anchored in the context of Lanao del Sur.

2.3 Research Participants
As applicable in most qualitative study designs, the number of participants in a case study is typically small (Hammarberg et al., 2016; Vasileiou et al., 2018). Bernard (2000) suggested that between ten and twenty knowledgeable participants are sufficient to uncover and understand issues. Hence, the participants of this study were 24 informal teacher leaders from different secondary schools in Lanao del Sur. They were identified and recommended by the school principals to participate in focused-group interviews, write personal narratives, and undergo observations. These participants were purposively selected because of their knowledge and experiences in informal teacher leadership. Thus, the detailed and varied perspectives of these 24 participants were sufficient to uncover rich and in-depth insights about the case of informal teacher leaders in Lanao del Sur.

2. 4 Research Instruments
The researcher used focused-group interviews, personal narratives, and observations to gather data. Focused-group interview was chosen to collect a variety of knowledge and experiences from the participants. The guide questions are aligned with the research questions as well as the central framework of the study. Data were also gathered through written personal narratives to gain a deeper understanding of the case of informal teacher leaders through their knowledge, experiences, and perspectives. Personal narratives were used to substantiate the data gathered from FGI. Data were also collected through observations and field notes as they practiced leadership. The researcher conducted observations with some of the participants to verify and supplement other sources of data to enhance the credibility and validity of the research findings.

2. 5 Data Gathering Procedure
The researcher obtained the approval of individuals in authority (Creswell & Creswell, 2018). Seeking permission from the Ministry of Basic Higher and Technical Education and the School Divisions Superintendents of Lanao del Sur 1, Lanao del Sur 2, and Marawi City Division were commenced through personal visits and giving formal letters that specified the extent of time, the potential impact, and the research outcomes.

After approval, the researcher went to the target secondary schools and personally talked and handed letters to the principals. During these visits, the researcher gave brief information about the research, asked permission, and requested them to identify and recommend informal teacher leaders who could participate in the study. Then, the researcher talked and asked permission to the recommended informal teacher leaders to participate in the study. They were given an information sheet that explained the research, its objectives, and its contribution to education. They were also asked to sign the consent form before the data collection. Those willing to participate were approached or contacted for the focused-group interview, personal narrative, and observation schedules.

The collected data were analyzed through thematic analysis. This involved transcribing and bracketing the data, developing codes, forming categories, creating themes, writing analysis, validating the findings with the participants, generating table presentation and explaining the findings.

2. 6 Ethical Considerations
This study adhered to and safeguarded the sanctity of research ethics. Thus, all measures to protect the participant's identity and the ways to govern confidentiality, integrity, and objectivity were strictly followed and observed throughout the research process.

3.0 Results and Discussion

3.1 Concepts of Leadership
The findings (see Table 1) exposed six (6) major themes on the concept of leadership. These are leadership as a skill, leadership as a process, leadership involves mobilizing people, leadership involves attainment of goals, leadership as a vision, and leadership as an obligation.

Table 1. Themes, Frequency, and some responses on the concept of leadership

Themes	Frequency	Participants	Some Responses
Leadership as a Skill	15	(P2) (P4) (P5) (P6) (P7) (P10) (P11) (P12) (P13) (P14) (P15) (P16) (P19) (P22) (P23)	Leadership is a practical skill that includes an individual's ability to lead, influence, or guide others. (P16) The concept of leadership means the ability of a person to motivate, inspire, and influence others to attain a certain goal or vision. (P10)
Leadership as a Process	9	(P1) (P3) (P4) (P6) (P7) (P12) (P14) (P19) (P24)	Leadership is the process of how a leader performs his role, duties, and responsibilities to achieve goals. (P4) Leadership is the act or work of a leader who possesses leadership qualities and skills to lead towards attaining a successful plan and achieving the goal. (P1)
Leadership involves Mobilizing People	22	(P1) (P2) (P4) (P5) (P6) (P7) (P8) (P9) (P10) (P11) (P12) (P13) (P14) (P16) (P17) (P18) (P19) (P20) (P21) (P22) (P23) (24)	Leadership is to influence, conform, and inspire others to work and to guide others to succeed, and a leader possesses these. (P20) It involves the ability of influencing and motivating others, making decisions, and effectively communicating and collaborating with team members. (P12)
Leadership Involves Attainment of Goals	17	(P1) (P2) (P3) (P4) (P6) (P7) (P8) (P10) (P11) (P12) (P13) (P14) (18) (P21) (P22) (P23) (P24)	Leadership is the accomplishment of a goal through the direction of leaders. The leader is the person who successfully guides his colleagues to achieve particular ends or goals. (P18) Leadership is the act of leading people or groups of people to achieve organizational goals. (P24)
Leadership as a Vision	2	(P11) (P23)	It involves setting a vision, communicating it clearly, and creating an environment that motivates others to work towards that vision. (P11) It is the capacity to translate vision into reality to achieve common goals. (P23)
Leadership as an Obligation	2	(P15) (P17)	Leadership can be a skill that needs to be developed in a matter of time. It is a sense of responsibility. (P15) Leadership, for me, is not just about leading your people. It is also about having a sense of responsibility and accountability. A sense of responsibility means to guide, protect, motivate, and give your people room to grow. Then, accountability means accepting responsibility when things go wrong and giving credit where it is due. (P17)

The findings conceptualized leadership as a skill or a process of mobilizing individuals or groups of individuals to attain the common goals of an organization. This complemented the definition of Yukl (2006) that leadership is a process of influencing others to have a unified understanding and agreement about what needs to be done and how to do it. He added that it is a process of facilitating individuals to have collective efforts to accomplish common objectives. Northouse (2010) also intellectualized leadership as a process whereby an individual influences a group of individuals to achieve common goals. Likewise, Leithwood (2012) stressed that leadership is the exercise of influence on the members of an organization and diverse stakeholders toward the identification and achievement of goals. The findings also defined leadership as a vision and an obligation to make goals tangible and possible by directing people toward the achievement of goals. Handy (1992) also insisted on the importance of setting a vision and sharing it with others, which gives a point to the work of others. This means that leadership is ability to create a compelling vision and translate it into realities. Furthermore, Molinario (2016) emphasized that when an individual is aware of his obligations as a leader and always keeps sight of the people he leads while leading, he can effectively and efficiently manage tensions that will arise.

The findings imply that informal teacher leaders' concept of leadership forms how they perceive themselves as leaders which contributes to the development of a leadership identity that aligns with the personal values and needs of the organization. It also affects the way they practice leadership and lead others which in turn affects morale, motivation, and productivity. It shapes not only their actions but also the cultures within which leadership occurs. This suggests that conceptualizing leadership encourages informal teacher leaders to explore various leadership theories, styles, and models to be adopted and practiced.

3.2 Concepts of Informal Teacher Leadership

The findings (see Table 2) revealed nine (9) significant themes on the concept of informal teacher leadership. These are leadership as a skill, leadership as a process, leadership involves mobilizing stakeholders, leadership involves attainment of educational goals, voluntarily undertaking of additional tasks, ancillary duties, and responsibilities, duties beyond the teaching description, informally designated to teachers, and practiced by recognized teachers.

The findings conceptualized informal teacher leadership as a skill or a process of mobilizing stakeholders towards the attainment of educational goals such as increasing students' learning and achievements and school improvement through providing quality and inclusive education. According to Fullan (2007), leadership mobilizes people's commitment to implement plans. It is an individual commitment, but above all, it is collective mobilization. York-Barr and Duke (2004) complemented this when they described teacher leadership as a process wherein teachers individually or collectively influence their colleagues, principals, and stakeholders to improve teaching and learning practices to increase students learning and achievement. Danielson (2006) eloquently demarcated teacher leadership as a set of skills demonstrated by teachers who continue to teach students but also have influence on others and extend duties and responsibilities beyond their classrooms.

Table 2. Themes, frequency, and some responses on the concept of informal teacher leadership

Themes	Frequency	Participants	Some Responses
Leadership as Skill	7	(P1) (P3) (P4) (P9) (P15) (P16) (P23)	Informal teacher leadership is a skill of making change possible by influencing people to attain the school's objectives or goals. (P16) Informal teacher leadership is the ability to lead the people in the school to reach school objectives like providing standard education. (P23)
Leadership as Process	7	(P5) (P6) (P7) (P9) (P10) (P18) (P20)	Informal teacher leadership, for me, is a process done by a teacher through leading students and colleagues, even without designations. (P6) It is a voluntary act of a teacher who wants to contribute and help the school shape students' minds. (P10)
Leadership as Mobilizing People	11	(P2) (P3) (P4) (P5) (P6) (P7) (P9) (P16) (P17) (P18) (P23)	It is a kind of leadership where an informal teacher leader guides and influences people in the school, the stakeholders, even without designation. (P17) Informal teacher leadership is the skill of influencing others to achieve the goal. (P4)
Leadership Involves Attainment of Educational Goals	5	(P4) (P7) (P16) (P18) (P23)	Informal teacher leadership is a voluntary action of a teacher like us. We are accepting additional tasks aside from teaching to achieve the school's aims of providing quality education to the students. (P18) Informal teacher leadership is a skill of making change possible by influencing people to attain the school's objectives or goals. (P16)
Voluntary Undertaking Additional Task	14	(P1) (P4) (P5) (P9) (P10) (P11) (P12) (P13) (P15) (P18) (P20) (P21) (P22) (P24)	This kind of leadership is not compensated. It is for the good of the school. I know it is another responsibility to benefit the students and the school. That will be enough reason to do the job. (P1) Informal teacher leadership is a voluntary action of leading people in the school. Informal teacher leaders have no formal designations but are willing to help. They are willing to lead. (P9)
Ancillary Duties and Responsibilities	12	(P1) (P3) (P5) (P8) (P10) (P11) (P12) (P13) (P17) (P18) (P19) (P22)	Informal teacher leadership is an additional responsibility to the teacher yet fulfilling duty. That is how I define informal teacher leadership. (P8) You must be committed to your work as an informal teacher leader because you are doing additional tasks besides teaching. (P10)
Duties Beyond Teaching Description	12	(P4) (P6) (P7) (P9) (P12) (P13) (P16) (P18) (P19) (P20) (P21) (P22)	My concept of informal teacher leadership is an activity outside of teaching. For example, those activities that were given to us as coordinators. It is an extension of our work wherein we are not obliged to do it, but with our passion for teaching, we accept it and exert extra effort. (P12) It has something to do with what teachers do outside the four corners of the classroom. It is beyond the teaching and learning process. So, just like what you have mentioned, it involves other school activities and programs as long as it is not the everyday routine in the four corners of the classroom. So, we teachers are involved in that. (P19)
Informally Designated to Teachers	8	(P11) (P6) (P9) (P15) (P16) (P20) (P21) (P22)	When you talk about informality, it means there is no black-and-white document to show, but the fact that the person who appointed you is the right person to give you the designation means you must feel confident. (P21) My concept of informal teacher leadership is a voluntary action by a teacher designated by the principal. It is informally designated because formality still matters to BARMM. (P20).
Taken by Recognized Teachers	23	(P1) (P2) (P3) (P4) (P5) (P6) (P7) (P8) (P9) (P10) (P11) (P12) (P13) (P14) (P15) (P16) (P17) (P18) (P19) (P20) (P21) (P22) (P23)	I am glad that we are informal teacher leaders. We are recognized based on our expertise and abilities. (P6) She knows that I have the potential to lead, so she always assigns me tasks and designated me as coordinator field. She can trust me. Those became the pathway for my principal to choose me as an informal teacher leader. (P7)

It also defined informal teacher leadership as voluntarily accepting additional tasks beyond job descriptions and informally taking extra duties and responsibilities even without time and money compensation and even without formal designation. These accounts are supported by Ross (2019) who stressed that informal teacher leaders are willing to extend their duties and responsibilities beyond their classrooms or their job descriptions to engage in professional learning. Equally, Muijs and Harris (2007) argued that informal teacher leaders voluntarily engage in additional tasks, duties, and responsibilities without expecting compensation. Hence, teacher leaders are praised for their confidence in extending their expertise beyond their classrooms (Lieberman & Miller, 2005).

Furthermore, informal teacher leadership is taken or practiced by teachers who are perceived to have well-regarded ability and expertise, experience, credibility, and honor and possess leadership attitudes and skills. Martin (2018) specified in his study that experience and credibility are essential elements to be perceived as a legitimate leader among colleagues; informal teacher leaders are expected to have several years in teaching and are described as successful teachers in their classrooms both in mastering their expertise and reaching their students. Correspondingly, Oracion (2007) detailed that teacher leaders are excellent and highly effective teachers who are recognized by principals, colleagues, and students by showing trust in them. In connection, these teachers possessed leadership attitudes, which are greatly important for them to thrive in practicing leadership in their school contexts.

The findings imply that informal teacher leaders should have a clear concept of informal teacher leadership. It affects how they lead, how followers respond, and how leadership is approached. It also forms how they see themselves as leaders. These suggest informal teacher leaders to explore and adopt numerous leadership theories, styles, and models that contribute to the development of their leadership identity so that they can be effective and efficient. In addition, conceptualizing and understanding informal teacher leadership acknowledges that leadership can come from teachers, regardless of title or rank. With this, informal teacher leaders are empowered to take initiative, share their expertise, and lead in their schools. It allows them to make significant contributions to students' performance and school development. Hence, it promotes an inclusive, collaborative, and innovative school environment, where leadership is a shared responsibility.

3.3 Developed Leadership Attitudes

The results (see Table 3) discovered fourteen (14) themes on developed leadership attitudes among informal teacher leaders as they practiced leadership in their schools. These are increased sense of obligation, honor opinions and value support from others, developed sense of autonomy, demonstrated emotional intelligence, amplified positive and constructive attitudes and mindsets, augmented boldness to face adversity, increased enthusiasm in teaching and imparting knowledge, developed steadfastness in facing trials, conform and follow orders, amplified willpower despite deterrents, lead by example, advocate change, adhered moral principles, and aspired goal achievement.

Table 3. Themes, frequency, and some responses on developed leadership attitudes

Themes	Frequency	Participants	Some Responses
Increased Sense of Obligation	9	(P1) (P2) (P6) (P7) (P9) (P10) (P17) (P18) (P23)	My commitment to teaching has increased despite many hindrances. I give extra time, effort, and money to achieve my goals for my students. (P9) I have become more motivated and inspired to teach my students because I want to give them the standard education they deserve. (P18)
Honor Opinions and Value Support from Others	9	(P2) (P3) (P4) (P6) (P9) (P13) (P16) (P21) (P22)	Another is being open-minded. We accept ideas and suggestions. We are open to suggestions from students and parents. We honor the opinions of others. (P9) In terms of leadership, I become more open to others. I encourage everyone to participate in the process. I get their opinions and hear them out for better output. (P16)
Developed Sense of Autonomy	9	(P1) (P3) (P4) (P5) (P7) (P8) (P10) (P15) (P19)	I organized and conducted Career Guidance. My initiative is to motivate the students by identifying careers that match their skills, interests, and personalities. Alhamdulillah! It was successful even without the presence of the principal. (P4) One of the things I learned and am practicing now is to be responsible when you do your job or whatever task is given to you. (P4)
Demonstrated Emotional Intelligence	9	(P6) (P8) (P10) (P11) (P12) (P17) (P20) (P21) (P24)	Your concerns for the students develop as you become a teacher leader. You are not the kind of teacher who does not care if they understand the lesson or not. (P9) I have learned to consider how they express themselves. I allow them to express who they are, which they could not do at home. I have realized that it is better to listen to them, but sometimes you must be strict when it is too much. (P6)
Amplified Positive and Constructive Attitudes and Mindsets	8	(P1) (P6) (P11) (P12) (P13) (P14) (P18) (P19)	You must have a positive attitude to think you can do it. "Okay, I can do it! I must try this to become an effective teacher and leader". (P19) I developed positive attitude despite criticisms from colleagues. It is inevitable to commit mistakes because you are only human. (P11)
Augmented Boldness to Face Adversity	8	(P3) (P4) (P11) (P14) (P15) (P18) (P19) (P23)	I am a shy type. I do not usually mingle or converse with my co-teachers if it is unimportant. When they saw my potential, they assigned me to organize and conduct school activities and attend seminars. Since then, I have started to build my confidence to accomplish tasks assigned to me. I am no longer scared to commit mistakes. (P3) You have to think that you can do it. You have to try. You are not afraid to try new things to further develop your skills. You can use these skills not only as a teacher but also as a leader. (P19)
Increased Enthusiasm in Teaching and Imparting Knowledge	7	(P1) (P7) (P9) (P10) (P12) (P13) (P16)	As an informal teacher leader, I become more passionate because I am dedicated to provide the standard education to my students. (P1) I love to work with people around me. If there is no love, you will feel that you are struggling. Being sincere in your work is the most important. Sincere love for the students is the most beautiful. (P10)
Developed Steadfastness in Facing Trials	7	(P2) (P9) (P17) (P18) (P20) (P21) (P23)	I am resilient. When you have that resiliency, you bounce back from any difficulties. That is an essential characteristic you should have as an informal teacher leader. (P4) You are resilient in dealing with the stakeholders, especially the parents because they are difficult to deal with when it comes to the status and problems of their children. (P18)
Conform and Follow Orders	7	(P1) (P2) (P3) (P4) (P11) (P13) (P14)	I never complain to my principal. When he is giving me tasks, I always say yes. (P14) I have learned and developed to be a good follower. If you want to be a leader, you must learn to follow. Learn to be a follower. You have to follow the rules. You will go through with those things. You need to be a good follower to become a good leader. (P1)
Amplified Willpower Despite Deterrents	5	(P1) (P3) (P4) (P9) (P12)	I have strong willpower. I have the mentality that I am going to finish this work whether others will help or not or whether it will rain or not (P1) There may not be any support from the principal. There are many competitions in the division, and sometimes, we cannot participate. But in Math department, we really find ways to have our representative. Looking for finances and everything else is all up to you. (P5)
Lead By Example	4	(P1) (P8) (P9) (P20)	It is also essential that we become role models so that we can have an impact and influence to our students. (P9) So, the impact is that you become the school head's benchmark or role model in inspiring other teachers to do well. (P20)
Advocate Change	4	(P1) (P4) (P5) (P10)	I am very innovative because we are catalysts of change. We adapt to change for progress. (P1) We are catalysts of change. Change starts with us. Who will make the change if change does not start with us? Let us accept that there are problems in our educational system. It is not only you who change it, collaboration. You collaborate with your colleagues and your superiors to make change possible. (P4)
Adhered Moral Principles	3	(P1) (P3) (P10)	We also have personal integrity. Integrity matters to us, and we value it. We are truthful to ourselves and to others to gain respect and understanding. (P1) As a teacher leader, I told the students to go to school, prepare for examinations, and be on time. I always come on time. When another teacher wanted to switch schedules, I refused because I had already announced it, and the students had studied for the exam. It will be frustrating for them if I will tell them next time. It will leave an impression that I am a liar. So, when I say it, I mean it. (P10)
Aspired Goal Achievement	2	(P4) (P13)	A good leader leads the way and lights the way. Right? You always begin with an end. (P4) As an SSG adviser, I aim to help my students implement their platforms. I want them to accomplish their platforms and implement them at the end of the school year. I make sure that by the end of the school year, whatever their plans are implemented. (P13)

Wenner and Campbell (2017) supported these findings. The findings explained that informal teacher leaders have a great sense of obligation by showing accountability and responsibility in all tasks and designations assigned to them (Oracion, 2007). This is depicted by their enthusiasm for teaching and imparting knowledge to stakeholders to achieve their aspired educational goals. Informal teacher leaders also have a great sense of autonomy through establishing goals, initiating actions, and solving problems (Martin, 2018). They persist and do not permit setbacks to derail the important initiative they are pursuing (Danielson, 2007). They develop steadfastness, boldness and strong will to face adversity to reach their goals. Additionally, they adhere to moral principles and lead by example to make change in their schools. They are agent of change.

Besides, Danielson (2007) stressed that influential teacher leaders possess necessary attitudes such as open-mindedness and respect for other's views and ideas. They are open to exploring options to gather the necessary resources to improve learning and develop the school (York-Barr & Duke, 2004). Additionally, Goleman et al, (2002) emphasized that teacher leaders possess emotional intelligence, which encompasses personal and social competence and demonstrates the ability to manage oneself and one's relationships with others. Crowther et al. (2009) also postulated that teacher leaders exuded optimism and are capable of transforming negativities into positivity. In connection, they positively conform and follow orders of the principals and others to build and maintain good relationships.

The findings indicate that informal teacher leaders should possess and develop leadership attitudes that are indispensable to engage in leadership. These leadership attitudes influence them how to approach and interact with stakeholders, make decisions, and drive change which directly impact their schools. These equip them to handle complex challenges, make better decisions, inspire stakeholders, and drive positive change. These propose that informal teacher leaders should consistently develop and augment leadership attitudes to inspire, influence, and guide stakeholders to achieve common goals. Thus, informal teacher leaders should engage in an ongoing process that involves self-awareness, empathy, adaptability, and commitment to personal and professional growth. Additionally, school principals should empower teachers, foster collaboration, offer personal and professional development, model positive leadership attitudes, and create an environment where teachers can naturally develop their leadership attitudes.

3.4 Developed Leadership Skills

The results (see Table 4) discovered ten (10) main themes on developed leadership skills among informal teacher leaders such as effective communication and connection skills, improved technical skills, build authentic relationships and teamwork, developed organization and time management skills, augmented problem-solving skills, amplified adaptability, increased critical-thinking skills, heightened ability to influence, enhanced ability to coach and mentor, and improved decision-making skills.

Kasapoğlu and Karaca (2021) found that teacher leaders are excellent communicators. They prioritize listening over speaking and seek to understand different perspectives. They clarify, probe, and synthesize ideas and questions to understand the concerns and leverage the expertise of others. They also establish open communication, where all ideas are heard and all possibilities are explored. In connection, Lieberman and Miller (2005) accentuated that teacher leaders relate to their colleagues by speaking their minds about what is best for students, bringing innovation to schools, and acting as stewards for change to shape the profession positively.

Also, teacher leaders influence colleagues by cultivating collegial relationships and fostering a culture of trust and collaboration (Lieberman & Miller, 2005; Martin, 2007). Angelle and DeHart (2011) mentioned that teacher leadership involves sharing knowledge on pedagogy and classroom management with colleagues, accepting leadership opportunities when asked, and routinely stepping beyond required detaching duties to serve students and the school. Besides, they are problem solvers or solution-driven leaders who sometimes solve problems themselves but usually encourage colleagues towards solutions suited to the school community (Oracion, 2007). connection, their skill in decision-making enables them to act intuitively and take advantage of the opportunities to do tasks and solve problems.

Table 4. Themes, frequency, and some responses on developed leadership skills

Themes	Frequencies	Participants	Some Responses
Effective Communication and Connection Skills	21	(P1) (P2) (P3) (P4) (P5) (P6) (P7) (P8) (P9) (P10) (P11) (P12) (P13) (P15) (P16) (P17) (P19) (P20) (P21) (P23) (P24)	The way you communicate always defines you. You should know whom you are talking with, whom you are talking to, and when, where, and how. An informal teacher leader knows what to talk about and how to talk about it. When you are talking to your co-teachers, you know how to say it. (P9) We need communication skills because we cannot avoid talking to stakeholders. We must know how to communicate to them and consider our differences to avoid misunderstandings. (P11)
Improved Technical Skills	16	(P1) (P2) (P3) (P4) (P5) (P10) (P12) (P13) (P14) (P16) (P17) (P18) (P19) (P20) (P22) (P24)	Regarding technical competence, you should have sufficient knowledge about your tasks or designations. (P1) In campus journalism and research, you should be good in English, grammar, and writing...You must be capable in writing English and Filipino articles, use correct grammar, and write research paper. (P20)
Build Authentic Relationship and Teamwork	13	(P1) (P2) (P4) (P6) (P7) (P8) (P10) (P12) (P13) (P14) (P15) (P16) (P24)	The other one is building relationships. This is a crucial skill of a leader because having a good relationship with co-teachers and learners will manifest good results. (P1) When you are a leader, you are willing to work collaboratively with your colleagues and your school head to achieve goals in a united manner. (P6)
Amplified Adaptability	13	(P4) (P6) (P7) (P8) (P12) (P14) (P15) (P19) (P20) (P21) (P22) (P23) (P24)	I learned from being an informal teacher leader is adjustment. Although I graduated from that school, the set-up of generations then and now is very different. If we had been diverse before, they would have been more diverse because of this technological breakthrough. (P15) Through informal leadership, I began to understand the different personalities of the people I am dealing with, such as my students and co-teachers. (P19)
Developed Organization and Time Management Skills	11	(P1) (P4) (P8) (P10) (P11) (P13) (P14) (P15) (P20) (P21) (P24)	Time management skills: Knowing this, you can properly organize your tasks and allocate time to each task to attain your goals. (P1) Time management: As a guidance counselor, adviser, and given other tasks, you must know how to manage time because conflicts will happen. I need to prioritize those that need to be prioritized. (P8)
Augmented Problem-Solving Skills	10	(P3) (P8) (P9) (P10) (P13) (P15) (P16) (P17) (P20) (P21)	You can do something to solve the problems encountered in school by exchanging ideas with colleagues to come up with solutions to the problem. (P3) Accepting designations and tasks given by our principal is a real challenge. It is sometimes difficult to do tasks, especially when they need to be accomplished simultaneously. So, I have to organize tasks and prioritize the important ones. (P8)
Increased Critical Thinking	7	(P8) (P9) (P11) (P15) (P18) (P20) (P24)	In research, I am the president of the association. I am dealing with teachers and division officials. In journalism, culture, and arts, I am dealing with students. Then, as G11 chairperson, I am dealing with teachers, parents, guardians, students, social officials, and everybody. I always use different skills in each designation. (P19) I have developed my critical thinking skills because I needed to conceptualize how I can comprehensively deliver the topic to the participants. (P15)
Heightened Ability to Influence Others	7	(P1) (P3) (P8) (P10) (P13) (P14) (P19)	To our students, we become their inspirations. We inspire them to be involved in learning for their future. (P1) We are influencers. We specifically influence our students because they are our number one priority. To our students, we are given the chance to become good leaders in the future. (P6)
Enhanced Ability Coach and Mentor Others	5	(P5) (P10) (P18) (P20) (P23)	My training is all about math and teaching techniques. Then, I cascade this learning to my co-teachers. (P5) I developed my communication and listening skills and was able to manage and provide guidance and assistance to colleagues. (P10)
Improved Decision-Making	3	(P6) (P8) (P10)	It is not because you are the leader; it is not right that only your decision matters and should be followed. Some might disagree with it. What is okay for you might not be okay for them, and you do not realize it. So, you need to listen to other people, not just yourself. (P10) I agree with ma'am that when you are a leader, you are willing to work collaboratively with colleagues and the school head to achieve goals in a united manner. When you are a leader, you must stand firm on your decision. There are times when you will hurt someone. That is where your good communication skills come in. How will you explain the advantages of your decision to your colleagues? How will you explain to them that the decision is objective, fair, and beneficial to many? (P6)

Furthermore, Meyer (2019) commended that teacher leaders are trailblazers. They are adopter, try new things, and discover the unseen. They pursue professional development opportunities to learn more to improve their practice, share experiences, and collaborate with others to reach goals. Wenner and Campbell (2017) stated that teacher leaders are engaged in tasks beyond their classrooms, support professional learning in their schools, involve in policy and decision-making and focus on learning, achievement, and development of their students. York-Barr and Duke (2004) and Leithwood (2012) stressed that teacher leaders influence stakeholders towards identification and achievement of the organizational visions and goals.

These findings infer that informal teacher leadership is for those teachers who possess and develop leadership skills important to organizational success, driving performance, fostering innovation, and cultivating positive culture. These skills are vital and must be possessed by informal teacher leaders to execute leadership. These mean that engaging in leadership roles covers a range of skills such as communication, decision-making, problem-solving, emotional intelligence, adaptability, team building, and influence. Hence, informal teacher leaders should involve in professional development programs to enhance and develop their leadership skills. Moreover, school principals should create opportunities for informal teacher leaders to develop their leadership skills by including them in instructional practices, curriculum development, and school improvement plans.

3.5 Conditions that Encourage Informal Teacher Leaders

The findings (see Table 5) exposed twelve (12) main themes on the conditions that encourage informal teacher leaders to engage in leadership. These are receiving acknowledgments, support from principal and colleagues, strong personal beliefs and values in work, enthusiasm in teaching and value students' growth and development, positive work climate, trust and confidence of principal and colleagues, support and encouragement from family, opportunity for career growth and development, self-gratification, prospect for career advancement, way to instigate change to others, and showing gratitude to Allah.

Table 5. Themes, frequency, and some responses on the conditions the encourage informal teacher leaders

Themes	Frequency	Participants	Some Responses
Receiving Acknowledgments	16	(P1) (P2) (P3) (P5) (P6) (P8) (P9) (P10) (P11) (P12) (P13) (P15) (P17) (P20) (P21) (P22)	I am grateful to have a principal who has entrusted me with leadership opportunities, recognized my potential, and provided valuable experiences. Their belief in my abilities has been a constant source of encouragement, empowering me to grow and develop as a leader. (P11) Recognition is one because when we are recognized, we feel fulfilled. When we are recognized, we do more. We want to attain something that, if possible, exceeds our expectations. (P1)
Support From the Principal and Colleagues	14	(P1) (P2) (P3) (P4) (P6) (P7) (P8) (P10) (P12) (P16) (P18) (P19) (P22) (P24)	My principal is supportive of all activities I have organized and conducted. I explained it to her, and she helped and supported me. (P3) As for my colleagues, they are all active. We are encouraging one another. We are helping one another. Then, if they have questions related to your expertise, they will ask your opinions, suggestions, and advice. We are like that in school. (P8)
Strong Personal Beliefs and Values in Work	12	(P1) (P4) (P5) (P7) (P9) (P10) (P13) (P14) (P15) (P17) (P19) (P20)	I took oath as a teacher. I was inspired and encouraged to work hard because I applied to DepEd. I promised that if I became part of the DepEd, I would be a catalyst for change. Whatever it takes to deliver quality education, I will do it. (P20) It is a calling. When you enter the job, it is expected that there will be tasks like those. So, it is a call. (P14)
Enthusiasm in Teaching and Value Students' Growth	11	(P1) (P5) (P6) (P9) (P13) (P15) (P17) (P18) (P20) (P22) (P23)	I do my best to help the students learn. I always thought that those students were my children. They have to learn. So, I am teaching them all the Math techniques. (P4) As a leader, the most motivating factor is my passion for teaching. We are accepting those tasks and designations for our students. (P1)
Positive Work Climate	10	(P1) (P4) (P5) (P6) (P8) (P9) (P11) (P16) (P23) (P24)	My principal and co-teachers work harmoniously, agreeing on all my suggested plans. (P15) My principal and colleagues are supportive. We support each other. We encourage and cheer up each other. Moreover, we always show love and care to each other. No crab mentality occurs between my colleagues because we accept and acknowledge the potential and capabilities of every one of us. (P8)
Trust and Confidence of Principal and Colleagues	10	(P1) (P2) (P3) (P11) (P12) (P15) (P19) (P20) (P21) (P23)	The principal assigned me to all the work. That is my encouragement. The trust and confidence that my school head gave me. (P15) Although I needed to be more competent, my colleagues pushed me to do it because they believed in my capabilities as an informal teacher leader. (P3)
Support and Encouragement from Family	9	(P2) (P4) (P5) (P6) (P9) (P14) (P15) (P22) (P3)	My inspiration is my mother. When she was alive, she was pushing me. She pushed me to be the best. Until now, I still carry her teachings. (P3) They are the great forces that encouraged me to do my best, whether seen, unseen, or promoted. (P9)
Opportunity for Career Growth and Development	8	(P7) (P8) (P11) (P12) (P14) (P16) (P20) (P23)	My motivation, I guess, is that I could become the best version of myself by taking a task and, at the same time, accomplishing it. (P16) My main motivations are learning and experience. Your knowledge increases when you engage in leadership. You gain ideas on how to handle tasks and designations. You will learn new knowledge. (P11)
Self-Gratification	7	(P1) (P6) (P7) (P8) (P9) (P16) (P21)	One of the biggest motivations is self-fulfillment, which is to see our students succeed. (P9) Most of my designations are aligned with my passion, like community engagements where I can immediately see the impacts of my leadership, which makes me fulfilled. (P21)
Prospect for Career Advancement	7	(P1) (P6) (P7) (P9) (P14) (P20) (P21)	Promotion is part of it. We want to be promoted not because we want a position but because we will have a great opportunity to help our students. It is not the position but a great opportunity to extend our help. (P6) We want to be promoted. We always have the battle cry of promotion. Why are we doing this? We do not want to be Teacher 1 until we retire. We want to be promoted. (P20)
Way to Instigate Change to Others	6	(P8) (P9) (P15) (P20) (P21) (P22)	To my co-teachers, I inspire them to excel more, do good, be innovative, and be resourceful. When I entered the school, I introduced a proper way of doing variety shows because what they know is a simple fashion show. (P15) I also have a student who has become my best friend and advisee. She has become my best friend because I have touched her life. I see changes, good changes, gradually. Their characters and attitudes have changed; you can see their development and improvement. It is one of my encouragements. (P8)
Showing Gratitude to Allah	5	(P5) (P9) (P15) (P20) (P23)	I love my job. I have to do it because I am paid for it. Then, I should be reciprocating it. Moreover, Allah has given this work to me, so I have to commit to it. (P23) When I feel unmotivated to go to work, I think that Allah gave me this kind of work for a reason. It is His plan. (P9)

Crowther et al. (2002) emphasized that informal teacher leadership can only be realized if the environment where it is practiced allows it. The findings argued that informal teacher leaders take leadership roles when their efforts are recognized and acknowledged (Fairman & Mackenzie, 2012). Giving special recognition and positive feedback improves self-efficacy and commitment (Daniel et al., 2019). Hence, principals and administrators should deliberately provide morale support and orchestrate opportunities for teacher leaders to take risks and lead (Mujis & Harris, 2007; Johnson & Donaldson, 2007). Pineda-Baez et al. (2019) specified that support from principal matters for teacher leaders to engage in leadership.

Additionally, principals and administrators should promote a positive school culture of shared leadership and professional learning (Fairman & Mackenzie, 2012). Hence, principals and administrators must trust teachers with leadership duties and responsibilities. They should expect teachers to lead, relinquish some of their power and authority to their teachers, and trust and empower them (Blegen & Kennedy, 2000; Murphy, 2005) by including and involving them in a collaborative culture, protect and recognize them, share responsibility, and give credit for their success (Frost, 2012; Barth, 2001)). Harris (2010) stressed that the successful distribution of leaders depends upon the firm establishment of trust. Aside from establishing trust, autonomy is the prerogative to control one's work (Pink, 2011). When autonomy exists in schools, principals treat teachers as professionals by showing trust in their professional judgment and giving them autonomy to identify, generate, and implement solutions to problems (Katzenmeyer & Moller, 2009). With this, informal teacher leaders maintain a sense of purpose (Lambert, 2003), which helps them to focus on their goals of giving standard and quality education to their students which compels them to act despite disincentives (Ross, 2019).

Subsequently, providing rich and diverse opportunities for continuous personal and professional development is a must for informal teacher leaders (Mujis & Harris, 2007). Teacher leaders, especially informal ones, need ongoing personal and professional growth. Therefore, administrators can support and help informal teacher leaders by engaging them in professional development so that they can define and describe their roles, set their goals, learn how to lead, and condition them to think like leaders (Harris, 2002).

The findings indicate that if these conditions occurred or existed in schools, teachers would be encouraged to practice leadership and informal teacher leadership would flourish. These conditions are vital for creating dynamic, collaborative, and effective learning where all teachers are empowered to contribute to the collective mission of educating students and improving schools. In support, Gronn (2000) names four factors that determine the extent to which teacher take up leadership functions. These are features of the school's structure and culture, opportunities for capacity building, nature of relationship between the principals and the teachers, and active encouragement and support for distributed forms of leadership by the principal.

Thus, these recommendations could help principals and administrators to foster informal teacher leadership such as (a) administrators should recognize and value the contributions of teachers, (b) administrators should involve teachers in decision-making processes and provide the time and resources necessary to support, (c) administrators must develop strong and trusting relationships with their teachers, (d) teachers should take a more proactive role, be willing to take risks and speak up with authority when they have opinions to share, and (e) post-graduate schools should include teacher leadership in their graduate programs (Beachum & Dentith, 2004).

3.6 Conditions that Discourage Informal Teacher Leaders

In contrast, the findings (see Table 6) disclose fifteen (15) substantial themes on the conditions that discouraged informal teacher leaders from engaging in leadership. These are stereotypical and negative perceptions, lack of support from the principal, lack of support and involvement of colleagues, insufficient time and conflict of tasks due to numerous tasks , negative work climate, absence of recognition, stress and overwork making one reluctant to take more tasks, bad leadership qualities, lack of career advancement, scarce school facilities and amenities, perception of insufficient expertise for leadership role, lack of career growth and development, informality of designation, extraneous teaching and task assignment, and people of unrealistic standards.

The findings explained that informal teacher leaders feel demotivated to practice leadership because of stereotypical and negative feedback from colleagues and principals. Danielson (2007) elucidated that some principals or administrators are jealous and guard their turf, fearing that ambitious teacher leaders will somehow undermine their authority. Also, Hart (1994) learned in her study the growing consensus of "animosity and jealousy" toward teacher leaders resulted in opposition groups working to undermine teacher leaders. Johnson and Donaldson (2007) gleaned that the professional, egalitarian norms of teaching, reinforced by colleagues, present a daunting challenge to informal teacher leaders who strive to improve educational practices beyond their own and were frequently rebuffed when they are offered to observe colleagues' classrooms or make suggestions about instructional practices.

Besides, imperious administrators who refuse to relinquish some of their authority and responsibilities to teacher leaders or who do not help informal teacher leaders define their roles act as barriers to teacher leadership (Barth, 2001; Goldstein, 2004; Muijs & Harris, 2007). These views from the participants concluded that informal teacher leaders felt frustrated and discouraged. Lack of support from principals and colleagues posed the biggest obstacles for teacher leaders. In many cases, some colleagues resist leadership among their ranks (Blegen & Kennedy, 2000). DeMore-Palmer (2011) believed that resistant colleagues hinder the growth of informal teacher leaders more than any other aspect of school culture. Teachers who take on more leadership responsibilities "go against the grain" and can find themselves at odds with their colleagues (Harris, 2005; Barth, 2001). Muijs & Harris (2003) accentuated those teachers who took leadership roles felt a loss of connection with their colleagues and a feeling of isolation.

Table 6. Themes, frequency, and some responses on the conditions the discourage informal teacher leaders

Themes	Frequency	Participants	Some Responses
Stereotypical and Negative Perceptions	15	(P1) (P2) (P4) (P6) (P9) (P10) (P11) (P12) (P15) (P17) (P19) (P20) (P21) (P22) (P23)	At first, my principal was not supportive because she felt I was a threat. (P6) One of the discouragements is other teachers. They inevitably think that you are showing off. (P11)
Lack of support from Principal	13	(P4) (P5) (P6) (P8) (P9) (P10) (P11) (P13) (P14) (P15) (P18) (P21) (P23)	The only factor that discourages me from leading is the lack of support from the principal and colleagues. Even if you are competent, if your principal and colleagues do not support you. You are like a threat to them. (P4) The finances, such as registration, transportation, food, and everything, are yours. It is up to you whether you will attend or not. The principal has no contribution because he occasionally goes to school. (P5)
Lack of Support and Involvement of Colleagues	11	(P1) (P2) (P4) (P10) (P11) (P13) (P14) (P16) (P17) (P18) (P23)	There are lots of times I used to be discouraged or demotivated in doing the assigned tasks. Because there is a lack of support from colleagues, they let you do the tasks alone without even lending a hand. (P14) My co-teachers because they do not want to grow. They lack motivation. They do not want additional tasks. They do not want to accept responsibility. They do not have interest, though they can do it. (P14)
Insufficient Time and Conflict of Tasks Due to Numerous Tasks	7	(P11) (P12) (P13) (P19) (P10) (P20) (P24)	I think there is a lack of time. When you have many tasks, it's hard to manage your time. So, that discourages me. So, what happens is that you tend to neglect some of your tasks or reject other tasks to have extra time. (P19) I have to accept the fact that no matter how best I try to manage time. You can steal time for your priority positions. For example, I sometimes tend to neglect my function as a class adviser. For example, there is a deadline for the submission of grades. There is a deadline for these, but you cannot manage your work because you are busy with research, journalism, sports, culture, arts, etc. (P20)
Negative Work Climate	8	(P1) (P7) (P9) (P10) (P11) (P12) (P20) (P23)	In our school, we are divided into groups who are competing with each other. When a new (teacher) influences others, it creates divisions. (P23) I do not stay in the office during my vacant time because they gossip. If one is not around, they gossip about her. (P10)
Absence of Recognition	6	(P1) (P10) (P12) (P16) (P20) (P23)	Sometimes, I feel less appreciated for my work. A simple announcement or even acknowledgment would somehow motivate me to do more, but I feel there are circumstances where I am not appreciated. (P16) When your principal does not appreciate you, no matter how good you are, your skills, and the devotion you give, you will be tired if you do not receive appreciation from the principal. Even thank you, simple thank, nothing, you will be discouraged. (P10)
Stress and Overwork	6	(P8) (P10) (P11) (P12) (P19) (P23)	The feeling of being burnt out or overworked because your school head bombarded you with many additional works. I think that there was an unfair distribution of workloads since there are teachers in our school who can also do it. (P10) All the coordinator positions in the division are given to me. Sometimes, I ask the principal, aren't there other teachers? All tasks are given to me. (P11)
Bad Leadership Qualities	4	(P1) (P3) (P5) (P9)	When I reported in our school…they have this culture that you are not allowed to talk against the opinion of the principal…If you have an opinion, you cannot say it because once you speak, the principal will react negatively. (P9)
Lack of Career Advancement	4	(P1) (P20) (P21) (P23)	Although you deal with all the tasks in school, you still have no assurance of being promoted. (P20) There are some challenges in life that sometimes discourage me. For example, I have served for several years but have not been promoted. I received many awards, such as twice as an outstanding secondary teacher in the division. I attended regional and national seminars for the Division of Lanao del Sur 1. I was a regional and a division trainer, among many others. Other awards are already forgotten. Promotion never finds my way. (P1)
Scarce School Facilities and Amenities	4	(P2) (P4) (P6) (P9)	Our school also has limited land; we cannot expand…Without those facilities and equipment, it is not easy because it will depend on theories. (P6)
Perception of Insufficient Expertise for Leadership Role	**3**	(P13) (P14) (P24)	Lack of experience because I am not an education graduate. So, I will admit that during my first time, I fumbled. (P13) It is discouraging that we do not have leadership training and the assistant principal does not have a place. It seems that your role is not identified. You are just there, but what are you worth in school? (P24)
Lack of Career Growth and Development	**2**	(P4) (P9)	We cannot always go to seminars, although we want to. You can't go there if the principal does not recommend you. Each one of us is craving for knowledge. Other teachers want to be sent to seminars. (P9) When there is a seminar for field teachers, the division takes it. Right? That is not good; they are not the ones who will benefit from it; it is us. If it is really for field teachers, they should be the ones to be sent. When there are seminars, they send staff from the division." (P4)
Informality of Designation	**2**	(P20) (P24)	Another discouragement is the position being informal. The school head is just designating you, and there is a big possibility that you will be lifted out…Anytime will come, and you are no longer designated to be in your position. (P20) Since we don't have the black and white paper or a memo or a designation from the region, sometimes I am hesitant to implement or impose some rules on my colleagues. (P24)
Extraneous Teaching and Task Assignment	**1**	(P20)	Last is you cannot pursue your expertise. For example, I am an expert in history and teaching creative writing and research. It is because of the mismatch in teaching in the Department of Education. It is a huge discouragement. (P20)
Unrealistic Expectations	**1**	(P15)	Those people who have high expectations of you. Because you are good, you must be good. Hello! We are humans, too; we commit mistakes. Even the four-legged horse stumbles; how much more us? We are just humans. (P15)

Moreover, due to their multiple designations and numerous tasks, they experienced difficulties in organizing tasks and managing time. This resulted in stress and overwork. Teachers are often forced to make sacrifices that compromise their ability to be effective in both roles. Lieberman et al. (1988) reported that teacher leaders experienced time constraints that significantly limited their ability to succeed in the dual roles of both teacher and leader. Mujis and Harris (2006) pointed to time as an additional impediment to teachers' capacity to do extra work because of the numerous responsibilities. However, despite accepting multiples designations and tasks, informal teacher leaders have no clear paths for promotion and are stuck in their present position. Thus, when informal teacher leaders see limited opportunities for career advancement, it negatively impacts their moral and job satisfaction. They feel undervalued which results in decreased involvement and commitment to their roles.

Additionally, the findings explicated that informal teacher leaders are discouraged due to a negative work climate and the presence of factions. According to Deal and Peterson (2002), a toxic culture manifests when the school community focuses on negative values so different groups of stakeholders become fragmented. Also, they explained that inadequate facilities such as wrecked classrooms and lack of facilities hinder their abilities to implement innovative teaching methods. This limitation frustrates and impede their efforts to drive positive change in the school.

When teacher leaders are expected to take on responsibilities, effectiveness is constrained because they may not feel secure about their roles (Little, 1995). As Danielson (2007) enlightened, informal teacher leaders usually do not have training on the personal and interpersonal skills required to lead effectively. Although opening doors to peers and possible ridicule is unnerving to some teachers (Buckner & McDowelle, 2000), with appropriate professional development, even anxious teachers can gain the confidence necessary to be role models to their colleagues. Participating in professional development might help teacher leaders learn their roles and establish their values (Fullan, 1993).

The findings contend that if these conditions existed and happened in schools, teachers will be demotivated to engage in leadership and informal teacher leadership will languish. These conditions block informal teacher leaders from taking leadership roles and can have far-reaching consequences for students, teachers, and school contexts. Consequently, overcoming these hurdles is essential for creating a collaborative, innovative, and supportive learning environment where all teachers can thrive. Hence, the school principals and administrators could remove these hurdles by fostering a supportive, collaborative, and inclusive environment, offering leadership development, recognizing their contributions, and addressing workload challenges.

3.7 Contextualized Model on Informal Teacher Leadership

The findings of the study proposed a contextualized model on informal teacher leadership, as shown in Figure 1.

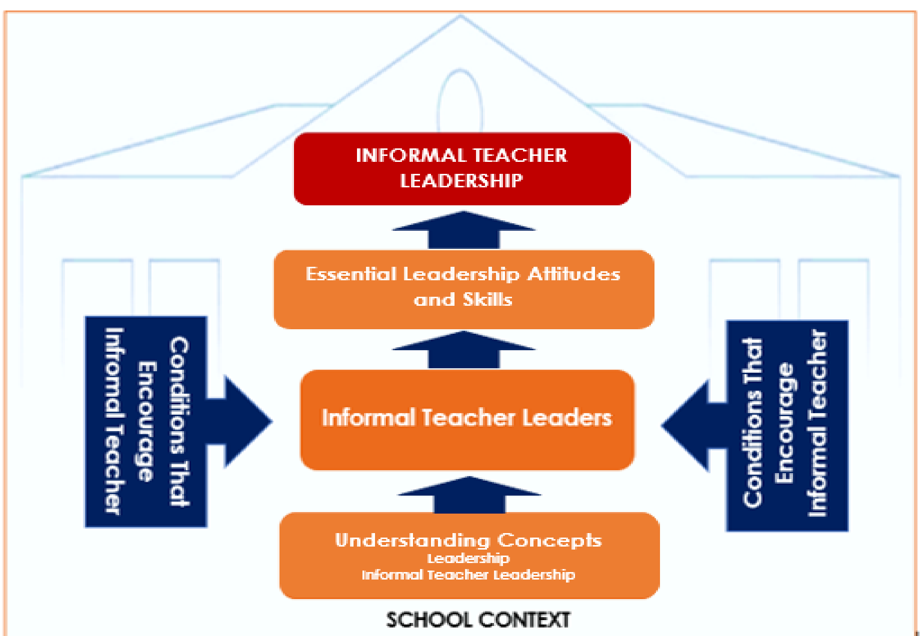

Figure 1. Contextualized Model on Informal Teacher Leadership

It is contextualized because it is generated from the knowledge and experiences of informal teacher leaders in Lanao del Sur, as they practiced leadership in their school contexts. This model serves as a guide for school stakeholders in recognizing and increasing informal teacher leadership in their school context. It depicts how informal teacher leadership exists and is practiced in Lanao del Sur and presents variables such as the concepts of leadership and informal teacher leadership, the essential leadership attitudes and skills, and the conditions that encourage or discourage informal teacher leaders from taking leadership.

As displayed in the model, conceptualizing and understanding leadership and informal teacher leadership serve as a solid foundation for informal teacher leaders to take leadership roles and accept duties and responsibilities beyond their classrooms and job descriptions. These concepts serve as the grounds for informal teacher leaders on how they practice leadership and approach leading others. It shapes how informal teacher leaders perceive themselves as leaders which contributes to the development of leadership identity. With this, it helps them articulate their goals and inspire others to work towards common goals. They can also embody these concepts in their behaviors and skills, reflect on their strengths and weaknesses, seek feedback, and engage in ongoing development to enhance their leadership skills.

However, the leadership enactment of informal teacher leaders is subjected to various conditions that encourage or discourage them from leading in their school contexts. Informal teacher leaders are encouraged to pursue and practice leadership when people around them motivate and support their leadership and when conditions that motivate them exist in their school. This contends that encouraging informal teacher leaders to take leadership roles requires a strategic approach such as creating a culture of appreciation, providing leadership development opportunities, offering coaching and mentoring, encouraging collaboration and teamwork, providing resources and support, empowering teacher initiatives, giving career advancement opportunities, and lead by example are some of the strategies that school administrators can use to motivate informal teacher leaders.

On the contrary, it is difficult for informal teacher leaders to engage in leadership due to discouraging conditions that hinder them. Thus, removing conditions that discourage informal teacher leaders requires a proactive approach to address barriers and create an environment that fosters leadership development and empowerment. These strategies are (a) addressing administrative barriers; (b) promoting a culture of collaboration and shared decision-making through open communication, trust, and mutual respect among stakeholders; (c) providing professional development; (d) encouraging risk-taking and innovations by encouraging teachers to propose new ideas and innovations; (e) promoting inclusivity and diversity through ensuring leadership opportunities accessible to all; (f) providing mentorship and support to build confidence, develop skills, and overcome challenges, and (g) creating opportunities for recognition and advancement by giving rewards or awards and creating pathways for advancement and career development.

Given these conditions, informal teacher leaders must develop their attitudes and skills to successfully practice leadership. The combination of some, if not all, leadership attitudes and skills is essential to inspiring, influencing, and leading change effectively in their school contexts. By cultivating positive attitudes and honing leadership skills, informal teacher leaders can significantly impact teaching practices, students' learning experiences, and school improvement.

In a nutshell, informal teacher leadership is a kind of educational leadership taken by teachers who conceptualize and understand the concept of leadership and informal teacher leadership and develop leadership attitudes and skills in facing those encouraging and discouraging conditions created by the school stakeholders and environment. This leadership either flourishes or languishes in school contexts depending on how informal teacher leaders apply their concept of leadership and informal teacher leadership and use their leadership attitudes and skills in dealing with the conditions that encourage or discourage them from leading.

4.0 Conclusion

In conclusion, informal teacher leadership refers to the capacity of teachers to influence stakeholders and contribute to students' learning and school improvement through informal means such as collaboration, mentorship, and support. Informal teacher leaders may not hold formal positions or official authority. Hence, it is essential to conceptualize and understand the concepts of leadership and informal teacher leadership to help them define and clarify their roles and responsibilities and ensure that their contributions are acknowledged and valued. Additionally, understanding and developing leadership attitudes and skills are essential to maximize their potential contributions to students' performances, school improvements, professional growth, collaboration, and school culture. Furthermore, it is also important to identify and address those conditions that encourage or discourage them from taking leadership. Encouraging informal teacher leaders to take leadership roles requires a strategic approach. On the other hand, removing conditions that discourage informal teacher leaders requires a proactive approach.

Meanwhile, the generated informal teacher leadership model suggests that the concepts of teacher leadership and informal teacher leadership serve as their foundation for taking leadership roles. It also displays that informal teacher leaders develop leadership attitudes and skills to face conditions that may support or hinder their leadership. These elements contribute to the flourishment or languishment of informal teacher leadership in schools.

5.0 Contributions of Authors

The authors indicate equal contributions to each section. All of the authors reviewed and approved the final work.

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The authors declare no conflict of interest.

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Functionality of Learning Sites for Agriculture as Farmers' Field Schools in the Province of Benguet, Philippines

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Abstract. This study examines the functionality of Learning Sites for Agriculture (LSAs) as Farmers' Field Schools (FFS) in delivering key agricultural extension services in the BLISTT (Baguio, La Trinidad, Itogon, Sablan, Tuba, and Tublay) areas of the province of Benguet, Philippines. The research focuses on four primary services: training, technology demonstration, farm business advisory, and information and communication support. A cross-sectional comparative design was used, with a sample of 50 local farmers and 16 LSA cooperators. The study employed t-tests and ANOVA to compare perceptions of these services between the two groups. The findings revealed that local farmers and LSA cooperators generally shared similar perceptions, with no statistically significant differences across the four services ($p > 0.05$). Training and technology demonstration services were considered sufficient, while farm business advisory and information support services were moderately sufficient. Challenges in information and communication services were noted, particularly regarding limited internet connectivity in remote areas. Overall, the results indicate that LSAs effectively meet the needs of small-scale farmers in Benguet province. The improvements in information and communication infrastructure could further enhance their impact. Future research could explore the long-term effects of LSAs on agricultural productivity and the effectiveness of specific extension methods across different regions.

Keywords: Agricultural extension; Technology transfer; Agricultural training; Farm business advisory; Agricultural innovations.

1.0 Introduction

Agriculture in the global context faces numerous hurdles that encompass dwindling agricultural land base, an aging farming population, the impacts of climate change, diminishing soil fertility, the emergence of new pests and diseases, limited mechanization and technology adoption, capital constraints, inadequate financial literacy among farmers, and similar issues (Sassenrath et al., 2008). Furthermore, the sector contends with the added strains of rapid population growth, high poverty rates, and recurring natural disasters, all of which exert continuous pressure on the advancement of agriculture in this region (Mohamed, 2017).

Despite these obstacles, many of our farmers have responded to the call to emerge as pioneers within their farming communities. The farmers manage agricultural enterprises where they exhibit their abilities and expertise to their fellow farmers (Kilpatrick, 2000). The farmers put into practice the technological knowledge acquired through their training and seminars, offering practical demonstrations of relevant innovations and serving as valuable sources of information in their specialized fields and more (Black, 2000). These agricultural hubs have earned the designation of "Agricultural Learning Sites" and the accompanying recognition from the Agricultural Training Institute following a thorough process of farm validation, interviews, and documentation (Department of Agriculture, 2022).

The primary objective of the Learning Sites for Agriculture in the Philippines has been to serve as exemplars, showcasing practical agricultural technologies and processes related to agricultural products and by-products. This endeavor aimed to enhance the capacities of small-scale farmers and other rural community members (Lapar & Ehui, 2004). The foundational principles guiding the creation of these Learning Sites for Agriculture are rooted in the belief that experience is the most effective teacher (Knobloch, 2003). These principles emphasize hands-on learning, active participation, and practical experiences. Moreover, they promote a farmer-to-farmer knowledge-sharing approach, encouraging problem-solving within the farming community (David, 2007). Learning by observation and modeling also plays a pivotal role in this initiative. It underscores the importance of farmers adopting the role of entrepreneurs, treating farming as a business enterprise. Lastly, the curriculum at these Learning Sites for Agriculture is demand-driven and tailored to address specific needs (Department of Agriculture, 2022).

Learning Sites for Agriculture are believed to play a crucial role in promoting the viability of agriculture as a business. It is essential to efficiently and effectively convey suitable farming technologies and strategies to farmers to facilitate rural development (Knox et al., 2012). Therefore, an evaluation is necessary to assess their performance and effectiveness in delivering essential agricultural extension services. The feedback from both the collaborators of Learning Sites for Agriculture and local farmers will provide valuable insights into their roles as partners in agricultural extension. By the Agriculture and Fisheries Modernization Act (AFMA) of 1997, also known as Republic Act 8435, Section 87 outlines that "Agriculture and Fisheries extension services shall encompass the following primary services for the farming and fishing community." These services encompass training, farm or business advisory, demonstration, and information and communication support services through various media outlets.

In its pursuit of excellence and improved governance in the delivery of extension services, the Agricultural Training Institute (ATI) recognizes the need to conduct an assessment of these Learning Sites for Agriculture (Bonifacio, 1994). With the impending full implementation of the Mandanas-Garcia ruling, the changing landscape and related concerns affecting the provision of extension services at the national, regional, and local levels are addressed (Department of Agriculture, 2022). However, despite the establishment of LSAs, the specific problem lies in the limited evaluation of their functionality in delivering essential agricultural extension services tailored to the unique challenges of small-scale farmers. While studies have discussed the general role of LSAs (Kilpatrick, 2000; Black, 2000), there is a gap in the literature regarding their effectiveness as Farmers Field Schools (FFS) in Northern Luzon, specifically in addressing critical areas such as training services, technology demonstration, and farm business advisory services. This study aims to fill this gap by assessing the functionality of LSAs as Farmer's Field Schools and their role in stimulating local innovations for sustainable agriculture. By aligning agricultural extension strategies with the Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), and SDG 17 (Partnerships for the Goals), this research contributes to broader efforts to ensure food security and rural development (Lal et al., 2021).

2.0 Methodology

2.1 Research Design

This study utilized a cross-sectional comparative design to evaluate the functionality of Learning Sites for Agriculture (LSAs) as Farmer's Field Schools (FFS) in delivering essential agricultural extension services. Data were collected from two distinct groups—local farmers and LSA cooperators—at a single point in time, allowing for a direct comparison of their perceptions regarding specific services provided by LSAs.

2.2 Research Locale

The study was conducted in the BLISTT (Baguio, La Trinidad, Itogon, Sablan, Tuba, and Tublay) area of Benguet, Philippines. This province provides a diverse and representative setting for evaluating the functionality of Learning Sites for Agriculture (LSAs) as Farmer's Field Schools (FFS). The BLISTT area was chosen due to its mix of rural and peri-urban farming communities, which allows for a comprehensive assessment of agricultural extension services across different types of LSAs.

2.3 Research Participants

A total of 50 local farmers were selected using random sampling. This method ensured that the sample represented a broad cross-section of farmers from the BLISTT (Baguio, La Trinidad, Itogon, Sablan, Tuba, and Tublay) areas. Random sampling allows for the inclusion of farmers from various backgrounds and with different levels of involvement with LSAs, ensuring diversity in the data and minimizing selection bias. Moreover, a group of 16 LSA cooperators was selected using purposive sampling. This approach was used to identify individuals directly involved in the management and operations of LSAs. These cooperators play a key role in delivering agricultural extension services, and their insights are critical for understanding the internal functionality of LSAs.

The combined sample size of 66 participants was deemed sufficient for conducting t-tests and ANOVA to compare the perceptions of these two groups regarding the four major agricultural extension services offered by LSAs (training services, technology demonstration services, farm business advisory services, and information and communication support services). Using random and purposive sampling ensures that the study captures a well-rounded perspective from service recipients (local farmers) and service providers (LSA cooperators).

2.4 Research Instrument

The research instrument used in this study is a structured survey questionnaire designed to collect quantitative data from two distinct groups: local farmers and Learning Sites for Agriculture (LSA) cooperators. The instrument was developed based on the study's objectives, which aim to assess and compare the functionality of LSAs as a Farmer's Field School in the BLISTT areas. It was divided into several sections to gather relevant information on the participants' demographics, their awareness and perceptions of agricultural extension services, and the effectiveness of LSAs in meeting agricultural training needs. The survey questionnaire was validated, including expert evaluation from agricultural extension specialists and pilot testing with a small subset of local farmers and LSA cooperators. Feedback from these processes was used to refine the instrument, ensuring the questions were clear, relevant, and aligned with the research objectives. Cronbach's alpha was used to assess internal consistency for the items, particularly in the perceptions and functionality sections, achieving an acceptable reliability coefficient of 0.85.

2.5 Data Gathering Procedure

The data-gathering procedure for this study followed a structured approach, beginning with pre-data collection activities such as the preparation and validation of the survey instrument. Experts in agricultural extension and a pilot test with local farmers and LSA cooperators helped refine the questionnaire to ensure clarity and relevance. Permissions were then secured from local government units and agricultural offices in the BLISTT areas, along with consent from LSA cooperators. Enumerators were trained to administer the survey to ensure consistency, focusing on ethical considerations and assisting respondents. Sampling involved the random selection of 50 local farmers from diverse communities and the purposive sampling of 16 LSA cooperators. During the data collection, face-to-face interviews were conducted to accommodate respondents who needed clarification or assistance with the survey. This method allowed for more accurate data collection, with informed consent obtained before each interview to ensure voluntary participation. Finally, the face-to-face approach helped establish rapport, enhancing the reliability of responses.

2.6 Data Analysis Procedure

The study employed comparative analysis techniques, specifically t-tests and analysis of variance (ANOVA), to assess differences in perceptions between these two groups. These tests were chosen because they can compare means across groups and determine whether any observed differences are statistically significant. T-tests were used to compare the mean responses of local farmers and LSA cooperators for each major agricultural extension service: training services, technology demonstration services, farm business advisory services, and information and communication support services. The t-test is appropriate here because it evaluates whether the mean perceptions between the two independent groups (local farmers and LSA cooperators) are significantly different.

ANOVA was employed when comparing multiple variables across more than two categories. In this case, ANOVA helps to determine whether variations in the perceptions of specific services are influenced by factors such as geographic location, farmer demographics, or types of LSAs. ANOVA can assess the interaction between these variables and how they impact overall perceptions of LSA functionality. The dependent variables in this study are the perceptions of agricultural extension services, measured on a Likert scale. The independent variables are the respondent group (local farmers or LSA cooperators) and type of service (e.g., training, technology demonstration). These statistical tests allow for a detailed understanding of how the two groups perceive services differently and whether these differences are statistically significant, providing insights into the functionality of LSAs in agricultural extension.

2.7 Ethical Considerations

Ethical considerations were central to the design and execution of this study to ensure that the rights, dignity, and privacy of all participants were respected. First, informed consent was obtained from all respondents before they participated in the study. The purpose of the research, the voluntary nature of participation, and the right to withdraw at any time without penalty were explained clearly to the local farmers and LSA cooperators. Participants were assured that their responses would remain confidential and that their identities would not be disclosed in any part of the research findings.

3.0 Results and Discussion

Learning Site for Agriculture is an innovative extension modality conceptualized by the ATI. Farmers worthy of emulation and willing to share their technologies on their farms will be partners in implementing training and extension interventions, particularly hands-on training or on-the-job instruction to complement classroom instruction (Davis et al., 2019). The statistical comparison of perceptions between local farmers and cooperators plays a crucial role in understanding the dynamics of the study on the functionality of Learning Sites for Agriculture (LSAs) in the Benguet province. The data in Table 1 presented here provides valuable insights into the participants' perceptions regarding major agricultural extension services offered by LSAs, including training services, technology demonstration services, farm business advisory services, and information and communication support services.

Table 1. Major agricultural extension services offered by LSAs

Services	Mean	SD	SEM	N	P-Value	Level of perception
Training Services	3.34	0.94	0.13	50	0.4154	Moderately Sufficient
Technology-Demonstration Services	3.62	0.57	0.08	50	0.7851	Sufficient
Farm Business Advisory Service	3.38	0.11	0.11	50	0.3357	Moderately Sufficient
Information and Communication Support Services	3.24	0.67	0.12	50	0.5585	Moderately Sufficient

In assessing various aspects of the services provided by Learning Sites for Agriculture (LSAs), it is evident that local farmers and cooperators generally share similar perceptions. In terms of training services, there is a moderate level of agreement between the two groups, with both local farmers and cooperators finding these services to be moderately sufficient for meeting the needs of their clients (Constance & Choi, 2010). This alignment is reinforced by the statistical analysis, which shows that the difference in their opinions is not statistically significant. Similarly, when it comes to technology demonstration services, local farmers and cooperators once again exhibit a high level of agreement in their perceptions, indicating that they both consider these services sufficient. The statistical analysis further supports this consensus by showing no statistically significant difference in their views. Moving on to farm business advisory services, both groups express a moderate agreement, with local farmers and cooperators perceiving these services to be moderately sufficient. The statistical analysis continues to confirm their alignment, as no statistically significant difference exists between their assessments.

Lastly, in the realm of information and communication support services, both local farmers and cooperators maintain a moderate level of agreement, with neither group finding these services inadequate. The statistical analysis again affirms this consensus by revealing no statistically significant difference in their perceptions. Overall, these findings suggest a general alignment in the views of local farmers and cooperators regarding the sufficiency of the services provided by LSAs across the different domains assessed.

In summary, the statistical comparison of perceptions between local farmers and cooperators suggests that there is no significant difference in their views regarding the major agricultural extension services provided by LSAs. Both groups tend to perceive these services as moderately sufficient. These findings lay the foundation for further investigations into the study's objectives, particularly those related to evaluating the functionality of LSAs in delivering agricultural extension services using the Participatory Technology Adaptation (PTA) model.

In determining the difference in the level of agreement between the local farmers and learning sites for agriculture cooperators on the functionality of learning sites for agriculture as a farmer’s field school in delivering major agricultural extension services. A Two-Sample t-test was utilized to assess if the mean difference is statistically significant on the level of agreement between the local farmers and learning sites for agriculture cooperators on the functionality of LSAs as a Farmer's Field School. These calculations were done for each of the four major agricultural extension services (training services, technology demonstration services, farm business advisory services, information and communication support services) for both local farmers and cooperators.

Training Services

The first core function of LSA in providing agricultural extension services is the training services in their respective farms. Based on the Independent Samples t-test, there is no statistically significant difference in perceptions between local farmers and cooperators regarding training services. Local farmers and cooperators regarding training services have similar perceptions that the provisions training services are sufficient to accommodate the needs of the clients, especially the small farmers who need such training on the best agricultural practices. The study also shows that the training services, which include training equipment, training facilities, sufficient numbers of training personnel in the farm, and training contents such as modules and workbooks, can provide a conducive set-up for the training and allow the clients and learners to be able to maximize the opportunity to learn from the LSA cooperators.

Moreover, most of the LSA cooperators mentioned the necessity of training materials and equipment to effectively course their knowledge to the clients (Maake & Antwi, 2022). The presented findings are supported by the study by Cardenas et al. (2004). which states that LSA cooperators implement extension programs using varied modalities. Generally, LSA cooperators supplement government extension programs in communities where they are based; thus, reaching out to farmers is not usually covered by other extension providers (Alex et al., 2002; Adeyanju et al., 2021). These institutions also serve as channels through which government extension services are delivered. Agriculture-based government agencies and donor institutions frequently commission them to undertake regional extension programs (Gustafson, 2002; Cooreman et al., 2021).

Technology-Demonstration Services

The t-test results indicate no statistically significant difference in perceptions between local farmers and cooperators regarding technology demonstration services. Both groups have similar perceptions that the Learnings Sites for Agriculture (LSA) successfully demonstrated farming or Agri-processing as a viable enterprise for learning purposes or a special technology on agriculture (e.g., urban gardening, edible landscaping, etc.). Moreover, the result suggests that the LSAs provide sufficient technology demonstration services to clients. The LSA cooperators apply the technology they learned from their training and seminars, demonstrate applicable technologies, serve as resource persons in their areas of specialization, and many more (Braun et al., 2005). A study by Juanillo (2002) further discusses that as part of agricultural extension services, LSAs must be able to provide clock assistance to farmers to ensure the transfer of technology and good harvest.

Farm Business Advisory Service

The t-test results indicate no statistically significant difference in perceptions between local farmers and cooperators regarding farm business advisory services. Both groups have similar perceptions that the provisions of advisory services on agricultural crop production, Postharvest technology, Market and marketing-related concerns, and Marketing standards for Agriculture Products have been utilized by the LSA cooperators as an essential link between agricultural input suppliers and farmers located in remote areas far from commercial centers (Katz, 2002). It has been understood that the Farm business advisory services of LSA are an essential part of their approach to creating resilience hubs where farmers group to coordinate farm production and collective sales (Alex et al., 2002).

Moreover, the result indicates how LSAs understand the crucial role of farm business advisory services in boosting agricultural productivity, increasing food security, improving rural livelihoods, and promoting agriculture as an engine of pro-poor economic growth. This is also supported by the stipulations of the Agricultural Fisheries Modernization Act (RA 8435) of 1997, which suggest that the functionality of Learning sites for Agriculture (LSA) in performing training, technology demonstration, farm business advisory, and information and communication support services need to be assessed to provide the basis for their capability building, enhancement, and another developmental upgrade to successfully complement the other pillars of extension i.e. LGUs, SUCs, DA & the private sectors.

Information and Communication Support Services

The t-test results indicate no statistically significant difference in perceptions between local farmers and cooperators regarding information and communication support services. Both groups have similar perceptions that most Learning Sites utilize tri-media to provide information to the farmers and help them access relevant information on new programs and technologies of the farm. The LSA cooperators still experience problems with Information and communication support services because of the lack of internet connection, very weak internet data connectivity, and lack of knowledge on media literacy.

Moreover, the area where the farm is situated is also a factor for the LSA cooperators not to be able to properly utilize the tri-media because most of them are far-flung places where no data is available. Furthermore, Adeyanju et al. (2021) acknowledge that the support to provide a channel where LSAs can provide access to information relative to their agricultural practices is very important for maximizing the use of information and communication technology and creates an electronic and interactive bridge for farmers, fishers and other stakeholders (Caine et al., 2015). During the focus group discussion conducted by the researchers, the informants, which are the LSA cooperators, suggested that one of the possible solutions to address the gap in information between the LSAs and the farmers is for the ATI to create a website or a channel where the information about the LSAs are present and easily viewed by the public.

Department of Agriculture (2022) further added that the initiative to create an information hub showcases the evolution and history of agricultural extension, the successful farmers and technologies applied in the country, a diorama of appropriate farming systems in different landscapes, and an interactive corner and a playroom for kids and kids at heart (Caine et al., 2015). It will soon offer an entrepreneur's corner to showcase products and café serving produce and meals from organic agriculture practitioners (Osorio-Vega, 2019).

Table 2. Comparison between the agreement of local farmers and cooperators on the functionality of learning sites

F-Test Result	Comparison with α (α = 0.05)	Comparison with α (α = 0.01)	Interpretation
0.202188536	p-value > 0.05	p-value > 0.01	The p-value (0.202188536) is notably greater than the significance levels of 0.05 and 0.01. Consequently, the data does not provide strong enough evidence to reject the null hypothesis. Therefore, within the context of the analysis (likely a Two-Way ANOVA or similar), there are no statistically significant differences between the groups or conditions.

The findings revealed that local farmers and LSA cooperators shared similar perceptions of training services, indicating that LSAs provide sufficient agricultural extension services that cater to small farmers seeking knowledge on best agricultural practices. This aligns with the role of LSA cooperators in supplementing government extension programs, extending outreach to underserved farmers, and facilitating agricultural knowledge transfer. In determining the significant difference in the level of agreement between local farmers and learning sites for agriculture (LSA) cooperators regarding the functionality of LSAs as farmer's field schools for delivering major agricultural extension services, the F-test result assumes great importance. When we consider a significance level (α) of 0.05, commonly used in statistical analyses, the obtained p-value of 0.202188536 surpasses this threshold. This indicates that the differences in perceptions between local farmers and LSA cooperators are not statistically significant, as shown in Table 2.

Table 3. Practical implications of the statistical analysis

Practical Considerations	Interpretation
Random Variation	The absence of statistical significance suggests that any differences observed between groups or conditions are likely due to random variability in the data.
Meaningful Differences	Researchers often use statistical significance to determine whether observed differences are meaningful or merely the result of chance.

The study further shows that the agricultural extension services of the Learning Sites for Agriculture as a Farmers Field School are effective and sustainable. Moreover, table 3 shows that the sufficiency of inputs and conduciveness of the facilities are directly related to program success. The study's findings are anchored by a similar work conducted by Maake and Antwi (2022), which investigated the effectiveness of extension services in improving agricultural productivity. The authors surveyed and analyzed extension programs implemented in various agricultural contexts in their study. They found that field visitation, conduct of training, and technical briefings were among the most common extension methods utilized by agricultural extension services worldwide.

Field visitation emerged as a prominent strategy in extension services due to its personalized approach. According to Cardenas et al. (2004), direct interaction between extension workers and farmers during field visits allows a better understanding of farmers' specific needs, challenges, and local conditions. Extension workers can provide tailored recommendations through face-to-face communication, offer immediate solutions to problems, and demonstrate agricultural practices on-site. These personalized interactions build trust and rapport between the extension workers and farmers, fostering knowledge transfer and adopting improved practices.

The study conducted by Contado (2004) further supports the significance of training programs in extension services. Training sessions offer a structured platform for farmers to acquire new knowledge and skills. Cooreman et al. (2021) emphasized that interactive and participatory training programs, where farmers actively engage in hands-on activities and knowledge-sharing, have a greater impact on knowledge retention and behavior change. These training programs enhance farmers' understanding of modern agricultural techniques and empower them to adopt innovative practices in their farming operations (Gustafson, 2002).

In addition to field visitation and training programs, technical briefings focused on concise information to farmers. These briefings provide updates on new technologies, market trends, policy changes, and other relevant agricultural information. Cardenas et al. (2004) highlights that technical briefings serve as a means to bridge the knowledge gap between researchers, extension workers, and farmers. By conveying scientific knowledge in a simplified and accessible manner, technical briefings enable farmers to stay informed and make informed decisions regarding their agricultural practices. Furthermore, the researchers also evaluated the overall process of learning sites for agriculture as farmers' field schools in delivering major agricultural extension services using the Participatory Technology Adaptation (PTA) model, as shown in Figure 1. The Participatory Technology Adaptation (PTA) model plays a crucial role in the context of Farmers Field School (FFS) and Learning Sites for Agriculture by fostering a collaborative and farmer-centered approach to agricultural development (Reichelt & Nettle, 2023). FFS and Learning Sites are designed to empower farmers with knowledge and skills. However, PTA enhances its effectiveness by involving farmers directly in developing and adapting agricultural technologies (Mashi et al., 2022).

In the FFS setting, PTA enables farmers to actively experiment with and adapt best practices, fostering a sense of ownership and agency in their learning process (Sabourin et al., 2002). Similarly, within Learning Sites for Agriculture, PTA can help tailor extension services to farmers' specific needs and preferences, making the learning experience more relevant and engaging (Quiroga et al., 2014; Mwongera et al., 2017). By engaging farmers as partners and co-creators of knowledge, PTA not only enhances the impact of FFS and Learning Sites but also promotes sustainable and context-specific agricultural solutions, ultimately contributing to the improvement of practices and rural livelihoods (Mwongera et al., 2017; Reichelt & Nettle, 2023).

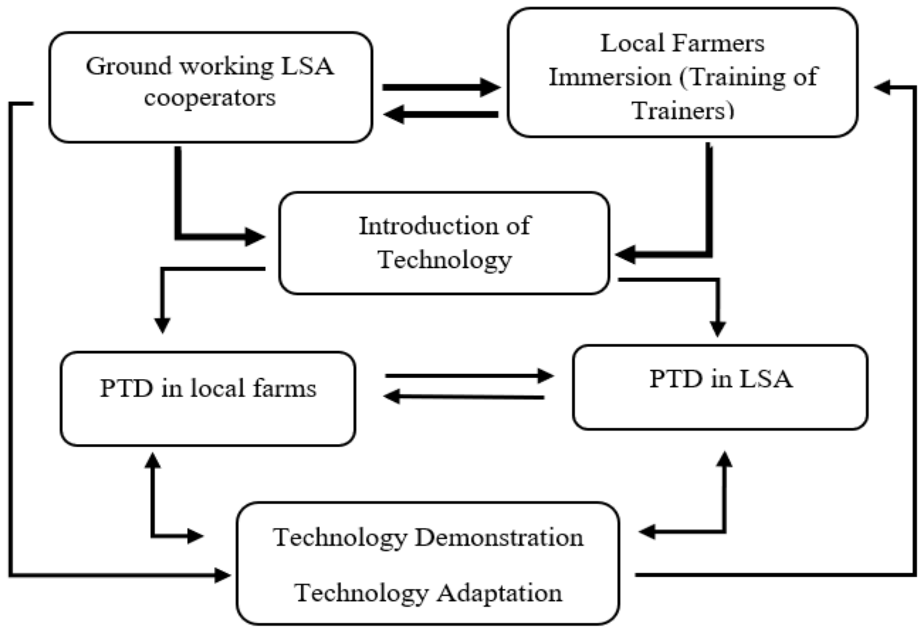

Figure 1. Flow chart for establishing PTA in Learning Sites for Agriculture (LSA)

It is clear from the flow chart that at least seven (7) important steps should be followed in conducting PTA at the Learning Sites for Agriculture. These are as follows:

Step 1: Conduct Ground Working Activities

Local farmers will do the field visit and actively participate in the LSA's PTA program. During this interaction, they will share insights about on-site challenges, traditional farming practices, and cultural management techniques. Additionally, this stage allows for the initial connection with LSA cooperators, which is valuable for identifying relevant technologies to address perceived farm issues. Furthermore, local farmers can exchange thoughts regarding the community's attitudes, values, and norms.

Step 2: Conduct LSA Immersion Activities

With support from facilitators, local farmers actively engage in the LSA farm experience. Likewise, they take the opportunity to introduce themselves and the program, aiming to establish a positive rapport with fellow farmers or clients. In this phase, participants verify the agricultural challenges observed in local fields and the existing farming methods identified during the initial groundwork activities carried out by LSA cooperators and local farmers within the community.

Step 3: Prioritizing Agricultural Problems to be Addressed by the Technology Adaptation

By harnessing the data collected during on-site groundwork and farm immersion activities, a foundational survey tool is deployed to delve deeper into farm-related challenges. These issues are subsequently ranked as a priority by examining the agricultural context. This prioritization is the foundation for collaborative efforts between farmers and facilitators to initiate the Participatory Technology Adaptation process. This process aims to broaden the comprehension of all stakeholders regarding the ecological, socio-economic, cultural, and political aspects influencing the current situations.

Step 4: Plan and Design PTA Activities

Once the field problems have been prioritized, planning and developing PTA (Participatory Technology Adaptation) activities begin, focusing on identifying promising solutions. The goal is to establish a clear agenda for experimentation. The PTA experiments should be straightforward yet capable of yielding dependable results, all while being manageable and assessable by the farmers themselves.

Step 5: Implement PTA Activities
It is essential for all participants to collectively assess these activities While certain PTA activities are implemented on the Learning Site for Agriculture (LSA) farm. However, it is worth noting that LSA cooperators typically oversee and manage the PTA activities on the farm. The focus is on addressing urgent issues that require immediate attention, often utilizing demonstration technologies, whether they are indigenous or research-developed, within the LSA farm. As participants engage in, evaluate, and analyze PTA experiments, they concurrently enhance their skills in conducting agricultural experiments and strengthen their capacity to conduct and monitor their experiments independently.

Step 6: Collect and Interpret the Result of PTA Activities
Participants should gather and analyze PTA results depending on their information requirements. Learning Sites for Agriculture training primarily emphasizes agroecosystem analysis (AESA), which enables participants to better understand ecological dynamics within the agricultural environment. This, in turn, empowers them to generate novel ideas, identify technology deficiencies, or uncover emerging issues that can be incorporated into subsequent PTA initiatives in the community.

Step 7: Utilize Results in Succeeding PTA Activities
It is essential to consistently apply the outcomes to ensure that PTA remains a sustainable approach for addressing future community field challenges. Any innovations generated during PTA endeavors should be integrated into solutions for similar field issues that may arise. Additionally, any technology gaps or new problems identified in prior PTA experiments should be considered when planning, designing, and executing future PTAs. These insights should serve as an additional foundation for guiding and improving PTA activities within the Learning Site for Agriculture (LSA) for subsequent projects.

The outlined process for Participatory Technology Adaptation (PTA) within the Learning Site for Agriculture (LSA) framework reflects a comprehensive and systematic approach to addressing agricultural challenges in the community. The initial phases, including groundwork activities and immersion experiences, emphasize the importance of community engagement and collaboration. These steps provide valuable insights into local farming practices and challenges and facilitate the establishment of trust and rapport among participants (Mwongera et al., 2017). Prioritizing agricultural problems is a critical step that ensures a focused and data-driven approach to technology adaptation (Reichelt & Nettle, 2023).

PTA activities' subsequent planning and design aim for practicality and effectiveness, aligning with the identified priorities (Mwongera et al., 2017). As the PTA activities are implemented, they address immediate concerns and serve as opportunities for capacity building and skill enhancement among the participants. The emphasis on data collection and interpretation allows for a more profound understanding of the agricultural ecosystem and fosters innovation (Kaplan et al., 2021). Furthermore, the iterative nature of the process, where insights and solutions from previous PTAs inform future endeavors, underscores the sustainability and continuous improvement of the approach. Overall, this approach appears well-structured, emphasizing community participation, data-driven decision-making, and the empowerment of local farmers in effectively addressing agricultural challenges within the LSA framework.

4.0 Conclusion
This study has provided valuable insights into the functionality of Learning Sites for Agriculture (LSAs) in Northern Luzon, particularly in their role as Farmers Field Schools (FFS) for delivering agricultural extension services. The statistical analysis revealed that local farmers and LSA cooperators generally share similar perceptions regarding the sufficiency of the four major agricultural extension services provided by LSAs: training services, technology demonstration, farm business advisory, and information and communication support services. These findings suggest that LSAs are effectively fulfilling their role in agricultural extension, especially in addressing the needs of small-scale farmers. However, the results also highlighted specific areas that could benefit from improvement, particularly in information and communication support services, where infrastructure challenges such as limited internet connectivity hinder the full potential of LSAs in delivering timely and relevant agricultural information. Addressing these gaps could further enhance the effectiveness of LSAs and strengthen their impact on rural communities.

In terms of future research, several key areas warrant further investigation. One promising avenue is the exploration of the long-term impacts of LSAs on agricultural productivity and rural livelihoods, which could provide deeper insights into the sustainability and overall contribution of LSAs to rural development. Comparative studies across different regions of the Philippines could also identify region-specific challenges and best practices in agricultural extension. Another area of interest is assessing the effectiveness of specific extension methods used in LSAs, such as field visits, technical briefings, and participatory technology adaptation (PTA), to determine which approaches yield the most significant improvements in farmer knowledge, adoption of technologies, and agricultural outcomes. Given the growing importance of digitalization in agriculture, future research could explore how LSAs can better integrate information and communication technologies (ICT) to improve service delivery, especially in remote areas where connectivity remains challenging. Overall, this study underscores the crucial role of LSAs in enhancing agricultural productivity, empowering small-scale farmers, and contributing to rural development. By addressing current challenges and exploring new research avenues, LSAs can continue to evolve and play an even more pivotal role in sustainable agriculture.

5.0 Contributions of Authors

The paper has a single author who confirms that the author reviewed this study.

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7.0 Conflict of Interests

The author declares no conflicts of interest about the publication of this paper.

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Perspectives on Mother Tongue-Based Multilingual Education Implementation in the Philippines

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Abstract. This qualitative content analysis is aimed at analyzing the status and school support programs or activities for MTBMLE implementation in selected schools in the Philippines through the perspectives and experiences of 15 participating teachers and school administrators. A phenomenological research design laid out the theoretical groundwork of this study as it looked into the participants' lived experiences using semi-structured interviews. Transcripts were analyzed for codes, thematized into three discussion headings: (a) status and school support on the implementation of MTBMLE; (b) perspectives on the importance of L1 or Mother Tongue as MOI and learning area; and (c) awareness on the principles of MTBMLE. In summary, the findings showed that regarding the status and school support on implementing MTBMLE, the schools adhered to the provisions of the guidelines set by the Department of Education. In terms of the participants' perspectives on the value of L1 or mother tongue as MOI and a learning area, the benefits of L1 or mother tongue use in pedagogy are recognized; finally, regarding the participants' awareness of the underlying principles of MTBMLE, a few expressed incomplete, if not lacking, awareness at all. However, all of them were deemed knowledgeable, with an implicit willingness to learn more about the concept. Recommendations for further research were indicated. This paper stands unique among others for its method of analysis and its unique look at the implementation status seen through school support and status, perspectives of teachers and school administrators, and awareness of the same on the principles of MTBMLE.

Keywords: Education; K-to-12; Mother tongue; Multilingual education; Policy.

1.0 Introduction

The advent of the K-to-12 Curriculum in the Philippines paved the way for the implementation of the Mother Tongue-Based Multilingual Education (MTB-MLE) program through which learners beginning from Kinder to Grade 3 start their educational journey "in the language they understand best" (DepEd, 2016, p. 2), that is their mother tongue (L1). MTBMLE is the latest and one of the numerous language policies the country has adopted over the years (Adriano et al., 2021). While it was through the Republic Act 10532, otherwise known as the "Enhanced Basic Education Act of 2013" that MTBMLE was articulated and completely integrated into the Philippine basic education system, it was already formally recognized for its benefits and institutionalized for further promotion and use in schools through DepEd Order Number 74, series of 2009, "Institutionalizing Mother Tongue-Based Multilingual Education (MLE)" (Bernardo et al., 2018). The same document defines MTBMLE or MLE as "the effective use of more than two languages for literacy and instruction" (DepEd, 2009, p. 1). Findings from various related studies were cited in the Order to back the relevance of MTBMLE, such as that "learners learn to read more quickly when in their L1;" (p. 1) and that "pupils who have learned to read and write in their L1 learn to speak, read, and write in a second language (L2) and third language (L3) more quickly than those who are taught in a L2 or L3 first."

Dekker and Dekker (2016) claim that the educational value and impact of L1-based MLE is recognized globally. The role of the use of L1 or the mother tongue in teaching fundamental concepts undeniably positively impacts the cognitive development of learners. Gaylo (2020) not only underscore the pedagogical benefits of MTBMLE, but also emphasizes its cultural and social relevance. Other than these underpinnings, empirical studies after empirical studies (Dayon, 2019; Durante, 2021; Gempeso & Mendez, 2021; Pamittan, 2020; Trujillo, 2020) in the most recent times continue to provide evidence on the effectiveness and positive impact of MTBMLE in the academic life of the learners and even to the lives of the teachers.

The implementation of MTBMLE did not come without corresponding challenges. A qualitative take on the issue, for instance, by Lopez et al. (2019), culled from the lived experiences of rural indigenous MTBMLE teachers from schools in the Cordillera Administrative Region, has some interesting findings. Accordingly, the work of Lopez et al. provided a direct counter against what most language scholars underscored as the advantage of MTBMLE, that is, the facility of linguistic and cognitive skills in a two-way means. More specifically, this facility of transfer seemed problematic, if not only unachievable, as the policy is short of "well-established bridging practices," specifically among grades 3 and 4, which is when the shift to English and Filipino use as media of instruction begins. In addition, the same scholars provided support through their study that L1 does not cater to particular content areas across the elementary-level curriculum.

Abrea et al. (2021) related similar findings regarding implementing MTBMLE through a mixed-methods study on the experiences of teachers teaching MTBMLE from selected divisions in Caraga, Philippines. Accordingly, issues of transition or bridging from the mother tongue to the target language or English as a medium of instruction beyond Grade 3 among pupils pose an obstacle to the learning process. In the same work, while Abrea et al. managed to reconfirm the pedagogical advantage of teaching concepts in the L1 on the one hand, it also rather served as a disadvantage on the other hand as concepts that were supposed to be taught in L2 and L2 learning itself were being impeded along the way.

Implemented in the blended learning context, Mantilla (2022) determined the teaching of MTBMLE challenges met by key stage 1 pupils and teachers alike in a public elementary school in Leyte. Findings revealed that these challenges included materials preparation over a distance learning mode, the creation of meaningful and valuable learning experiences despite the setup, and an increase in the number of non-readers and non-numerates in class as brought about by the prior pandemic and the context of a blended learning or distance learning environment.

In a similar context, Orbeta (2023) identified unfamiliarity with the L1, shortage of available relevant materials, and negative attitudes towards the use of L1 as MOI and the teaching of MTBMLE in general as themes to the lived experiences of parents in a home-based remote teaching setup. A qualitative study, particularly phenomenological, Orbeta focused on the experiences of selected parents who homeschooled their children using L1, with teaching MTBMLE as a subject in itself. Along with the problems that emerged, strategies were also sought to be established in such a setup. Notwithstanding these, Orbeta's work is common with the abovementioned research literature on the pre-existing and existing challenges of implementing MTBMLE in the Philippines. It could be surmised from these that despite the platform or mode of instruction, some difficulties remain almost the same.

All the above mentioned, and even while it has been in operation for over 20 years now at the time of this writing, teachers and learners alike still continuously face almost the same problems from its earlier years of implementation (Alberto et al., 2016; Bernardo et al., 2018; Cabansag, 2016; Hunahunan, 2019; Metila et al., 2016; Tenorio, 2022; Yap-Dequiña & Oliva, 2022). Another commonality among these is the emphasis on such challenges related to pedagogical practices and linguistic competencies of both teachers and students that seem to hinder and problematize the smooth implementation of the program. The literature is still very young, yet it looks into how the policy and program itself might have something to do with either the solution or the problematization itself. This is where the current study comes in. Especially in the advent of the recently lifted pandemic, private and public schools in the Philippines suffered drastic changes in instruction delivery, among others. The pre-existing problems of the education system in the country were only exacerbated by these. Surely, a closer look into the MTBMLE implementation of schools, in particular, could provide critical insights into pedagogy and policymaking.

Numerous quantitative and mixed methods studies such as that of Anudin (2018), Lang-ay and Sanadan (2021), Dagalea et al. (2022), and Natividad et al. (2022) have already been conducted on related issues such as the practical challenges of implementing MTBMLE and use of mother tongue itself to pedagogy and policymaking. However, it seems that a qualitative look at similar issues, which could potentially provide more meaningful and richer data to describe the status and impact of the program and policies surrounding it among schools in the Philippines, is lacking. Ford and Goger (2021) and Apollono and Bero (2017) note the unique role and use of qualitative research in meaningfully and richly informing policymaking and evaluation. Accordingly, "Qualitative research allows the researcher to gather rich contextual insights into people's lived experiences of policies, programs, and power dynamics" (Ford & Goger, 2021).

The researchers purported to explore and analyze existing MTBMLE implementation policies among selected public and private elementary schools in the Philippines, to add if not only enriching, the available qualitative data that could serve as a more meaningful and in-depth look into the phenomenon towards better policy creation. Furthermore, such a study is interesting in its context as it was written after a more than two-year pandemic. Specifically, this study purported to determine the implementation status and impact of MTBMLE-supporting policies on teaching and learning.

2.0 Methodology

This study employed a qualitative research approach in addressing its objectives, specifically utilizing a phenomenological research design, following the related tenets of executing such research by Creswell (2013). A total of 15 participants selected through purposive sampling were enjoined. Criteria of selection or qualifications required the participant to be presently a teacher of MTBMLE at the elementary level, particularly in grades 1, 2, and/or 3, and a school administrator of an institution offering MTBMLE, all employed at either a private or a public school in the Philippines. Of these 15 participants, 7 were school administrators, while 8 were classroom teachers. Semi-structured interviews were conducted among the participants via online means (i.e., Google Meet) or in-person engagements. An interview protocol was used to guide the interviewer-researcher, and the participants were informed that they could share as much as they wanted per the questions being asked during the interview. After the interviews, the transcripts were analyzed by means of qualitative content analysis. Meaningful units were extracted from the transcribed lines and then were coded to be eventually categorized into themes. The study participants were thoroughly informed of the nature of their participation and the study, and their consent was expressly obtained. All other appropriate ethical considerations were observed before, during, and after the data gathering and analysis procedures.

3.0 Results and Discussion

3.1 Status and School Support on the Implementation of MTBMLE

When asked about existing in-school policies supporting the implementation of MTBMLE in their institutions, the participants mostly referred to the implementing guidelines of DepEd Order No. 74, s. 2009. Further, the participants explained that, in compliance with the said guidelines, they are religious about propagating each of their localities' L1 as a medium of instruction (MOI) in grades 1-3.

Regarding school support on implementing MTBMLE, the participants shared that their schools and local DepEd division offices provide relevant training and resources to assist teachers and students. Teachers of MTBMLE receive particular support in terms of materials and training to better implement the program. These trainings are sometimes particularly funded through the school MOOE (Maintenance and Other Operating Expenses), as explained by one of the participants. Moreover, school events or programs such as a dedicated month for celebrating their L1 and the cultural background of which. One of the participants shared that hosting school events celebrating the culture of their region or province with emphasis on its linguistic background was one of the most concrete ways their institution valued and supported the MTBMLE program.

One of the objectives of implementing MTBMLE stipulated in DepEd Order No. 16, s. 2012, to develop "socio-cultural awareness which enhances the pride of the learner's heritage, language and culture" (p. 2). What the participants shared about how the school supported the implementation of MTBMLE in their institution aligns with the abovementioned stipulation; school events highlighting through a dedicated monthly celebration the L1 or mother tongue further its cultural significance, along with its linguistic relevance among the learners and other viewers or consumers of such activities. Meanwhile, another one of the stipulations in the same document is being fulfilled by providing training and equipment for sufficient learning experiences and materials among MTBMLE teachers and administrators of schools and by their local divisions. The Order was clear, "a team of trainers for each region composed of education supervisors from different divisions has been organized." Teachers' training and development are also components of the MTBMLE implementation guidelines by the DepEd. From among the participants' responses, such practice is still ongoing and relevant in light of the said guidelines. In other words, schools adhere to the provisions of DepEd Order No. 16, s. 2012.

DepEd Order No. 16 s. 2012 is divided into five (5) components: (a) objectives; (b) areas of focus; (c) teaching and learning process; (d) teachers' training and development; and (e) preparation of learning resources. The objectives subsection enumerated the specific aims of the MTBMLE, which revolved around language development, cognitive development, academic development, and socio-cultural awareness development. The focus areas specified MTBMLE as a learning area and MOI in grades 1-3. The subsection on teaching and learning process, as well as the teachers' training and development, specified how L1 or the mother tongue specific to the locality must be used and taught as a learning area and an MOI, respectively, and other options of modifications to the model process of teaching and learning, depending on contextual factors such as the nature of the L1 in a particular division or school. Meanwhile, the subsection on teachers' training and development assured that a team of trainers and experts are available to provide relevant help to the teachers; and finally, the subsection on preparation of learning resources assured continuous materials development relevant to the pedagogical context, needs and nature of MTBMLE program in schools nationwide.

As gleaned from the interviews, it can be surmised that MTBMLE is being implemented well, following the provisions of DepEd in schools with elementary education offerings. However, it can also be noted that the participants did not specify the contextualization of the guidelines set forth by DepEd. In other words, it seemed that the schools and the teachers did not contextualize well according to their locality or division and other factors related to the institution's identification guidelines. The responses did not specify or go on more deeply into how, for instance, they address issues of bridging from L1 to L2, materials that may be found to be out-of-context for the learners, or linguistic issues such as lack of formal grammar or even orthography of a certain L1. Finally, other than school events held to celebrate or promote the sociocultural background of an L1 or mother tongue, there seemed to be no concrete and more meaningful ways to do this. These may be points for further research and inquiry.

3.2 Perspectives on the Importance of L1 or Mother Tongue as MOI and a Learning Area

From the participants' responses, the use of L1 as MOI is valuable, especially to the learners. While varied, the perspectives of the participants related to each other as common to their responses were that the learners benefit from the use of L1 as MOI because it helps them understand the lessons better and grasp new concepts faster, fosters a sense of cultural identity and self-confidence, and assists in better learning of a second (L2) and a third language (L3) respectively.

A sense of familiarity and, therefore, comfort among the learners is seen to be developed from the use of L1 as MOI because "when students learn in their mother tongue," so goes one of the participants, "they are more receptive to new concepts and show improved learning outcomes." One of the participants shared that using L1 as MOI and teaching MTBMLE in general is valuable because it "contributes to the positive self-concept of the learners." Another participant explained that "the first language should be used in teaching early-grade learners because they can express their feelings, thoughts, and experiences without fear. Learning to read in the first language could be a bridge in learning 2nd and 3rd language." Accordingly, "it helps the learner value the rudimental significance of literacy and the value of his/her own culture and heritage. It provides the building blocks of literacy much more comfortably since it is the primary language used in the community where the learner grows."

In addition to these, another participant shared, "The first language is crucial in instruction because it serves as the foundation for learning. When students are taught in their mother tongue, it enhances their understanding, cognitive development, and overall academic performance. It fosters a sense of identity and cultural pride as well." This particular insight from one of the participants aligns with the foci of the objectives of MTBMLE as indicated by DepEd in its guidelines of implementation: It is the goal of the program or policy to develop among the learners their linguistic, cognitive, academic, and socio-cultural skills.

These findings corroborate the work of Cabansag (2016), who enumerated four primary advantages of MTBMLE and L1 as MOI: improved idea expression among learners, self-confidence boosting, greater retention, and promotion of a pleasant and comfortable environment. Navarro et al. (2016) also observed the same in a similar study and confirmed that MTBMLE encourages stronger classroom participation. In Bernardo et al. (2018), a positive perception and attitude towards MTBMLE anchored on its theoretical link with L2 learning were also found in a similar study. The work of Santiago and Dagdag (2021) confirms these findings, and they concluded that "MTB-MLE could help pupils achieve significant improvement and metacognitive learning orientations" (p. 54).

On the contrary, some studies are contradictory to the claims of benefit of the MTBMLE program. One such is the work of Andrino and Arsenal (2022), who indicated through their study that "teachers disagree that the MTBMLE policy is in good principle as they believe that it will not make the lessons interesting to students and that it will not enable them to understand their lessons easily" (p. 138). Problems concerning linguistic competence and resources, as well as competent and available training and resources for teaching, were observed to hinder or to make MTBMLE fail to reach its objectives in Cruz's study (2015). Arispe et al. (2019), in a more recent study, revealed the negative sentiments and attitudes of some Bicol-based elementary teachers who attribute lack of materials or resources and training, and linguistic issues in both teachers and students, among others, as hindrances to the supposed benefits of MTBMLE. In a much more updated work on a similar topic, Dagalea et al. (2022) recommended a "reconfiguration of the MTBMLE" program to suit the contextual factors of linguistic, economic, and cultural backgrounds of Filipino learners as these drove the supposed failure of the same program to deliver well.

Noticeably, perspectives vary in terms of the value and benefits of using L1 or the mother tongue as not only an MOI but also a learning area in itself. While this is so, it is interesting to think about whether these perceptions vary because of certain factors, such as the difficulties faced or experienced by the teachers and students, as well as the parents or guardians of these learners and the school administration. This calls for further investigation.

3.3 Awareness of Teachers and School Administrators on the Principles of MTBMLE

A few participants stated that they were not completely aware of the principles supporting MTBMLE, but the rest expressed confidence in their knowledge about the program. Participants mentioned L1 being helpful in developing the learners' cognitive skills, especially in L2 learning. It was also mentioned that MTBMLE promotes cultural literacy and linguistic development among the learners.

One participant had to share this regarding their understanding of the supporting principles of MTBMLE: "Developing learners appropriate cognitive and reasoning skills for them to understand other languages similarly. Children can easily understand text in 2nd and 3rd language if they fully develop the skills in their 1st language."

Another participant enumerated the following as part of the principles supporting MTBMLE: " (1) Native language is a part of the child's identity, MTB MLE connects them to their culture; (2) MTBMLE ensures better cognitive development; and (3) MTBMLE develops a strong foundation in a language they understand best after which they are more prepared to learn the national language or any second language." A participant related MTBMLE principles to concepts of peace education, sustainable development goals, gender equity, and human rights advocacy. Meanwhile, another participant shared that they understand MTBMLE as contextualizing learning as "the process of translating the Bicol-Naga term into Bicol-Bulan for the learners to understand and familiarize the terms."

On the one hand, at least a couple of the participants shared that they did not know of any of the principles underlying MTBMLE; on the other hand, a few participants shared that they only knew a little bit about it, relating: "but the importance of having this subject is to teach to the learners effectively language learning and cognitive development. it is expected to bridge the two languages to improve learning." Along the same vein, a participant shared similarly, stating, "I am not that fully aware about the principles, but I believe that using MTBMLE will surely help in making understand the topics easily if they used their first language as the medium of instructions, but it will have some disadvantage if they do not understand the language of other places hence the pupils will have difficulty in communicating others." This response also highlighted the disadvantage of using the L1 as MOI and as a subject.

The MTBMLE is conceptually defined as the use of the mother tongue or L1 of the learner both as a bridge to learning effectively the L2 and other concepts at the elementary level or earlier schooling years and as an avenue or a window to one's sociocultural identity and background. As mentioned earlier in this paper, even before the roll out of K-to-12, DepEd has already institutionalized the promotion of mother tongue use in the class and instruction, citing empirical evidence supporting its benefits to student learning and performance. Awareness of the principles underlying MTBMLE is critical so teachers can effectively use the opportunity for better pedagogy. In other words, while MTBMLE may have disadvantages and advantages, a well-prepared or equipped teacher should be able to navigate and come through it all for the learners' most optimal learning experience.

However, awareness is only one thing. As mentioned earlier in this paper, challenges beyond awareness or knowledge of the concept abide. Problems with resources, for instance, in Arispe et al. (2019) or Andrino and Arsenal (2022), continue to hamper the maximum potential of MTBMLE towards sociolinguistic development of the learner, hand-in-hand with academic and otherwise development. Meanwhile, the findings above are promising as the interviewees also showed basic understanding and willingness to learn and understand it better. Most of the difficulties learners and teachers encounter are more systemic than pedagogic.

4.0 Conclusion

At the time of writing, MTBMLE has been in implementation for over 20 years. The literature is rich in its arguably positive and beneficial effects on teaching and learning processes. However, as one gap is addressed in this paper, studies on its implementation status and impact seem to be an interesting source of insight—research in which area allegedly needs further update, especially in the Philippine setting. From the findings of the present work, it could be concluded that the implementation of MTBMLE is still in its early stages despite its supposed maturity. Institutions and educators alike show little to no contextualization of the implementing guidelines of DepEd on MTBMLE.

Meanwhile, teachers of MTBMLE are shown through this study to receive training in the form of seminars at the various levels of DepEd hierarchy. These trainings are then re-echoed or cascaded until the benefits reach the target students in the classroom through the pedagogical process that ensues afterward. In addition, teachers seem to have a good grasp of the concepts of MTBMLE, not to mention an understanding of L1 and L2 learning and acquisition, as well as the cognitive development of learners at various ages and environments. Teachers specifically understand how using L1 as MOI benefits the learners' better comprehension of lessons and the development of both L1 and L2 in the classroom.

In sum, as far as the status and school support of the implementation of the MTBMLE in schools, findings showed that schools are adherent to the guidelines set forth by the DepEd but in need of further look into local contextualization, especially on the school support programs towards MTBMLE. Responses varied based on the perspectives of the teachers and school administrators towards L1 as a learning area and an MOI, but the findings lean towards the favorable advantages of MTBMLE or the use and teaching of the mother tongue in elementary school. Finally, as awareness seems to be better measured quantitatively, a quantitative approach could be suggested from here to describe teachers' awareness, knowledge, and competence in teaching and through MTBMLE. Finally, in terms of the participants' awareness of the principles of MTBMLE, it is revealed that a few of them are not yet completely knowledgeable. However, at the very least, these participants, including those who indicated their awareness, showed promise as they were not uninformed about the concept. In addition, further research, especially through other data collection and analysis methods, is recommended.

5.0 Contribution of Authors

All the authors indicated in this study contributed to the conception, design, and data-gathering procedures, the analysis and interpretation of the data gathered and its writing and revisions.

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7.0 Conflict of Interests

The authors declare no conflicts of interest inherent in the publication of this work.

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Cultural Diversity and Students' Learning Outcomes in Social Science

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Abstract. This study investigates the levels of cultural diversity, learning outcomes in social sciences, and the differences in cultural elements across colleges of the graduating students at Central Philippines State University-Main Campus, Kabankalan City, Philippines. This research problem addresses the need to explore how students' awareness of cultural diversity within their classrooms impacts their academic achievements, particularly their adaptability to diverse learning environments. It also highlights the gap in understanding whether and how culturally responsive teaching strategies can positively affect academic performance, suggesting further investigation to generalize findings and enhance inclusive, effective learning environments. This descriptive-correlational study was designed to establish the relationship between cultural diversity and learning outcomes among 361 students across key areas in Social Sciences. The primary data were derived from examinations administered to the students to assess learning outcomes. A questionnaire consisting of ten-item statements for each component was administered to test the students' levels of cultural diversity. The largest number of respondents was from respondents in the College of Teacher Education, while the lowest number of respondents was from the College of Forestry. The diversity of cultural expressions among colleges manifests the heavy influence of academic settings in the design of students' cultural understanding. The study showed the necessity of more proper cultural diversity training at some colleges, such as Business Education and Teacher Education, where the knowledge of norms and values must be reinforced. The outcomes represented that students from the various colleges are exposed to a good understanding of cultural diversity, although aspects like cultural values and beliefs require improvement. Intercorrelation between the exposure to cultural diversity and the consequences implies that students' views, particularly the social sciences views, grow through greater exposure to cultural diversity.

Keywords: Academic performance; Cultural diversity; Culturally responsive teaching; Learning outcomes; Social Science.

1.0 Introduction

This study highlights a significant relationship between perceived classroom cultural diversity and students' learning outcomes in Social Sciences. Given the enormous diversity of social, religious, ethnic, and cultural groups present in schools today, multicultural education programs that acknowledge and value the uniqueness of children and adolescents are necessary. Teachers' perceptions of the school environment are influenced by cultural differences in authority, academic and social norms, peer and self-regulation behaviors, and classroom management. For people to properly teach about other cultures and understand that there is unity amidst differences, educators must examine and consider intercultural awareness (Opeña & Pontillas, 2020).

In the 21st century, teachers must have a new set of skills and abilities to successfully apply inclusion practices in the rapidly evolving educational landscape of the twenty-first century. Inclusive education aims to give every student equitable opportunity for learning and development, irrespective of their backgrounds or talents (UNICEF, 2023). With the growing cultural diversity of the world, the classroom has become a critical launching pad for educating cultural differences that begin with the teacher. However, the teacher finds it difficult to uncover how cultures influence families, government, language, and academic learning outcomes (Jones, 2013). Cultural diversity in higher learning institutions has the advantage of challenging student perspectives, ideas, and ways of thinking, encouraging dialogue, and invoking critical thinking. This boosts the level of globalization and matters affecting society at large. Increased exposure to peer socialization with individuals from other backgrounds fosters empathy, adaptability, and cultural competence.

In the Philippines, Pejaner and Vistades (2020) found out that although teachers used a variety of applications and techniques in the classroom, it was only limited to those activities that connected the subject's concepts to their daily lives. Due to the teachers' lack of knowledge of the students' culture, other indigenous knowledge systems and practices were not considered. In a classroom, whether for children or adults, pupils learn in an educational setting. Students from diverse religious backgrounds, socioeconomic backgrounds, sexual orientations, genders, and languages are present in the classroom. Therefore, students in the classroom will exhibit various behaviors, learning styles, communication abilities, etc. This diversity requires acceptance and encouragement to help kids develop the ability to stay in their roots. Global diversity will only increase, so it is critical to teach children how to adjust to this changing environment and value differences as assets rather than flaws. Students from different cultural backgrounds bring their knowledge and life experiences to the academic setting. Teachers should take the time to learn more about the background, values, histories, practices, and traditions of these students and their families. For this reason, teachers must be equipped to differentiate instruction, accommodate diverse learning styles, and create inclusive classroom environments that foster collaboration and support for all students (Hamstead, 2024). They must also possess strong communication skills, empathy, and cultural competency to effectively engage with students from diverse backgrounds.

In a classroom, the students spend their working hours learning and receiving their education. However, from time to time, they had that bad feeling about the place. In general, different classroom experiences have different effects on the students because students in the class come from different ethnic origins. That could be controlled and fixed using the teacher's abilities and lessons taught. Another important factor is cultural diversity, which directly impacts the learning outcome. It unites students belonging to different cultures and, thus, provides a vibrant and dynamic learning environment. This resonates with research by Marvi, K. (2023) on the effects of cultural diversity in school classrooms. The study was conducted to promote and sustain a positive environment in diverse classrooms. Socio-cultural value realized in schools always tends toward the dominant culture, leaving behind the rest that differs from the former. This situation, therefore, leads to educational practices that enhance social inequalities because of the failure to recognize and value cultural differences.

In connection, this study was conducted to analyze the distribution of participants, levels of cultural diversity, learning outcomes in social sciences, and the differences in cultural elements across colleges. The study explored how academic disciplines, environments, and student characteristics influence cultural diversity and learning outcomes and the connection between diversity in cultures and learners' outcomes in core areas of social sciences. This assessment evaluates the students' perceptions of the class's cultural diversity and its influence on their learning outcomes.

2.0 Methodology

2.1 Research Design

This study employed a descriptive-correlational research design to determine levels of cultural diversity among students from four categorized components in the classroom setting. In this study, a structured questionnaire with ten items for every component was rated by the students on a Likert scale. The study also aimed to determine the outcome of learning through exams on courses in Social Science. The dependent variable is the outcome of learning, assessed through course-based assessment. This comprises courses like Anthropology, Economics, Political Science, and Social Psychology, all with ten general questions from each.

2.2 Research Locale

The study was conducted at Central Philippines State University located in Kabankalan City, Negros Occidental, Philippines. The author's prior position as a Social Science instructor at the said university gained important knowledge about the academic environment and cultural variety of the school experience, which made it a good setting for investigating the connection between learning outcomes and classroom diversity. More accurate data collection and interpretation would have been made possible by familiarity with the students and the academic environment.

2.3 Research Participants

The respondents, who were selected using purposive sampling—a non-probability technique in which the researcher explicitly chooses individuals based on predefined criteria—were 361 fourth-year students. In this case, the selection of 68% of the target group (531 students) is justified because the respondents were graduating students. Graduating students are a relevant population for this study since they are in their final year of study and are well-positioned to examine the relationship between cultural diversity and learning outcomes. Their extensive academic background provides valuable insights into the long-term effects of cultural variety on performance and adaptability.

2.4 Research Instrument

The survey questionnaire to assess students' cultural diversity was adapted and modified from instruments commonly employed in similar studies at various universities worldwide. To ensure construct validity, the questionnaire underwent Factor Analysis. For cultural diversity, a structured questionnaire with ten items for every component was rated by the students on a Likert scale. The outcomes of learning were assessed through examination. This comprises courses like Anthropology, Economics, Political Science, and Social Psychology, all with ten general questions from each.

2.5 Data Gathering Procedure

The researcher conducted the data collection process. After obtaining the required permissions, the researcher personally administered the survey questionnaires and the exams. The researcher administered the tests and surveys simultaneously while utilizing other colleagues to coordinate the data collection process.

2.6 Data Analysis

In data analysis, the profile of the fourth-year students in CPSU-main according to Colleges, Courses, Language, and Gender was determined using the frequency and percent distributions. The levels of students' cultural diversity and Learning Outcomes when grouped into Colleges and Languages were treated using the Mean. The significant differences in students' cultural diversity and learning outcomes when grouped into Colleges and Gender were computed with one-way ANOVA. The significant correlation between students' cultural diversity and learning outcomes in social science was dealt with by Pearson correlations.

2.7 Ethical Considerations

The respondents were provided with a detailed report outlining the specific approach and objectives of the study. Process discretion ensures that data is kept completely confidential, whereby the respondent identities are masked through all phases of data processing and analysis to avoid violating participants' rights. In addition, the data was completely evaluated and interpreted to explicate the study's relevance. Furthermore, the researchers needed to guarantee that the volunteers properly understood the study's goals and relevance and had the choice to participate or not.

3.0 Results and Discussion

3.1 Distribution of Participants

Table 1 presents the distribution of the study participants according to colleges. The respondents from the College of Teacher Education rank highest, with 70, or 19.39% of the total respondents.

Table 1. Distribution of participants according to colleges

Colleges	Frequency	Percentage
College of Agriculture	42	11.63
College of Animal Science	45	12.47
College of Arts and Sciences	30	8.31
College of Business Education	50	13.85
College of Computer Science	40	11.08
College of Criminal Justice Education	58	16.07
College of Engineering	20	5.54
College of Forestry	6	1.66
College of Teacher Education	70	19.39
Total	**361**	**100.00%**

This reflects interest or enrollment among senior students in education-related courses. This corresponds to Hansen (2014), who also noted that getting students off lower-achieving teachers and onto higher-achieving ones led to notable gains in learning, and improvement of the performance of a country's teaching corps is just one of the important ways through which it can shore up the overall quality of education. Specifically, the College of Forestry invested the smallest share at the senior level, only 6 students, 1.66 percent. Thus, it can be interpreted as limited enrollment or niche specialization in forestry studies. According to CHED (2019), enrolment in Agriculture, Forestry, and Fisheries in the country is quite low compared with the numbers of Business Administration and Education Science and Teacher Training enrollment, which has become the primary theme of the country for the past ten years. This development has made the agriculture sector unpopular, especially among the young population (CHED 2019).

3.2 Cultural Diversity

Table 2 provides data on the levels of cultural diversity of senior students across nine colleges, measured across four components: Cognitive Elements (CE), Language and Symbols (LS), Beliefs (BEL), and Norms and Values (NV).

Table 2. Levels of cultural diversity

Colleges	Cognitive Elements (CE)	Language and Symbols (LS)	Beliefs (BEL)	Norms and Values (NV)
College of Agriculture	3.57	3.80	3.86	3.78
College of Animal Science	3.42	3.56	3.67	3.52
College of Arts and Sciences	3.38	3.47	3.48	3.20
College of Business Education	3.28	3.72	3.76	2.98
College of Computer Science	3.59	3.91	4.07	3.59
College of Criminal Justice Education	3.59	3.58	3.53	3.50
College of Engineering	3.39	3.48	3.46	3.53
College of Forestry	3.53	3.47	3.55	3.57
College of Teacher Education	3.92	3.11	3.00	3.10
Overall Mean (Interpretation)	**3.51 (High)**	**3.55 (High)**	**3.57 (High)**	**3.41 (High)**

The scores range from 3.41 to 4.20, which indicates a "High" level of cultural diversity based on the scale provided. The overall cultural diversity level across all colleges is 3.54 (High), indicating that senior students have a strong orientation toward cultural diversity. The strongest component is the beliefs (3.57), and language and symbols (3.55) are the highest-scoring components, indicating that students are particularly aware of cultural symbols, language, and belief systems. The weakest component is the norms and values (3.41), suggesting that students might struggle to understand or adhere to cultural norms and values more than other aspects of cultural diversity. Lin and Jackson (2019) state that the human condition has become multicultural and interactive. As shown in the table above, most colleges consistently score high across the components, indicating a well-rounded understanding of cultural diversity. The lower scores in "Norms and Values" in several colleges, especially in the College of Business Education, point to a potential area for improvement in reinforcing cultural norms and values in student orientation. The College of Teacher Education scores lower across components, especially in "Beliefs" and "Norms and Values," suggesting a need for more focus on cultural diversity training within the education sector. The data suggest senior students are generally well-versed in cultural diversity, particularly cognitive understanding, language, and beliefs. However, there is room for improvement in understanding norms and values, especially in specific colleges like Business Education and Teacher Education.

3.3 Learning Outcomes

Table 3 provides insight into the learning outcomes in social sciences across nine colleges. These outcomes are assessed across various subject areas such as anthropology (IANTH, PANTH), economics (INECON, PRNECON), political science (PS, PRNPS), sociology, and psychology (SOCPSY, PRNSSP).

Table 3. Learning outcomes in Social Sciences across nine colleges

Colleges	IANTH	PANTH	INECON	PRNECON	PS	PRNPS	SOCPSY	PRNSSP	Total
College of Agriculture	3.07	3.10	3.05	3.57	2.36	3.62	3.05	2.31	3.01
College of Animal Science	2.60	2.27	3.13	3.24	3.22	4.44	3.44	2.58	3.12
College of Arts and Sciences	4.10	3.07	2.57	3.43	3.50	4.47	2.93	3.93	3.50
College of Business Education	3.58	3.38	2.26	3.12	3.46	3.70	3.92	3.28	3.34
College of Computer Science	3.93	3.30	1.98	3.18	3.33	3.08	2.95	3.48	3.15
College of Criminal Justice Education	3.09	2.69	2.10	3.45	4.19	3.07	3.67	3.60	3.23
College of Engineering	5.05	5.30	5.20	5.15	5.80	5.50	5.20	5.10	5.29
College of Forestry	3.17	2.67	2.83	5.00	5.50	3.67	4.17	3.50	3.81
College of Teacher Education	5.80	6.30	5.73	5.60	5.96	6.03	4.81	4.86	5.64
Overall Mean	**3.91**	**3.72**	**3.27**	**3.90**	**4.06**	**4.23**	**3.78**	**3.62**	**3.81**
Level	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

The scores range from 2.81 to 6.40, with 2.81-4.60 categorized as Low (L) and 4.61-6.40 as Average (A). The overall learning outcome score across the nine colleges is 3.81, which falls into the Low (L) category. This suggests that, on average, students across most colleges do not demonstrate strong proficiency in social sciences. Despite the low overall average, two standout colleges—the College of Engineering and the College of Teacher Education—perform at an Average (A) level, with scores of 5.29 and 5.64, respectively.

The disciplines in social science play a significant role in fostering knowledge, skills, and behavior necessary to become members of society who understand their rights and civic duties (Mafrudin, 2023). Furthermore, this cultivates essential skills, including creative thinking, problem-solving, decision-making, and research, empowering individuals to enhance their lives and contribute to social transformation (Mafrudin, 2023; Mutiani & Faisal, 2019). In the table above, the lowest scores are seen in Political Science (PS) for the College of Agriculture (2.36) and Economics (INECON) for the College of Computer Science (1.98), indicating that students in these colleges struggle significantly in understanding certain social science disciplines. The large disparity between the College of Engineering and Teacher Education versus the other seven colleges suggests that certain colleges emphasize social sciences more effectively. It may also reflect the academic expectations in these fields, where students must maintain higher academic standards (cut-off GPAs of 85% or higher). Learning outcomes assist students in concentrating on their studies, but this does not automatically imply that these outcomes promote active, autonomous, responsible, and self-directed learning (Brooks et al., 2014).

3.4 Differences in Cultural Diversity

As shown in Table 4, the significance value of 0.965 is far above the typical threshold of 0.05, indicating no significant difference in the languages students speak across the colleges.

Table 4. Analysis of the difference in students' cultural diversity

Cultural Diversity	Mean Square	F	Sig.
Language	0.076	0.301	0.965
Language and Symbols (LS)	2.877	7.536	0.000
Beliefs (BEL)	4.904	13.705	0.000
Norms and Values (NV)	3.151	7.408	0.000
Cognitive Elements (CE)	2.390	6.147	0.000

The result implies that the number of students speaking Cebuano and Hiligaynon is relatively consistent across the different colleges, and language does not vary as a key differentiating factor among them. The significance value of 0.000 indicates a highly significant difference in the use of language and symbols across the colleges. This suggests that how students use language and symbols (such as communication styles, cultural references, or local terminologies) varies substantially between colleges, possibly due to different cultural backgrounds, fields of study, or academic environments that influence communication patterns. With the highest F-value of 13.705, there is a highly significant difference in belief systems among students across different colleges. This may reflect differences in personal, cultural, or religious beliefs influenced by the specific focus or ethos of the various colleges.

For instance, students in fields like education, criminal justice, or business might be exposed to values, ethics, and worldviews different from those in technical fields like engineering or agriculture. Not bilingual speakers enjoy greater cognitive control or mental fluency regarding executive functioning in the brain (Qu et al., 2021).

The significant difference in norms and values across colleges suggests that students from different fields adhere to different social norms and prioritize varying values. The distinct social environments and expectations within each academic discipline could influence this. For instance, fields like teacher education or criminal justice may emphasize certain ethical norms and values, while others might prioritize different cultural or professional standards. The significant differences in cognitive elements suggest that students across colleges differ in their ways of thinking, perceiving, and understanding cultural diversity. This could be shaped by the education type and intellectual challenges in their respective fields. The analysis shows that while language is not a distinguishing factor, significant differences exist in how cultural diversity is expressed through language and symbols, beliefs, norms and values, and cognitive elements across colleges. These differences suggest that students' academic environments and disciplines strongly influence their perceptions and expressions of cultural diversity. Tailored programs and interventions are necessary to address these differences and promote a more unified understanding of cultural diversity across the institution. According to Berry et al. (2022), there is still a lot to do to understand the complexities of culture and its role in behavior.

3.5 Differences in Learning Outcomes

The table presents ANOVA results on learning outcomes in social sciences for various subjects (Anthropology, Economics, Political Science, Social Psychology) across different colleges. The significance (Sig.) values for all variables are 0.000, indicating highly significant differences in student performance across colleges for each subject.

Table 5. Analysis of the difference in students' learning outcomes

Cultural Diversity	Mean Square	F	Sig.
Introduction to Anthropology (IANTH)	54.001	21.729	.000
Principles of Anthropology (PANTH)	90.148	46.182	.000
Introduction to Economics (INECON)	89.191	45.878	.000
Principles of Economics (PRNECON)	41.812	17.803	.000
Introduction to Political Science (PRNPS)	53.202	22.789	.000
Introduction to Social Psychology (SOCPSY)	24.302	11.818	.000
Principles of Social Psychology (PRNSSP)	35.203	16.663	.000

There are highly significant differences in the scores for Introduction to Anthropology across colleges. The table mentions that Teacher Education and Engineering students top the scores in this subject, indicating that these colleges have a stronger grasp of basic anthropological concepts than other colleges. The differences in performance in Principles of Anthropology are even more pronounced, with a higher F-value. This suggests that certain colleges, including Teacher Education and possibly Engineering, have a much stronger understanding of advanced anthropological theories than others. The stark differences may reflect varying levels of emphasis on anthropology in different college curriculums. INECON (F-value: 45.878) and PRNECON (F-value: 17.803) show significant differences across colleges.

Colleges and universities are no longer just under pressure to enhance access, affordability, and the rate of completion in today's uncertain future but to develop individuals' core competencies and dispositions, or their "non-economic" benefits in terms of logical thinking, having the capacity to question the status quo, and an aspiration to develop sophisticated values for success in the highly competitive global labor market (Brennan et al., 2013; Selingo, 2016; Tilak, 2008; Washburn, 2005). This reflects how economics is approached differently depending on the discipline. Colleges like Business Education may naturally emphasize economics, leading to higher scores, while other colleges may not prioritize the subject as much. The lower F-value for Principles of Economics (compared to Introduction) suggests that while there are still significant differences, students across colleges may have a slightly more uniform understanding of more advanced economic principles. There are significant differences in students' understanding of Political Science across colleges. This could be due to the relevance of political science in certain fields, like Criminal Justice Education or Teacher Education, where students are more exposed to concepts related to governance, law, and social structures. These differences may indicate which colleges prioritize political science in their core curriculum. Both the Introduction and Principles of Social Psychology show significant differences across colleges. Like political science, fields like Teacher Education and Criminal Justice may emphasize understanding human behavior and societal interactions, leading to better performance in these subjects than in technical or scientific fields like Engineering or Agriculture. According to Roksa and Arum (2015), there is a need for new research that analyzes the public or social purpose of higher education and its personal or private purpose to understand the extent to which students learn the discipline-specific competencies and higher-level learning outcomes necessary to live responsibly in an increasingly diverse democracy and an interconnected global community.

3.6 Relationship between Cultural Diversity Variables

Table 6 presents the correlations among components of cultural diversity (Language, Language and Symbols, Beliefs, Norms and Values, and Cognitive Elements), showing how each element is related to the others.

Table 6. Correlation analysis of the relationship between cultural diversity variables

	Language (Lang)	**Language and Symbols (LS)**	**Beliefs (BEL)**	**Norms and Values (NV)**
Language and Symbols (LS)	0.002 0.967			
Beliefs (BEL)	-0.093 0.079	0.738(**) 0.000		
Norms and Values (NV)	-0.101 0.054	0.637(**) 0.000	0.707(**) 0.000	
Cognitive Elements (CE)	-0.119(*) **0.024**	0.713(**) **0.000**	0.739(**) **0.000**	0.769(**) **0.000**

Note: *Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed).

Cognitive Elements (CE) are significantly correlated with Language and Symbols (LS) ($r = 0.713$, $p < 0.01$), Beliefs (BEL) ($r = 0.739$, $p < 0.01$), Norms and Values (NV) ($r = 0.769$, $p < 0.01$). These high correlations suggest that students' cognitive understanding of cultural diversity (CE) is strongly tied to their understanding of symbols, beliefs, and norms. In other words, those who score high in cognitive understanding of culture are also likely to have a deeper grasp of cultural symbols, beliefs, and values. Beliefs (BEL) are positively correlated with Norms and Values (NV) ($r = 0.707$, $p < 0.01$), Language and Symbols (LS) ($r = 0.738$, $p < 0.01$). This shows that students with stronger beliefs related to cultural diversity also tend better to understand cultural norms, values, and symbols. Language (Lang), specifically Cebuano and Hiligaynon, has a weak negative correlation with Cognitive Elements (CE) ($r = -0.119$, $p < 0.05$). This suggests that as students' understanding of cognitive aspects of cultural diversity increases, their reliance or identification with local languages (Cebuano and Hiligaynon) slightly decreases. This might indicate that regional linguistic factors less influence students who perform well in cognitive aspects of cultural diversity. However, the correlation is weak and insignificant, so this finding should be interpreted cautiously.

The significant correlations among Cognitive Elements (CE), Beliefs (BEL), Norms and Values (NV), and Language and Symbols (LS) show that these components of cultural diversity are highly interconnected. When students score highly in one area, they are likely to score highly in others, indicating that their understanding of cultural diversity is comprehensive rather than fragmented. The negative correlation between Language (Cebuano and Hiligaynon) and Cognitive Elements (CE) suggests a complex relationship between local languages and students' understanding of broader cultural concepts. As students increase their cognitive understanding of cultural diversity, they might rely less on specific linguistic identities, indicating that linguistic diversity could be less emphasized in a broader cultural context. However, since the correlation is weak, this might indicate a minimal impact, and it would be worth further exploring how regional language plays into broader cultural understanding. The present institutions of learning are hurdles in generating an environment of learning where all students have equal opportunities, representation, and belongingness (Huijnk et al., 2016). The present interethnic tensions prevailing between the students and their peers and with their teachers, as well as structural barriers like mainstream education that fail to connect with the personal experiences and views of the minoritized students (Stevens et al., 2017).

The data suggests that students with a better understanding of cultural diversity, particularly cognitive elements, beliefs, norms, and values, are likelier to perform well in subjects like social sciences. These relationships can positively influence students' learning outcomes because a deep understanding of cultural diversity enriches their perspectives on these subjects.

4.0 Conclusion

The objectives of this study included the analyses of participant distribution and levels of cultural diversity, learning outcome in social sciences, and differences in cultural elements across colleges. In that respect, the paper aimed to test how academic disciplines, environmental factors, and student character influenced cultural diversity and learning outcomes. This significance unfolds because the studies fill gaps in available literature in research on how academic environments shape cultural understanding and proficiency in social sciences, providing valuable insights into student learning and diversity within a university setting.

The largest was from respondents in the College of Teacher Education, that many have an interest in education course offerings, while the lowest number of respondents were coming from the College of Forestry. Thus, the outcomes thus suggest that there is a national influence triggered by their trends whereby the business and education sectors have more demand, while those from agriculture and forestry have lesser. In theory, this already reflects Hansen's observation: with quality teaching greatly improved, the outcome changes accordingly (Hansen, 2014). The low enrollment in agriculture-related fields point to the need for shifts in the policy landscape to revive interest in these sectors, as opined by CHED in 2019.

This of course, proves and can be supported by the diversity of culture among colleges, indicating a wider awareness of culture in cognitive aspects, language, and beliefs, though in norms and values, it had relatively low scores. The diversity of cultural expressions among colleges manifests the heavy influence of academic settings in the design of students' cultural understanding. This outcome aligns with the claim by Lin and Jackson (2019) that multiculturalism is increasingly interactive and vital in modern society. The study showed the necessity of more proper cultural diversity training at some colleges, such as Business Education and Teacher Education, in which the knowledge of norms and values has to be reinforced.

The study concludes that students from the various colleges are exposed to a good understanding of cultural diversity, although aspects like cultural values and beliefs require improvement. Intercorrelation between the exposure to cultural diversity and the consequences implies that students' views, particularly the social sciences views, grow through greater exposure to cultural diversity. Academic environments shape not only the cultural understanding of students but also the ultimate learning outcomes that influence their roles in responsible citizenship. For practice, it suggests a need for finely tailored interventions to improve cultural understanding and proficiency in social science, even in technical disciplines, and to design policies to enhance interdisciplinary cultural education.

One of the major limitations of this study is that it is based on self-reported data. Moreover, it was based only on one institution, and therefore, the generalizability of the findings to other contexts of education is limited. The analysis of cultural diversity was limited only to the four components that could encompass other viable and significant dimensions of culture. Future work can extend the scope of cultural diversity metrics across more institutions to provide a broader view of the relative variations of other educational settings regarding cultural diversity.

Future studies should attempt to determine how specific cultural diversity interventions in higher education may impact the outcome of the student's learning, especially in such fields as badly underperforming agriculture, forestry, and technical disciplines. Further, the long-term outcomes of improving cultural diversity could be subjected to study, understanding of students' professional development, and societal engagement. Additionally, there is a need for longitudinal studies that track the evolution of cultural diversity comprehension throughout a student’s academic career, considering factors such as regional language influence and interethnic relations within the academic environment.

5.0 Contributions of Authors

The author contributes to the conceptualization, formal analysis, original draft, supervision, data curation, validation, writing–review and editing, visualization, funding acquisition, investigation, methodology, and project administration of this study.

6.0 Funding

The author is solely responsible for funding this research, and no external funding agency provided financial support for its completion.

7.0 Conflict of Interests

The author declares that she has no known competing financial interests or personal relationships that might influence the work reported in this paper.

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Teachers' Instructional Practices vis-à-vis Students' Interest in Learning Mathematics

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Abstract. The study explores the correlation between teaching practices and student's interest in learning mathematics among Grade 10 students of Guihulngan National High School—Hilaitan. It utilizes a survey with a sample size of 134 students distributed across five sections. The study focused on teachers' instructional practices regarding classroom management, social-emotional support, instructional quality, and students' cognitive engagement as independent variables. The dependent variables were students' overall interest in mathematics and their confidence level in mathematical problems. Results indicated that teachers' instructional practices were rated as effective, with an average mean of 2.88 on classroom management, social-emotional support, instructional quality, and cognitive engagement. Students expressed "confidence" in their problem-solving abilities, with an average mean of 2.86, and exhibited a "high" level of interest in learning mathematics, with an average mean of 2.93. Positive correlations were found between teachers' instructional practices and students' confidence level and learning interest in mathematics. Classroom management ($r = 0.532$) and instructional quality ($r = 0.420$) showed moderate correlations with students' confidence levels in Mathematical problems. In contrast, instructional quality ($r = 0.653$) had the highest correlation with students' learning interest in mathematics. Classroom management ($r = 0.466$), social-emotional support ($r = 0.377$), and cognitive engagement ($r = 0.371$) also contributed positively. The study underscores the critical role of effective teaching methods in fostering students' mathematical interest, contributing to improved academic performance and positive attitudes toward the subject where educators can create a positive learning environment that promotes success in Mathematics and makes the learning process enjoyable. Teachers can always develop a better teaching strategy, especially regarding their instructional quality. As per the findings of this study, it has the highest correlation with the students' learning interests. These results highlight the importance of thorough and efficient teaching approaches in increasing students' confidence and interest in mathematics, which enhances their academic achievement and fosters a more positive attitude toward the subject.

Keywords: Classroom management; Cognitive engagement; Instructional practices; Instructional quality; Social-emotional support; Students' interest; Mathematics.

1.0 Introduction

Mathematics is an essential subject in human life. It is a fundamental subject taught to students at all levels of education, from grade school to college. Mathematics is at the heart of science and our daily lives. It is all around us in everything we do. It is the building block for everything. Mathematics instruction begins with identifying simple numbers, which progresses to complex ones. Mathematics is embedded in our everyday lives, especially with the rise of technology (Mustafa, 2024). Learning about it is essential in helping students build their mental and cognitive development, such as problem-solving and critical thinking abilities. Through Mathematics, they acquire an attitude of thinking about solutions rather than focusing solely on the problem. It is common for people to wonder what relevance Mathematics serves in their daily lives.

In the modern world, math, such as applied Mathematics, is relevant and crucial (Hom & Gordon, 2021). Mathematics has a widespread reputation for being the subject students hate. It is not uncommon to hear from students who are struggling with math. People are becoming scared of Mathematics, and it makes them anxious. Thus, the researchers were eager to conduct this study to determine the correlation between the teaching-learning process and the student's learning interest in Mathematics. The study primarily focuses on the teachers' instructional practices that could jeopardize the teaching-learning process, such as classroom management, social-emotional support, instructional quality, and students' cognitive engagement.

On the other hand, the students' confidence level in dealing with mathematical problems and their interest in learning mathematics serve as the dependent variables for students' achievements. The researchers desire to know the significant relationship between the two variables. The outcome of this study is a big help for teachers to innovate their teaching practices, for the students to enhance their understanding and learning interest in Mathematics, and for the institutions to improve their current academic pedagogy.

The study was conducted in the heart of Guihulngan National High School – Hilaitan with the participation of Grade 10 students within the School Year 2023-2024 where it focuses on the correlation between the teachers' instructional practices and students' interest in learning mathematics within this local context. Examining their teaching styles or engagement strategies, we can identify effective approaches that may enhance student interest and motivation. The findings are expected to inform local educational policies and practices, ultimately contributing to improved student outcomes in mathematics. Addressing this pressing need supports academic success and fosters a generation of learners equipped with essential mathematical skills necessary for the workforce.

2.0 Methodology

2.1 Research Design

The study utilized the descriptive research design to determine the relationship of the teaching-learning process to the student's learning interest in Mathematics. Specifically, the method used was a survey using floating questionnaires for the respondents. The researchers chose this research design to digest the information from the respondents through statistical tools fully.

2.2 Research Locale

The study focused on the teacher's instructional practices and the student's learning interest in Mathematics. The respondents were the Grade 10 students of Guihulngan National High School – Hilaitan, Guihulngan City, Negros Oriental.

2.3 Research Participants

The participants of this study were one hundred thirty-four (134) students in the Grade 10 level of Guihulngan National High School – Hilaitan enrolled in the Academic Year 2023-2024. Sixty (60) respondents were male, while the remaining seventy-four (74) were female.

2.4 Research Instrument

This study used an adapted questionnaire from Yan Zhu and Gabrielle Kaiser (2022) entitled Impacts of Classroom Teaching Practices on Students' Mathematics Learning Interest.

2.5 Data Gathering Procedure
The researchers had control over data collection because they coordinated and administered their respondents. Fundamentally, the data for this study was gathered from identified respondents (GNHS-Hilaitan Grade 10 students). A survey questionnaire was utilized to gather information about the respondents' mathematical learning interests and their relevance to the teaching-learning process. After collecting the data, the researchers tabulated and tallied the survey using statistical methods.

2.6 Data Analysis
To analyze the data, the researchers used frequency and percentage to determine the demographic profile of the respondents. They also used weighted mean or average mean to look for the level of confidence, teachers' institutional practices, and students' interest in Mathematics. Pearson's product-moment correlation coefficient was also used to identify the relationship between the two variables, the relationship between the independent variable, and the primary and secondary dependent variables.

2.7 Ethical Considerations
This research study followed ethical guidelines. The researchers obtained consent before conducting the research and did not force the respondents to respond to the surveys. It ensured that all respondents' personal information would be kept confidential. The researchers supplied a letter of permission to participate in the study. As a result, the participants readily engaged in the study after being approached by the researchers and given a suitable explanation of the research goal and methodology.

3.0 Results and Discussion
3.1 Demographic Profile
As shown in Table 1, seventy-six (76) of the respondents came from Grade 10—Bonifacio and Grade 10—Mabini, comprising thirty-eight (38) students in each section, making 56% of the total respondents. On the other hand, 22% of the respondents came from Grade 10—Rizal, which has 29 students, while the remaining 21% came from Grade 10—Silang and Grade 10—Luna, which had 15 and 14 students, respectively.

Table 1. Descriptive statistics of the demographic profile of the respondents (n= 134)

	Frequency	Percentage
Grade & Section		
Grade 10 – Bonifacio	38	28
Grade 10 – Mabini	38	28
Grade 10 – Luna	14	10
Grade 10 – Rizal	29	22
Grade 10 – Silang	15	11
Gender		
Male	60	45
Female	74	55

The data also indicates that sixty (60) of the one hundred thirty-four (134) students were male, which comprises 45% of the total respondents. The remaining seventy-four (74) students were female, which makes 55% of the total respondents. This denotes that the majority of the respondents were female, which is the same data extracted from the total population of the Grade 10 students of Guihulngan National High School—Hilaitan.

3.2 Effectiveness of Teachers' Instructional Practices

In terms of Classroom Management
Classroom management plays a vital role in the teaching-learning process. It ensures that the lessons run smoothly and effectively and emphasizes academic and social-emotional development. In this study, five (5) statements correspond under the sub-variable classroom management. The weighted mean was extracted from each statement and combined into one grand weighted mean. The data on classroom management is presented in the table below.

Table 2. Descriptive statistics of classroom management

Indicators	Mean	Description	Interpretation
1. When the lesson begins, our mathematics teacher does not have to wait long for us to quiet down.	2.66	Agree	Effective
2. The class never loses time because of students interrupting the lesson.	2.66	Agree	Effective
3. In our teacher's class, we know what is allowed and what is not.	3.16	Agree	Effective
4. Our teacher reacts to disruptions so that the students stop disturbing learning.	2.75	Agree	Effective
5. Our teacher is aware of what is happening in the classroom, even if he or she is busy with an individual student.	2.96	Agree	Effective
Average	**2.84**	**Agree**	**Effective**

As shown in Table 2, the total average mean in classroom management was 2.84, with a verbal interpretation of "effective." The statement "In our teacher's class, we are aware of what is allowed and what is not allowed" has the highest weighted mean, meaning most students agreed to this. This coincides with the article by Riches (2021) stating that two factors for success in any classroom are the students knowing what to do and how they should be doing it. Instructions and expectations are the bread and butter of successful learning. Quite simply, if students do not know how to complete a task and how they are expected to do it, they will not learn efficiently.

In terms of Socioo-Emotional Support

Table 3 below shows the data on social-emotional support, where students and teachers must acquire and effectively apply the knowledge, attitudes, and skills required to understand and manage emotions, form and maintain positive relationships, and make responsible decisions. In this study, five (5) statements correlate to the sub-variable social-emotional support, and the weighted mean from each statement has been combined into a single grand weighted mean.

Table 3. Descriptive statistics of the social-emotional support

Indicators	Mean	Description	Interpretation
1. I get along well with my mathematics teacher.	2.81	Agree	Effective
2. My mathematics teachers listen to what I have to say.	3.00	Agree	Effective
3. My mathematics teacher treats me fairly.	3.00	Agree	Effective
4. My mathematics teacher makes me feel she/he cares about me.	2.94	Agree	Effective
5. I never felt like an outsider (or left out of things) in my mathematics class.			
Average	**2.95**	**Agree**	**Effective**

Table 3 indicates the overall average mean of 2.95 with a verbal interpretation of "Effective." "My mathematics teacher really listens to what I have to say" and "My mathematics teacher treats me fairly" have the highest weighted mean. It shows that listening to students is critical to the student/teacher relationship. Knowing their teacher is interested in what they say makes students feel cared for and emotionally connected to their school. Since research shows that feeling connected is necessary for students' motivation to learn, showing that teachers listen is important not only as a matter of kindness but also as a motivational strategy (Kelly, 2019). Teaching also takes each student seriously as an individual. This means not taking equality and fairness for granted but setting them as an educational goal and seeing them as requirements for good teaching. That includes ensuring a good learning environment for everyone (Freie Universität, 2024).

In terms of Instructional Quality

Table 4 below displays the data on instructional quality, which is important in understanding the essence of effective instruction and developing strategies for improving learning. Instructional quality has a direct impact on student academic satisfaction, and students' academic satisfaction increases as instructional quality improves. In this study, eight (8) statements are associated with the sub-variable instructional quality, and the weighted mean of each statement is added together to produce one grand weighted mean.

Table 4 shows the descriptive statistics of the instructional quality. Based on the results, the weighted mean of the sub-variable instructional quality ranges from 2.75 to 3.17, which fits under the verbal interpretation "Effective". The average mean of 2.91 equates with the verbal interpretation "Effective." The statement "Our mathematics teacher explains how new and old topics are related" has the highest weighted mean. This coincides with the study of Alreshidi (2023) entitled "Enhancing topic-specific prior knowledge of students impacts their outcomes in mathematics," stating that learning new procedures that have relationships with other procedures that students possess would contribute to learning connections. This prior knowledge was selected to enhance by determining what is necessary for students to facilitate its integration into new information. For example, students cannot learn to compare or order fractions unless they have already learned equivalent fractions. Being able to recognize equivalent fractions works as a facilitator for new learning.

Table 4. Descriptive statistics of the instructional quality

Indicators	Mean	Description	Interpretation
1. Our mathematics teacher presents a summary of recently learned content.	2.84	Agree	Effective
2. Our mathematics teacher sets goals at the beginning of instruction.	3.01	Agree	Effective
3. Our mathematics teacher explains how new and old topics are related.	3.17	Agree	Effective
4. Our mathematics teacher presents tasks that require us to apply what we have learned to new contexts.	2.82	Agree	Effective
5. Our mathematics teacher gives tasks that require us to think critically.	2.82	Agree	Effective
6. Our mathematics teacher gives us opportunities to explain our ideas.	3.03	Agree	Effective
7. Our mathematics teacher encourages us to question and critique arguments made by other students.	2.81	Agree	Effective
8. Our mathematics teacher requires us to engage in discussions among ourselves.	2.75	Agree	Effective
Average	**2.91**	**Agree**	**Effective**

In terms of Cognitive Engagement

Table 5 below shows the students' cognitive engagement data, which is essential to their strategic involvement in learning and can increase their capacity to comprehend the subject. Cognitive engagement allows students to be motivated and engaged while learning in the classroom. In this study, five (5) statements correspond with the sub-variable students' cognitive engagement, and the weighted mean of each statement is merged to form a single grand weighted mean. The table below shows the data regarding the students' cognitive engagement. The weighted mean of the sub-variable instructional quality ranges from 2.53 - 2.98, indicating an "Effective" verbal interpretation.

Table 5. Descriptive statistics of students' cognitive engagement

Indicators	Mean	Description	Interpretation
1. Our mathematics teacher adapts the lessons to my class's needs and knowledge.	2.86	Agree	Effective
2. Our mathematics teacher changes the way of explaining (e.g., using different representations) when a student has difficulty understanding a topic or task.	2.85	Agree	Effective
3. Our mathematics teacher changes the lesson's structure on a topic that most students find difficult to understand.	2.75	Agree	Effective
4. Our mathematics teacher gives different work to students of different ability levels.	2.69	Agree	Effective
5. Our mathematics teacher asks questions to check if we have understood what he/she has taught.	2.98	Agree	Effective
Average	**2.83**	**Agree**	**Effective**

On the other hand, the average mean of 2.76 corresponds to the verbal interpretation of "Effective". Earning the highest weighted mean is the statement, "Our mathematics teacher asks questions to check if we have understood what he/she has taught," which is important because it helps educators make the most of instructional time. Essentially, it involves checking to see if students retain the information while you are still teaching it, not after. It often takes the form of a short formative assessment but doesn't need pencil-and-paper checks (Ozan & Kıncal, 2018).

Summary Instructional Practices

Table 6. Descriptive statistics of the composite mean of teachers' instructional practices

Indicators	Mean	Description	Interpretation
1. Classroom Management	2.84	Agree	Effective
2. Social-Emotional Support	2.94	Agree	Effective
3. Instructional Quality	2.91	Agree	Effective
4. Students' Cognitive Engagement	2.83	Agree	Effective
Average	**2.88**	**Agree**	**Effective**

Table 6 above presents all the data of each weighted mean of the sub-variables under teachers' instructional practices, which ranges from 2.83 to 2.94, gaining the verbal interpretation of "Effective." This garners the composite mean of 2.88, which also has the verbal interpretation of "Effective." This reveals that the Grade 10 students of Guihalngan National High School – Hilaitan had experienced above average regarding their teachers' instructional practices in terms of classroom management, social-emotional support, instructional quality, and students' cognitive engagement during their Mathematics class. Effective instructional strategies help students become actively involved in the learning process. When done right, instructional strategies also support students in reaching their learning objectives (Haramain & Alih, 2021).

3.3 Students' Confidence in Mathematics

Table 7 below displays the data according to the student's confidence level in Mathematical problems. Researchers must also consider the student's confidence level in solving various mathematical problems. Possessing the confidence to work through problems reflects how well students have learned the topic and reflects on how well they were taught. The first dependent variable in this study, the student's confidence level in solving mathematical problems, is linked to nine (9) statements. The weighted means of each statement are combined to create the grand weighted mean.

Table 7. Descriptive statistics of the student's confidence level in dealing with mathematical problems

Indicators	Mean	Description
1. Plotting the graph of $y=x^2$.	2.75	Confident
2. Solving a problem like x^2-4-0 by inspection.	2.79	Confident
3. Finding all values of x for which $(x - 4)(x + 5) = 0$.	2.97	Confident
4. Using the binomial formula $(a+b)^2=a^2+2ab+b^2$ when solving a problem like $x^2 + 6x + 9 = 0$.	2.95	Confident
5. Solving any quadratic equation (example: $4x^2+6x+3 = 0$).	2.94	Confident
6. Using different ways when solving a quadratic equation.	2.83	Confident
7. Explain when a quadratic equation has one, two, or no solutions.	2.81	Confident
8. Checking if an equation like $2x^2+3x+1$ has any real solution	2.86	Confident
9. Calculate the highest point of a ball thrown diagonally into the air.	2.82	Confident
Average	**2.86**	**Confident**

Legend: 3.26 – 4.00 – Very Confident 2.51 – 3.25 – Confident
1.76 – 2.50 – Somewhat Confident 1.00 – 1.75 - Not Confident

The weighted mean of the variable students' confidence level in mathematical problems varies from 2.75 to 2.97, all falling within the verbal interpretation of "Confident," as indicated in Table 4.0. The grand weighted mean of 2.85 equates with the verbal interpretation of "Confident." This signifies that the respondents are confident in their abilities to solve different Mathematical problems. Thus, students' mathematical confidence affects their approach to challenges and failure. Students who possess mathematical confidence look at challenging math problems completely differently. With mathematical confidence, they can persevere through challenging problems, trying and trying again until they figure them out (Heinemann Blog, 2024).

Table 8 below shows the student's interest in learning mathematics, where the effectiveness of learning also depends on the level of interest that a student has in a subject. A person will have difficulty learning something if their interest is in other things. This also applies to learning Mathematics. The more the student is interested in a subject, the more efficient learning is. The second dependent variable, students' level of interest in learning Mathematics, measures how the students are into Mathematics, with thirteen (13) statements. The grand weighted mean is obtained by summing the weighted means of each statement.

3.4 Students' Interest in Learning Mathematics

The overall weighted mean of the variable students' level of interest in learning Mathematics ranges was 2.93, as shown in Table 8, with a verbal interpretation of "High." This signifies that most respondents are highly interested in learning Mathematics, which is above average. The statement with the highest weighted mean is "I will learn many things in mathematics that will help me get a job," which was supported by Northern Illinois University (2024), stating that problem-solving and analytical skills are highly desired in many jobs. Your teens will have a greater chance of finding a job if they develop these skills in school. They will also do better on tests and exams that they take at school and college if they know how to solve problems. Math-related occupations promise high job satisfaction levels, making people feel better about their lives. The statement with the lowest weighted mean is "After mathematics class, I was often curious about the next mathematics class," although labeled as the lowest weighted mean, it still has the verbal interpretation of a high level of interest. It denotes that although curiosity is not an explicit part of most mathematics curricula, it can still improve learning and is essential for learning mathematics (Knuth, 2002).

Table 8. Descriptive statistics of students' level of interest in learning mathematics

Indicators	Mean	Description	Interpretation
1. Making an effort in mathematics is worth it because it will help me in the work I want to do later.	3.04	Agree	High Level
2. Learning mathematics is worthwhile because it will improve my career prospects.	3.11	Agree	High Level
3. Mathematics is an important subject because I need it for what I want to study later on	3.03	Agree	High Level
4. I will learn many things in mathematics to help me get a job.	3.12	Agree	High Level
5. I was interested in mathematics.	3.07	Agree	High Level
6. I often thought what we discussed in my mathematics class was interesting.	3.00	Agree	High Level
7. I was often curious about the next mathematics class after mathematics class.	2.84	Agree	High Level
8. I wanted to deal more intensively with topics discussed in my mathematics class.	2.96	Agree	High Level
9. I believe I will receive an excellent grade in mathematics.	2.87	Agree	High Level
10. I am confident I can understand the most difficult material in mathematics.	2.86	Agree	High Level
11. I am confident I can do an excellent job on the mathematics assignments and tests.	2.91	Agree	High Level
12. I expect to do well in mathematics.	2.92	Agree	High Level
13. I am confident I can master the mathematics skills being taught.	2.94	Agree	High Level
Average	**2.93**	**Agree**	**High Level**

3.5 Relationship Between Teachers' Instructional Practices and Students' Confidence Level

Table 9 presents the correlation between the teacher's instructional practices and the student's confidence level. Based on the result, there is a correlation between the teachers' instructional practices with its sub-variables and the students' confidence level in dealing with mathematical problems, which ranges from low/slight correlation to marked/moderate correlation.

Table 9. Correlation between the teachers' instructional practices and the student's confidence level

Instructional Practices	Computed r	Tabular Value	Degree of Relationship	Decision	Interpretation
Classroom Management	0.532	0.087	Moderate	Reject H_o	Significant
Social-Emotional Support	0.274	0.087	Low/Slight	Reject H_o	Significant
Instructional Quality	0.420	0.087	Moderate	Reject H_o	Significant
Students' Cognitive Engagement	0.380	0.087	Low/Slight	Reject H_o	Significant
Overall	**0.402**	**0.087**	**Moderate**	**Reject H_o**	**Significant**

The sub-variables social-emotional support and students' cognitive engagement show a low/slight correlation with the computed values of 0.274 and 0.380, respectively. In contrast, the sub-variables classroom management and instructional practices show marked/moderate correlation with the computed values of 0.532 and 0.420, respectively. This reveals that classroom management and instructional practices play vital roles in helping students gain confidence in dealing with mathematical problems. Although social-emotional support and students' cognitive engagement show a slight/low correlation, it could still impact the students' confidence level in dealing with Mathematical problems. Overall, the sub-variables sum up to a computed value of 0.402, representing a marked/moderate correlation. Since it is greater than the tabular value of r, thus it imposes a significant relationship between the two variables. This finding is aligned with the study of Begaj (2014), which denotes that positive student-teacher relationships, teachers' praise, and teacher feedback are important contributors to increasing students' self-confidence. Evidence was gathered and analyzed relating to students, teachers, pedagogues, and psychologists' views on teachers' role in increasing students' self-confidence. The study has shown that teachers are crucial to students' self-confidence.

3.6 Between the Teachers' Instructional Practices and the Students' Learning Interest in Mathematics

Table 10 below shows the Correlation Between the Teachers' Instructional Practices and the Students' Learning Interest in Mathematics. It indicates a correlation ranging from a low/slight correlation to a strong correlation between the students' learning interest in Mathematics and the teachers' instructional techniques and its sub-variables. With computed values of 0.377 and 0.371, respectively, the sub-variables social-emotional support and students' cognitive engagement exhibit a low/slight correlation. On the other hand, classroom management shows a marked/moderate correlation with a computed value of 0.466, whereas instructional quality shows a high correlation with a computed value of 0.653. This indicates that instructional quality is crucial in developing the student's interest in mathematics, gaining the highest correlation. The sub-variable classroom management succeeds it with a marked/moderate correlation, making it another vital factor affecting students' learning interest. Additionally, even if there is a low/slight correlation between the sub-variables students' cognitive engagement and social-emotional support, it could still have some bearing on the student's level of interest in learning mathematics. The sub-variables add up to a computed value of 0.467, which denotes a marked/moderate correlation. It implies a significant correlation between the two variables because it is greater than the tabular value of r.

Table 10. Correlation between the teachers' instructional practices and the students' learning interest in mathematics

Instructional Practices	Computed r	Tabular Value	Degree of Relationship	Decision	Interpretation
Classroom Management	0.466	0.087	Moderate	Reject H_o	Significant
Social-Emotional Support	0.377	0.087	Low/Slight	Reject H_o	Significant
Instructional Quality	0.653	0.087	High	Reject H_o	Significant
Students' Cognitive Engagement	0.371	0.087	Low/Slight	Reject H_o	Significant
Overall	**0.467**	**0.087**	**Moderate**	**Reject H_o**	**Significant**

This outcome mirrors the findings of the study by Zhu and Kaiser (2022), which stated that teachers' instructional quality and social-emotional support had a significantly positive impact on students' post-instruction mathematics interest and general mathematics self-efficacy after statistically controlling for students' characteristics and their pre-instruction performance. Moreover, this study showed that the quality of teachers' instruction positively enhances students' motivation. All these results suggest that the impact of teaching practices is multi-dimensional. While it is understandable that the most attention is paid to academic performance, this study revealed that the considerately positive impact of teaching practices on student's academic performance is through their general self-efficacy. Therefore, while paying attention to academic performance, it is particularly important to strengthen classroom management and students' emotional classroom experiences to enhance their learning motivation and other non-cognitive performance.

This is also supported by the study of Emiru (2019), which deduced that a teacher-focused approach to teaching has a significant positive correlation with students' surface approaches to learning. The study also affirmed that students' learning outcomes significantly correlate with teachers' conceptual change approach to teaching. In addition, it has been asserted that a significant positive correlation exists between students' deeper approaches to learning and their learning outcomes. In addition, a study by Ayuwanti et al. (2021) revealed that teacher-student interaction in mathematics learning affects students' mathematical understanding. The results of this study guide mathematics teachers in planning the implementation of learning in the classroom. In addition to implementing activities full of interactions between teachers and students, teachers can also add learning media that can support learning activities, such as computers, tablets, and other technologies. The results of this study are forms of teacher-student interaction in mathematics learning that can help students build and improve.

4.0 Conclusion

Based on the research findings, it can be concluded that using effective teaching methods can significantly boost students' interest and confidence in learning mathematics. When teachers effectively manage their classrooms, provide social-emotional support, and utilize engaging instructional techniques, students not only achieve better results but also develop a true appreciation and become more interested in the subject. This study highlights that by focusing on these aspects, educators can create a positive learning environment that promotes success in Mathematics and makes the learning process enjoyable. Furthermore, the relationship between teaching methods and students' feelings towards Mathematics is clear. Teachers can enhance students' confidence and interest in Mathematics by making lessons both interesting and supportive. This approach improves their academic performance and increases their eagerness to learn.

Therefore, schools should emphasize these teaching strategies to help students build a strong foundation in Mathematics and maintain a lasting interest in the subject. This implies that teachers can always develop a better teaching strategy, especially regarding their instructional quality. As per the findings of this study, it has the highest correlation with the learning interests of the students. These results highlight the importance of thorough and efficient teaching approaches in increasing students' confidence and interest in mathematics, which enhances their academic achievement and fosters a more positive attitude toward the subject. Second, School administrators can enhance the teaching quality of their educators by actively engaging them in seminars, training sessions, and workshops while addressing the students' basic needs. This approach may lead to increased student interest in mathematics. Lastly, for future studies, the researchers can improve the scope of this study or change the respondents from students to teachers or both. This involves the number of respondents not just limited to one year level and broadening the scope from one specific location into a much wider one for a larger sample size.

With this, a wider variety of insights can be gathered from the respondents. Future researchers may also consider transitioning from quantitative to qualitative research to explore different data-gathering techniques, such as using interviews instead of surveys or a combination of both. In addition, future researchers may also consider the other components of the teaching-learning process, such as background knowledge/experience of the teachers, availability and quality of the resources, lesson planning, and assessment methods.

5.0 Contribution of Authors

The authors reviewed, wrote, and approved the final work.

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7.0 Conflict of Interest

There is no conflict of interest.

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Learning Modalities and Styles of SPED Students and Interns: An Assessment During the COVID-19 Pandemic

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Abstract. This study used descriptive research design to assess the relationship of the learning modalities and learning styles of SPED students and student interns during the COVID-19 Pandemic. The instrument was adopted by O'Brien (1985). The data was interpreted using descriptive and relational analytical schemes to analyze the result. The following statistical tools were used to treat data: percentage, weighted mean, and relationship strength. The 281 respondents answered the questionnaire through Google Forms. The study showed a strong relationship between the following variables: (a) students' visual learning modality and visual learning style ($rs = 0.873$); (b) students' auditory learning modality and auditory learning style ($rs = 0.526$); and (c) students' kinesthetic learning modality and learning style ($rs = 0.737$). This signifies that students with a more visual learning style utilize visual learning modalities. It also signifies that students were more exposed to auditory learning styles performed in class using the auditory learning modality. Furthermore, students with a kinesthetic learning style tend to utilize the kinesthetic learning modality more. CTE special and inclusive SPED students of NORSU-Guihulngan Campus are adopting learning modalities suitable for their needs during the COVID-19 Pandemic. Furthermore, there are special conditions that need to be emphasized so that they can achieve academic success in this new normal set-up. The university must establish a learning environment where they are provided with adequate resources, including audio-visual materials. Blended learning must be continuously adopted. However, it should be flexible enough to cater to the various needs of the SPED students while considering their learning styles.

Keywords: COVID-19 pandemic; SPED students; Learning modalities; Learning styles; Student interns.

1.0 Introduction

The COVID-19 pandemic brought a sudden change from physical to virtual classrooms. The emergent and urgent response to contain the COVID-19 pandemic and sustain the academic endeavors in the Negros Oriental State University -Guihulngan Campus in general and Special and Inclusive Education students and Student Interns, in particular, is our primordial concern. Knowing and understanding our learner's diverse needs, learning styles, and learning modalities can help professors and instructors address the felt- needs, especially during the COVID-19 pandemic.

The sudden outbreak of this pandemic has been a global phenomenon that caused many challenges not only to health and well-being but also to wealth, economic, and academic aspects. Learners and educators had no options and were forced to accept online learning from home. Online learning can better accommodate students' diverse needs (Zhu et al., 2020; Zhao et al., 2021), but it can also result in learners experiencing a sense of isolation (Barak et al., 2016). Some surveys (Sawarkar et al., 2020; Velichová et al., 2020) during the pandemic have found that students do not agree that online learning is better than offline learning at school. In the online learning environment, students are subject to less supervision from teachers and peers, and there are fewer opportunities for interaction and feedback between teachers and students, which may lead to some more obvious negative learning consequences such as procrastination and inattention (Cheng & Xie, 2021; Hong et al., 2021).

Likewise, it will help the academic community in developing a more efficient flexible curriculum design that is relevant to remote learning and can foster the easier transfer of knowledge, and skills acquisition and values sustainability and resiliency in these global unprecedented disruptions. On the part of the learners, understanding their learning styles encouraged them to participate and motivated them to gain personal and professional knowledge. This study sought to match the needs of the changing times as well as harmonize the teaching-learning activities and flexible learning to develop optimum learners' commitment, thereby achieving the NORSU Vision, Mission, Goals, and Objectives of the programs of the Collee of Teacher Education, NORSU -Guihulngan campus amidst COVID-19 pandemic.

On the other hand, assessing learning modalities is also our primary and singular commitment to understanding how learners may use different senses to learn and, specifically, how individuals may learn in diverse ways and address them in the spirit of resiliency and sustainability. Under CMO No. 4, s.2020 stipulated that the design and delivery of programs, courses, and learning interventions address learners' unique needs in terms of place, pace, process, and products of learning. To address the learners' unique needs in their own and differentiated contexts, the researchers conducted the study. The study assessed the relationship between learning modalities and learning styles of Special and Inclusive Education (ED 204) students and student interns of Negros Oriental State University during the COVID-19 Pandemic.

2.0 Methodology

2.1 Research Design

This study used descriptive research design to assess the degree of relationship between the Learning Modalities and Learning Styles of CTE-Special and Inclusive (SPED) Students and Student Interns during the COVID-19 Pandemic.

2.2 Research Locale

This study was conducted at Negros Oriental State University – Guihulngan Campus, specifically in the College of Teacher Education.

2.3 Research Participants

This study focused on the CTE-Special and Inclusive (SPED) Students (ED 204) and Student Interns at the College of Teacher Education, Negros Oriental State University. It employed a complete enumeration method since its main goal was to assess all the SPED students and Student Interns. There was a total of 281 respondents.

2.4 Research Instrument

This study used an adopted from O'Brien (1985). The data was interpreted using descriptive and relational analytical schemes to analyze the result. For the treatment of data, the following statistical tools were used: percentage, weighted mean, and Pearson r to find the degree of relationship between the Learning Modalities and Learning Styles of CTE Special and Inclusive (SPED) students and Student Interns.

2.5 Data Gathering Procedure

The primary data were collected through Google Forms. Once the data collection phase is completed, the researcher will diligently organize, count, and interpret the statistical findings. To ensure accuracy and precision, the researcher will work closely with a skilled statistician, who will provide valuable expertise in analyzing the collected data. Two hundred eighty-one respondents answered the questionnaires.

2.6 Data Analysis

To analyze the data, the researchers used frequency and percentage to determine the learning modalities, learning styles, and preferred mode of instruction of CTE-Special and Inclusive (SPED)students. Also, the researcher used visual learning modality, auditory learning modality, kinesthetic learning modality, visual learning styles, auditory learning styles, and kinesthetic learning styles. It was also used Pearson-r for finding the relationship between the Learning Modalities and Learning Styles of the SPED Students and Student Interns during the COVID-19 Pandemic.

2.6 Ethical Considerations
This research study followed ethical guidelines. The researchers provided consent letters to the respondents, in which they informed the respondents about the study's goal and its purpose. This guarantees that respondents were fully informed before taking part in the survey and had the opportunity to ask questions. The researchers guaranteed the respondents' anonymity while processing and evaluating the data. The researchers took precautions to guarantee that the replies were processed with the strictest confidentiality, which would have contributed to the respondents' trust, and made the required efforts to guarantee that the study was carried out ethically and responsibly.

3.0 Results and Discussion

3.1 Learning Modality of SPED Students during the COVID-9 Pandemic

Visual Learning Modality
Table 1 shows that the visual learning modality of CTE special and inclusive SPED students is rated "Sometimes" (mean=2.81, SD=1.11). The result implies that the learning modality is used occasionally during the pandemic. Scoring higher compared to auditory and kinesthetic connotes those students used this modality more frequently than the others. This means that most students prefer visual learning during a pandemic. Furthermore, it can be seen that item 1, which is "I should get work done in a quiet place," obtained the highest score (mean=3.39, SD=1.33) interpreted as "Sometimes." This means most visual learning students can achieve better output in a quiet place. It could also imply that students need focus and an environment away from noise or disturbances. Meanwhile, item 10, which is "It is hard for me to understand a joke when someone tells me," Scored the lowest (mean=2.20, SD=0.98), interpreted as "Rarely." This only means that the students can easily respond to jokes. It could imply that they can easily process and react whenever someone tells jokes.

Table 1. Visual learning modality of SPED students during the COVID-19 pandemic (n = 281)

Indicators	Mean	SD	Description
1. I should get work done in a quiet place.	3.39	1.33	Sometimes
2. I remember something better if I write it down.	3.26	1.26	Sometimes
3. It helps me to look at the person while listening; it keeps me focused.	3.25	1.26	Sometimes
4. Using flashcards helps me to retain material for tests.	2.94	1.07	Sometimes
5. It is hard to understand what someone says when talking or playing music.	2.89	1.07	Sometimes
6. Trying to remember someone's telephone number or something new like that helps me get a picture of it.	2.75	1.04	Sometimes
7. If I am taking a test, I can "see" the textbook page and where the answer is located.	2.61	1.13	Sometimes
8. I enjoy doodling; even my notes have many pictures and arrows.	2.51	1.05	Rarely
9. I get lost or am late if someone tells me how to get to a new place, and I do not write down the directions.	2.33	0.89	Rarely
10. It is hard to understand a joke when someone tells me.	2.20	0.98	Rarely
Overall Mean	**2.81**	**1.11**	**Sometimes**

Auditory Learning Modality
Table 2 depicts that the auditory learning modality of CTE special and inclusive SPED students is rated "Rarely" (mean=2.50, SD=1.04). This implies that students do not usually use the auditory learning modality during this time of the pandemic. Nonetheless, it is reflected that item 1, which is "I understand how to do something if someone tells me, rather than having to read the same thing to myself," obtained the highest score (mean=2.76, SD=1.01). This connotes that in an auditory learning modality, most students learn information much better by listening. This means that they can easily remember information they hear from others than the information they have read in books. Further, item 10, which is "When I read, I mix up words that look alike, such as "them" and "then" "bad" and "dad," had the lowest score (mean=2.18, SD=1.04). This suggests that students rarely experience

mixing up words that almost sound the same. This implies that most students can differentiate words even if they are almost alike.

Table 2. Auditory learning modality of SPED students during the COVID-19 pandemic (n = 281)

Indicators	Mean	SD	Description
1. I understand how to do something if someone tells me, rather than having to read the same thing to myself.	2.76	1.01	Sometimes
2. Papers with very small print, blotchy dittos, or poor copies are tough on me.	2.65	1.09	Sometimes
3. If I had the choice to learn new information through a lecture or textbook, I would choose to hear it rather than read it.	2.65	1.03	Sometimes
4. I remember things that I hear rather than things that I see or read.	2.59	0.93	Rarely
5. My eyes get tired fast, even though the eye doctor says that my eyes are ok.	2.54	1.08	Rarely
6. It helps to use my finger as a pointer when reading to keep my place.	2.53	1.14	Rarely
7. My written work does not look neat to me. My papers have crossed-out words and erasures.	2.46	1.09	Rarely
8. Writing is tiring. I press down too hard with my pen or pencil.	2.40	1.07	Rarely
9. It is hard for me to read other people's handwriting.	2.29	0.93	Rarely
10. When I read, I mix up words that look alike, such as "them" and "then," "bad" and "dad."	2.18	1.04	Rarely
Overall Mean	**2.50**	**1.04**	**Rarely**

Kinesthetic Learning Modality

Table 3 reflects that the kinesthetic learning modality of the CTE special and inclusive SPED students is rated "Sometimes" (mean=2.69, SD=1.10). This means kinesthetic learning, like visual learning, was also used occasionally. This could imply that visual and kinesthetic learning was preferred during the pandemic. In addition, it can be depicted that item 1, which is "I learn best when I am shown how to do something, and I have the opportunity to do it," had the highest score (mean=3.24, SD=1.28) interpreted as "Sometimes." It suggests that students using kinesthetic learning modality can learn best if taught with theory and practice. It means they need to see an actual demonstration and be allowed to perform similar practices. This supports the principle of practice teaching and school visits so that the CTE special and inclusive SPED students can have first-hand and actual experiences in school processes and activities, even during the pandemic.

Table 3. Kinesthetic learning modality of SPED students during the COVID-19 pandemic (n = 281)

Indicators	Mean	SD	Description
1. I learn best when I am shown how to do something and I have the opportunity to do it.	3.24	1.28	Sometimes
2. I think better when I have the freedom to move around.	3.19	1.23	Sometimes
3. I find myself needing frequent breaks while studying.	2.86	1.05	Sometimes
4. It helps me see someone else do it before I follow directions.	2.75	1.13	Sometimes
5. When I cannot think of a specific word, I often use my hands and call something a "what-cha-ma-call-it" or a "thing-a-ma-jig."	2.75	1.23	Sometimes
6. I am not skilled in giving verbal explanations or directions.	2.64	1.01	Sometimes
7. I tend to solve problems through a more trial-and-error approach rather than step-by-step.	2.62	1.06	Sometimes
8. I do not become easily lost, even in strange surroundings.	2.59	0.97	Rarely
9. Studying at a desk is not for me.	2.23	0.97	Rarely
10. I wouldn't say I like to read directions; I would rather start doing it.	2.03	1.08	Rarely
Overall Mean	**2.69**	**1.10**	**Sometimes**

Summary

Table 4. Learning modality of SPED students during the COVID-19 pandemic (n = 281)

Learning Modalities	Frequency	Percentage
Visual	138	49.11
Auditory	49	17.44
Kinesthetics	66	23.49
Visual and Auditory	7	2.49
Visual and Kinesthetics	11	3.91
Auditory and Kinesthetics	4	1.42
Visual, Auditory, and Kinesthetics	6	2.14
Total	**281**	**100**

Table 4 illustrates the learning modality preference of CTE special and inclusive SPED students during the pandemic. It shows that the visual learning modality is the most used by students with a frequency of 138 or 49.11 percent. This implies that about half of the students prefer visual learning modality with their studies under the new normal set-up.

3.2 Learning Style of SPED Students during the COVID-9 Pandemic

Visual Learning Styles

Table 5 shows that the visual learning style of CTE special and inclusive SPED students during a pandemic is "Sometimes" (mean=3.05, SD=1.16). It implies that students are visual learners on some occasions. With a higher overall mean compared to the other learning styles, it could suggest that this type of learning is more prevalent among students during the pandemic. Further, it can be seen that item 1, which is "I remember something better if I write it down," had the highest score (mean=3.28, SD=1.27), interpreted as "Sometimes." It suggests that students need to represent the lesson by writing notes visually. It may imply that students learn better if they are provided with visuals during discussions. Hence, they must be provided with handouts where they can have their review. However, item 10, which is "I prefer to learn with TV or video rather than other media," had the lowest score (mean=2.74, SD=1.03), interpreted as "Sometimes." This implies that even though students were more visual learners, they did not prefer instructions using TV and videos. It could suggest that most of the students prefer other modes of media where they can be provided with direct instructions.

Table 5. Visual learning style of SPED students during the COVID-19 pandemic (N = 281)

Indicators	Mean	SD	Description
1. I remember something better if I write it down.	3.28	1.27	Sometimes
2. I visualize pictures, numbers, or words when I listen.	3.25	1.22	Sometimes
3. I understand lectures better when professors write on the board.	3.20	1.20	Sometimes
4. Charts, diagrams, and maps help me understand what someone says.	3.18	1.16	Sometimes
5. I remember peoples' faces but not their names.	3.16	1.28	Sometimes
6. I take detailed notes during lectures.	3.05	1.16	Sometimes
7. I have to look at people to understand what they say.	3.03	1.15	Sometimes
8. I need written directions for tasks	2.80	1.09	Sometimes
9. I use color coding to help me as I learn or work.	2.79	1.10	Sometimes
10. I prefer to learn with TV or video rather than other media.	2.74	1.03	Sometimes
Overall Mean	**3.05**	**1.16**	**Sometimes**

Auditory Learning Style

Table 6 reflects that the auditory learning styles of CTE special and inclusive SPED students during the COVID-19 pandemic are rated "Sometimes" (mean=2.72, SD=1.09). This infers that several students also considered themselves auditory learners. The result also suggests that the auditory learning style is the second learning preference of students under the new normal setup. Moreover, the table shows that item 1, "I remember things better if I discuss them with someone," received the highest score (mean=3.17, SD=1.13), interpreted as "Sometimes." It implies that auditory learners need to share or discuss with someone what they learn so that they can remember them better. In other words, they need interaction where they can speak and listen to understand a concept better. Nonetheless, item 10, "I like to listen to music when I study or work," received the lowest score (mean=2.39, SD=1.18), interpreted as "Rarely." It manifests that auditory learners do not need unnecessary noises during their studies.

Table 6. Auditory learning style of SPED students during the COVID-19 pandemic (N = 281)

Indicators	Mean	SD	Description
1. I remember things better if I discuss them with someone.	3.17	1.13	Sometimes
2. I prefer to learn by listening to a lecture rather than reading.	2.98	1.10	Sometimes
3. I easily remember jokes that I hear.	2.91	1.05	Sometimes
4. I can identify people by their voices (e.g., on the phone).	2.80	1.11	Sometimes
5. I need oral directions for a task.	2.75	1.01	Sometimes
6. I can understand what people say even when I cannot see them.	2.59	1.01	Rarely
7. I remember peoples' names but not their faces.	2.59	1.14	Rarely
8. When I turn on the TV, I listen to the sound more than I watch the screen.	2.57	1.00	Rarely
9. Background sound helps me think.	2.46	1.16	Rarely
10. I like to listen to music when I study or work.	2.39	1.18	Rarely
Overall Mean	**2.72**	**1.09**	**Sometimes**

Kinesthetic Learning Style
Table 7 shows that the kinesthetic learning style of CTE special and inclusive SPED students is rated "Rarely" (mean=2.55, SD=1.11). This implies that only a few of the students were kinesthetic learners. It could suggest that students mostly do not prefer the learning style during the pandemic. Likewise, item 1, "I move my hands when I speak," obtained the highest score (mean=3.12, SD=1.22), interpreted as "Sometimes." It infers that hand movement is the usual gesture of kinesthetic students when requested to speak. This implies that they consider hand movements as their occasional habit when speaking. It can also be gleaned that item 10, "I get nervous when I sit too long," had the lowest score (mean=2.21, SD=1.08), interpreted as "Rarely." This suggests that students do not feel nervous when they are not doing anything at all.

Table 7. Kinesthetic learning style of SPED students during the COVID-19 pandemic (N = 281)

Indicators	Mean	SD	Description
1. I move my hands when I speak.	3.02	1.22	Sometimes
2. I need frequent breaks when I work or study.	2.86	1.04	Sometimes
3. I think better when I move around (e.g., pacing or tapping my feet).	2.73	1.16	Sometimes
4. I need to eat something when I read or study.	2.71	1.13	Sometimes
5. Manipulating objects helps me to remember what someone says.	2.58	1.06	Rarely
6. I play with or bite on my pens during lectures.	2.47	1.22	Rarely
7. I draw many pictures (doodles) in my notebook during lectures.	2.36	1.15	Rarely
8. I would rather start doing things than pay attention to directions.	2.32	1.02	Rarely
9. I would rather stand if I had a choice between sitting and standing.	2.21	1.02	Rarely
10. I get nervous when I sit still for too long.	2.21	1.08	Rarely
Overall Mean	**2.55**	**1.11**	**Rarely**

Summary
Table 8 shows that CTE special and inclusive SPED students were mostly visual learners (f=162 or 57.65%). This suggests that many of the students learn with visual representations. It connotes that students best understand a concept when they can see the information or when a teacher uses visual aids in teaching.

Table 8. Learning style of SPED students during the COVID-19 pandemic (N = 281)

Learning Styles	Frequency	Percentage
Visual	162	57.65
Auditory	43	15.30
Kinesthetics	31	11.03
Visual and Auditory	19	6.76
Visual and Kinesthetics	6	2.14
Auditory and Kinesthetics	5	1.78
Visual, Auditory, and Kinesthetics	15	5.34
Total	**281**	**100**

3.3 Preferred Mode of Instructions
Table 9 illustrates that the Blended Learning Approach is the most preferred mode of instruction for SPED students and interns during the new normal (f=226 or 80.43%). This suggests that most students like different learning experiences in their classes. This implies that the respondents do not want to limit themselves to the singular teaching mode. However, it signifies that the respondents want to have a variety of teaching and learning processes like differentiated instruction to address their diverse and unique needs where they can choose which is more applicable to their situation. As mandated in RA 10533, a contextualized approach will be relevant for implementation.

Table 9. Preferred mode of instructions by SPED students and student interns in the advent of new normal (N = 281)

Mode of Instruction	Frequency	Percentage
Blended Learning Approach	226	80.43
Online/ e-learning scheme	140	49.82
Social Media Platforms	127	45.20
Distance learning	100	35.59
By text, Call, or email	57	20.28

3.4 Relationship Between the Learning Modalities and Learning Styles
Table 10 reflects that there is a strong relationship between the following variables: (a) students' visual learning modality and visual learning style ($r_s = 0.873$); (b) students' auditory learning modality and auditory learning style

(r_s = 0.526); and (c) students' kinesthetic learning modality and learning style (r_s = 0.737). This signifies that students with a more visual learning style utilize visual learning modalities. It also signifies that students more exposed to auditory learning styles perform in class using the auditory learning modality. Furthermore, students with a kinesthetic learning style tend to utilize the kinesthetic learning modality more. Hence, it can be implied that students learning modality can be attributed to their learning styles. It could suggest that the learning modality preferences of students are choices that will favor how they can best learn in school. This confirms the study of Cabual (2021), suggesting that every student has their own learning style and learning preferences. He mentioned that teaching can only be effective if they were aligned to the student's needs.

Table 10. Correlational analysis between the learning modalities and learning styles of the SPED students and student interns

Variables	Computed r_s	Degree of Relationship
Visual Learning Modality and Visual Learning Style	0.873	Strong
Auditory Learning Modality and Auditory Learning Style	0.526	Strong
Kinesthetics Learning Modality and Kinesthetics Learning Style	0.737	Strong

4.0 Conclusion

The assessment of the learning modalities and styles of CTE SPED students and interns during the COVID-19 pandemic highlights the adaptability and resilience of learners in navigating unprecedented challenges. The findings underscore the importance of providing diverse and flexible learning options to accommodate varied needs, particularly for special education students who require tailored approaches. While this study focuses on students and interns at Negros Oriental State University, its implications extend far beyond a single institution. CTE special and inclusive SPED students of NORSU-Guihulngan Campus are adopting learning modalities suitable for their needs during the COVID-19 Pandemic. Furthermore, there are special conditions that need to be emphasized so that they can achieve academic success in this new normal set-up. The university must establish a learning environment where they are provided with adequate resources, including audio-visual materials. Blended learning must be continuously adopted. However, it should be flexible enough to cater to the various needs of SPED students while considering their learning styles. Educational systems worldwide can draw valuable insights, recognizing that fostering an inclusive and supportive learning environment is crucial in ensuring that all students, regardless of location or educational background, thrive during disruption. The lessons learned from this pandemic can guide future educational strategies, emphasizing the need for continued innovation, equitable access to resources, and personalized support to meet the evolving demands of modern education.

5.0 Contributions of Authors

The authors reviewed, wrote, and approved the final work.

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Explanatory-Sequential Study of the Real Property Appraisal System and Challenges in Calamba City Assessor's Office

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Abstract. The collection of taxes was a significant component in maintaining the monetary stability of cities, regions, and countries and contributing to their economic growth**.** This study investigated the relationship between the assessments of assessor personnel and barangay captains regarding the level of observance of information dissemination on real property appraisal, as well as the challenges faced by the City Assessor's Office of Calamba City. The goal was to establish a more efficient system for information dissemination related to real property appraisal laws. In order to develop a comprehensive and efficient way of information dissemination in Calamba City about the real property appraisal law, a mixed-methods sequential explanatory design was used, involving 67 respondents: 54 barangay captains and 13 assessor personnel, selected through stratified random sampling. Additionally, using purposive sampling, 10 participants (5 barangay captains and 5 assessor personnel) were chosen for the qualitative phase. The quantitative analysis showed no significant difference in the assessments of barangay captains and assessor personnel regarding the observance of real property appraisal laws, with p-values of .308 and .554, both above the .05 significance level. Furthermore, no significant relationship was found between the level of observance and the challenges encountered by the Assessor's Office. In line with this, the qualitative phase identified three key themes: (1) Public Misunderstanding and Lack of Awareness, (2) Systemic Challenges in Information Dissemination, and (3) Strategies for Effective Communication that can highly influence the current taxation system. Based on these findings, an action plan was developed to enhance public awareness and improve communication strategies.

Keywords: Assessor personnel; Barangay captains; Information dissemination; Public awareness; Real property appraisal.

1.0 Introduction

Tax collection is a fundamental element in sustaining the economic and financial stability of cities, regions, and nations. Among various forms of taxation, the collection of real property taxes stands out due to its significant contribution to local government revenues. Efficient tax collection, particularly in the real property sector, ensures governments can finance essential public services, infrastructure development, education, and healthcare programs. Moreover, tax collection performance is commonly measured by the government's ability to collect taxes promptly and reduce cases of non-compliance and tax evasion. High performance in tax collection indicates a well-functioning system and positively impacts the economic health of a region (OECD, 2020). However, real property tax collection challenges remain prevalent, with issues such as unassessed properties, lack of awareness among taxpayers, and delinquency rates affecting the system's overall effectiveness.

Real property taxation hinges on accurately assessing land values, a process with economic, legal, and social implications. According to Folger (2020), the valuation of land is crucial for financing, sales listings, investment analysis, property insurance, and taxation. Economic conditions, government policies, social trends, and environmental considerations play a role in determining property value. As a result, tax collection performance is directly tied to the accuracy of property assessments, which form the basis for calculating real property taxes. When assessments fail to reflect the true market value or remain incomplete, the government forfeits potential revenue, as seen in cities like Calamba.

The assessment and collection processes have yielded substantial revenue in Calamba City, which has been recognized as the top-performing city in CALABARZON for real property tax collection. In line with this, data from the City Treasurer’s Office (2023) show that from 2018 to 2022, the city collected between Php 1.44 billion and Php 1.59 billion in real property taxes. However, despite these impressive figures, many properties remain unassessed, contributing to unrealized revenue potential. Moreover, the City Assessor’s Office reports that many property owners remain unaware of their tax obligations due to insufficient information dissemination, leading to higher delinquency rates.

Research on local governments' tax collection performance and property assessment has highlighted similar issues globally. In support of this, studies by Bird and Slack (2018) and Kelly (2021) have demonstrated that inefficiencies in tax collection stem from gaps in property assessment procedures and a lack of transparency in information dissemination. In particular, Bird and Slack (2018) noted that cities with more effective public communication strategies on property tax obligations tend to have lower delinquency rates. Meanwhile, Kelly (2021) emphasized the importance of ensuring that assessment practices align with current property values and are regularly updated. While these studies provide insight into local governments' challenges, they do not fully account for the role that local government units and community leaders play in disseminating tax-related information.

In the case of Calamba City, the role of barangay captains in facilitating the dissemination of real property tax information is particularly noteworthy. Republic Act No. 7160, or the Local Government Code of 1991, outlines the responsibility of local leaders in making ordinances and regulations publicly accessible. Section 201 of Chapter 2, on Appraisal and Assessment of Real Property, mandates that all properties be appraised at fair market value. Section 202 requires property owners to declare their properties for taxation purposes. However, despite these legal provisions, many property owners in Calamba City remain uninformed about their tax responsibilities, as evidenced by the delinquency rates in barangays such as Canlubang, Burol, and Makiling. According to the City Assessor's Office, the number of delinquent taxpayers across the city reached 10,868 between 2018 and 2022, with the most common being a lack of awareness about ordinances, deadlines, and real property announcements. Additionally, section 271 of the Local Government Code entitles barangays to a share of the collected taxes; this financial incentive has not been sufficient to reduce the number of delinquent taxpayers.

The literature consistently emphasizes the need for robust information dissemination mechanisms to improve tax compliance (Walker, 2017). Walker (2017) suggested that cities explore modern communication platforms such as social media and public access to enhance taxpayer engagement. Still, the effectiveness of such strategies has yet to be rigorously examined in the context of real property tax collection. However, many local governments, including Calamba City, struggle with implementing effective communication strategies. While

The current study seeks to address this gap by investigating the relationship between the information dissemination practices of the City Assessor’s Office and barangay captains and the level of tax compliance among property owners in Calamba City. Specifically, the research aims to examine the role of these local leaders in communicating real property appraisal laws and assess the challenges encountered by the City Assessor’s Office in improving tax compliance. By identifying the strengths and weaknesses of current dissemination practices, the study will contribute to developing a more comprehensive and effective communication strategy for real property tax obligations. Ultimately, the findings may help local governments like Calamba City maximize their revenue potential and reduce delinquency through enhanced taxpayer awareness and engagement.

In light of the identified gaps in the literature, this study aims to evaluate the effectiveness of information dissemination on real property appraisal laws in Calamba City and its impact on tax compliance. The research aims to provide practical insights into how collaboration between the City Assessor's Office and barangay captains can improve the dissemination of tax-related information. The significance of this study lies in its potential to guide policy reforms that will strengthen local tax systems, ensure the equitable distribution of tax burdens, and support the long-term financial sustainability of local governments.

2.0 Methodology

2.1 Research Design

This study employed an explanatory sequential research design, integrating quantitative and qualitative approaches to understand the research problem comprehensively. Initially, quantitative data were collected and analyzed, followed by qualitative data collection to explain further or expand upon the quantitative findings. This design was selected to explore the relationship between variables and to provide deeper insights into the phenomenon under investigation.

The quantitative phase adopted a descriptive-correlational research method. Saro et al. (2023) state that a descriptive-correlational design "investigates one or more characteristics of a group to discover the extent to which these characteristics vary together." This approach enabled the researcher to examine the potential relationship between the respondents' level of awareness regarding city programs related to real property appraisal laws and the effectiveness of tax collection systems. Rather than focusing on causality, the study aimed to describe and quantify these relationships using statistical methods like correlation and multiple linear regression. The subsequent qualitative phase contextualized and expanded upon the quantitative results, providing a more nuanced understanding of real property appraisal systems and the challenges encountered.

2.2 Research Participants

The research was conducted in Calamba City, Laguna, a first-class component city in Laguna, Philippines. The study targeted 67 participants, comprising 54 *punong barangays* and 13 City Assessor's Office personnel. A stratified random sampling technique was employed for the quantitative phase, assisted by G*Power software and supported by a statistician to ensure a representative sample. For the qualitative phase, a purposive sampling technique was used to select 10 participants: five *punong barangays* and five personnel from the City Assessor's Office. The participants were selected based on the following criteria: (1) a minimum of two years of service as either a *punong barangay* or assessor personnel, (2) the barangay in question being listed among those with delinquent real property payors, and (3) personal experience with challenges in the real property appraisal system.

2.3 Research Instruments

Two types of research instruments were utilized: surveys and semi-structured interviews. The researcher developed the survey instrument to measure the observance and implementation of real property appraisal laws and information dissemination. The survey consisted of real property appraisal law and information dissemination, assessed using a four-point Likert scale wherein the responses were scored along a range. The respondents for this phase included 54 *punong barangays* and 13 personnel from the City Assessor's Office.

For the qualitative phase, a set of semi-structured interview questions was developed. These interviews aimed to explore the challenges assessor personnel and barangay captains face regarding real property appraisal laws and the dissemination of related information. The semi-structured interview guide comprised three validated questions to elicit in-depth responses regarding the respondents' experiences and challenges. The survey and interview instruments were carefully crafted to ensure alignment with the research objectives. The thesis adviser initially reviewed and enhanced both instruments, followed by validation from five independent research experts to establish content validity. The instruments were pilot-tested on ten stakeholders who were not part of the final study sample. The reliability of the survey instrument was assessed using Cronbach's Alpha, which measured how closely related a set of items were as a group, with coefficients of .945, .934, and .878 for the three main sections of the questionnaire. The interview guide was further validated using the Content Validity Ratio (CVR), an approach to determine whether the knowledge per item on the test is essential or relevant, supported by the feedback of five institutional research experts. Moreover, a thematic analysis was utilized to identify the emerging themes, see the relationship of the qualitative data findings with the quantitative data, and develop a comprehensive interpretation.

2.4 Data Gathering Procedure

In the quantitative phase, data were collected using online and in-person survey methods. Respondents were encouraged to submit their completed questionnaires through Google Forms or by returning physical copies to the researcher. The researcher implemented a one-day collection strategy to maximize response rates, minimizing missing or incomplete data risk. Once collected, the responses were systematically tabulated and organized in a spreadsheet for further analysis. The qualitative phase involved one-on-one interviews with the selected participants. Informed consent was obtained before conducting interviews, ensuring ethical compliance. The researcher ensured that interviews were scheduled to accommodate the participants' availability, minimizing disruption to their regular work schedules. Interviews were conducted via Zoom and recorded with the participant's consent. Following the interviews, the recordings were transcribed verbatim, and the data were organized for qualitative analysis, with emerging themes identified through thematic analysis.

2.5 Ethical Considerations

This study adhered strictly to ethical research principles. Informed consent was obtained from all participants, ensuring they understood the nature and purpose of the study and could make voluntary decisions about their participation. The researcher guaranteed confidentiality and privacy, ensuring all data were anonymized and securely stored. Throughout the research process, the researcher was committed to respecting participants' autonomy and providing clear and transparent information about the study's objectives and procedures. No discriminatory or offensive content was included in the survey or interview questions. The research instruments were carefully designed to avoid references to specific religious or political beliefs that could cause participants discomfort. Additionally, all responses were treated with respect and confidentiality, ensuring the dignity of the participants was upheld. The researcher also ensured the proper citation and acknowledgment of all sources and literature used in the study, demonstrating academic integrity and avoiding plagiarism.

2.6 Data Analysis

The statistical analysis for the quantitative data was performed using the Statistical Package for Social Sciences (SPSS). The mean and the four-point Likert scale were used to assess the level of observance and implementation of real property appraisal laws and information dissemination by the *punong barangays* and assessor personnel. T-test was employed to analyze the significant differences between the assessments of the *punong barangays* and the assessor personnel regarding the observance of real property appraisal laws and information dissemination. Pearson-R was used to examine the relationship between the level of observance of the real property appraisal system and the challenges encountered by the Assessor's Office. For qualitative data, thematic analysis was employed. The interview transcripts were analyzed to identify patterns and recurring themes, allowing for a comprehensive understanding of the challenges faced by assessor personnel and barangay captains. Qualitative data were interpreted in line with Qualitative Data Analysis (QDA) methods, as described by Sarino (2016), to ensure an accurate and in-depth exploration of the participants' experiences.

3.0 Results and Discussion

3.1 Real Property Appraisal Observance

Real Property Appraisal Law

As depicted in Table 1, the level of observance of real property appraisal in the City Assessor's Office of Calamba City as assessed by assessor personnel and barangay captain in terms of real property appraisal law was Observed as shown in the composite assessment of 2.98. It garnered a standard deviation of 0.31 for the barangay officials and 0.19 for the residents. "Integration of feedback mechanisms to address knowledge gaps and enhance understanding of real property appraisal laws among personnel" yielded the highest mean score of 3.19 and was interpreted as Observed. On the other hand, "Implementation of existing mechanisms for addressing concerns or disputes raised by property owners regarding appraisal outcomes" received the lowest mean score of responses with 2.82 and was interpreted as Observed.

It implies that the City Assessor's Office of Calamba City has prioritized internal education and training initiatives to ensure its employees thoroughly understand real property appraisal laws. By incorporating feedback mechanisms, it has created an environment conducive to addressing knowledge gaps and improving comprehension among its employees. This proactive approach will likely result in more accurate and consistent property appraisals, which may explain why this aspect received the highest observed rating.

In contrast, the least observed aspect indicates a potential gap in the City Assessor's Office's responsiveness to property owners' concerns and disputes about appraisal results. The lack of effective mechanisms for addressing such issues may cause dissatisfaction among property owners and undermine trust in the appraisal process. This lack of implementation could be due to governmental obstacles or a lack of clear dispute resolution protocols, highlighting areas for improvement within the office's operational framework. Seemingly, this lack of understanding could contribute to disputes and resistance from property owners, as mentioned by Participant 7, who struggles to grasp the reasons behind delinquency and the necessity of payment.

Table 1. Descriptive statistics of real property appraisal law observance in Calamba city assessor's office

Indicators	Assessor Personnel		Barangay Chairperson		Composite	
	Mean	**Interpretation**	**Mean**	**Interpretation**	**Mean**	**Interpretation**
1. Frequency of training sessions conducted for assessors regarding real property appraisal laws.	2.62	O	3.07	O	2.85	O
2. Implementation of standardized appraisal procedures as outlined in relevant laws and regulations.	3.08	O	3.04	O	3.06	O
3. Existence of documentation showcasing compliance with legal requirements during property assessment processes.	3.31	HO	2.81	O	3.06	O
4. Participation rate of assessors and personnel in training programs focusing on property appraisal methodologies and legal frameworks.	2.85	O	2.96	O	2.91	O
5. Assessment of assessors' understanding and application of appraisal laws through periodic evaluations and assessments.	2.77	O	3.00	O	2.89	O
6. Integration of feedback mechanisms to address knowledge gaps and enhance personnel's understanding of real property appraisal laws.	3.15	O	3.22	O	3.19	O
7. Adherence to established valuation standards and methodologies endorsed by recognized appraisal organizations.	2.85	O	3.02	O	2.94	O
8. Regularly review and update appraisal guidelines to align with evolving industry standards and best practices.	3.38	HO	2.93	O	3.16	O
9. Consistency in applying appraisal standards across different types of properties and geographical areas within Calamba City.	2.85	O	2.94	O	2.90	O
10. Provision of accessible channels for property owners to inquire about the appraisal process and seek clarification on valuation methodologies.	3.00	O	3.04	O	3.02	O
11. Publication of appraisal reports and findings every month, quarterly, or annually to promote transparency and accountability in property valuation.	3.08	O	3.22	HO	3.15	O
12. Implement existing mechanisms for addressing concerns or disputes property owners raise regarding appraisal outcomes.	2.69	O	2.94	O	2.82	O
13. Maintenance of comprehensive records documenting property assessments, including relevant data, methodologies, and valuation outcomes.	2.62	O	3.07	O	2.85	O
14. Periodic audits of appraisal records to ensure accuracy, completeness, and compliance with established protocols.	2.85	O	3.02	O	2.94	O
15. Implement secure data management systems to safeguard confidential information related to property assessments.	3.08	O	2.91	O	3.00	O
Standard Deviation	0.31	O	0.19	O	2.98	O
Composite Assessment	2.94		3.01			

Legend: 3.25 - 4.00 Highly Observed (HO), 1.75 - 2.49 Slightly Observed (SO), 2.50 - 3.24 Observed (O), 1.00 - 1.74 Not Observed (NO)

The qualitative findings on Public Misunderstanding and Lack of Awareness supported this**.** Participant 1 and Participant 2 both emphasize the difficulty in comprehending the appraisal process, indicating a potential gap in communication or education between the Assessor's Office and the public. The statement highlights a common theme of public misunderstanding and lack of awareness regarding the details of real property appraisal laws and procedures. The lived experiences provided by participants underscores the complex challenges faced by the Assessor's Office in Calamba City regarding the real property appraisal system. The recurring theme of public misunderstanding and lack of awareness regarding appraisal laws and procedures suggests a critical need for improved communication and education initiatives between the Assessor's Office and property owners. This lack of understanding could contribute to disputes and resistance from property owners, as mentioned by Participant 7, who struggles to grasp the reasons behind delinquency and the necessity of payment. Additionally, the concerns raised about the complexity of appraisal guidelines, frequent policy changes, and technical difficulties in property assessment highlight the necessity for a stable and easily understandable framework to guide both assessors and property owners.

According to Yimam (2022), training is a continuous process that improves the quality of employees. The findings show that training design, training needs assessment, training delivery style, and training evaluation significantly impact employee performance. Finally, the study recommended that human resource management increase the quality and quantities of the training program and properly apply the four phases of the systematic training processes to improve the performance of administrative employees. Moreover, Karim et al. (2019) emphasized that employees are the most valuable assets of any organization. Organizations require well-trained employees to perform tasks efficiently and effectively. Organizations continuously develop their employees' skills, knowledge, and abilities. Training and development lead to improved employee performance. Employee performance is critical to organizational success. Training is essential for succeeding in today's global business landscape. It plays a crucial role in improving employee well-being and organizational development. Training and development are crucial factors in improving employee performance in most organizations. The study found that training raises employee awareness, motivates them, and improves performance.

Moreover, Baum et al. (2021) said that property appraisal is an important step in any real estate transaction because it calculates the fair market value of a property based on its condition, features, location, and comparable sales. However, the appraisal may come back lower or higher than the agreed-upon price, causing issues for buyers, sellers, lenders, and agents. Uchehara et al. (2020) found that effective communication is essential for successful real estate transactions. Whether it is an inquiry from a potential buyer, a request for property information, or a negotiation between parties, a timely response lays the groundwork for effective communication in the real estate industry. When clients contact real estate professionals, they expect prompt responses. A delayed response may give the impression that their needs are not being addressed or that the professional is disorganized and unresponsive. Such negative perceptions can quickly erode client relationships and jeopardize future business opportunities. Adhikari (2020) used descriptive statistical and linear regression analyses to determine that taxpayer awareness and understanding of taxes positively and statistically significantly impact taxpayer compliance. It has also been demonstrated that the taxpayer's comprehension has a greater impact than a variable of taxpayer awareness. In addition, the issue of continuous changes in appraisal guidelines and policies suggests that frequent revisions may exacerbate confusion and hinder public comprehension further, as mentioned by Participant 8.

Accordingly, Adhikari (2020) recommended in his study that the tax office implement regular and continuous tax education programs for taxpayers to increase their understanding and awareness. Based on the findings, Adhikari (2020) concluded that understanding taxation and taxpayer awareness positively and significantly affects taxpayer compliance in the Nepalgunj sub-metropolitan area.

Information-Dissemination

As shown in Table 2, the level of observance of real property appraisal in the City Assessor's Office of Calamba City as assessed by assessor personnel and barangay captain regarding information dissemination was Observed as shown in the composite assessment of 3.02. It garnered a standard deviation of 0.22 for the barangay officials and 0.20 for the residents. "Gathering of feedback from barangay captains and other stakeholders to identify areas for improvement" yielded the highest mean score of 3.65 and was interpreted as Observed. On the other hand, “Frequency and effectiveness of communication between the City Assessor’s Office and barangay captains regarding property appraisal initiatives and updates” attained the lowest mean score of responses with 2.51 and was interpreted as Observed. Regarding this, participant 6 raises concerns about difficulties in delivering information from the office to barangay captains, attributing it to a lack of authority or willingness to disseminate information effectively.

Table 2. Descriptive statistics of information-dissemination observance in Calamba city assessor's office

Indicators	Assessor Personnel		Barangay Chairperson		Composite	
	Mean	**Interpretation**	**Mean**	**Interpretation**	**Mean**	**Interpretation**
1. Regularity of public announcements regarding appraisal processes and related updates.	3.38	HO	3.06	O	3.22	O
2. Availability of accessible and comprehensible materials explaining property appraisal procedures to the public.	3.08	O	2.93	O	3.01	O
3. Utilization of digital platforms for disseminating information regarding property assessment, including website updates, social media engagement, and email newsletters.	3.08	O	2.96	O	3.02	O
4. Frequency and effectiveness of communication between the City Assessor’s Office and barangay captains regarding property appraisal initiatives and updates.	2.46	MO	2.56	O	2.51	O
5. Participation of barangay captains in consultative meetings or workshops to enhance their understanding of appraisal processes and legal requirements.	3.08	O	2.94	O	3.01	O
6. Gathering feedback from barangay captains and other stakeholders to identify areas for improvement.	3.62	HO	3.67	HO	3.65	HO
7. Determination of the average time to complete property assessments from initiation to valuation report issuance.	3.08	O	2.94	O	3.01	O
8. Implement streamlined procedures and technological solutions to expedite appraisal processes and minimize delays.	3.31	HO	2.81	O	3.06	O
9. Monitoring appraisal backlog to identify measures based on urgency and significance.	2.85	O	2.96	O	2.91	O
10. Establishment of internal quality control measures to review appraisal reports for accuracy, consistency, and compliance with regulatory requirements.	2.77	O	3.00	O	2.89	O
11. Engagement of external auditors or independent reviewers to assess the implementation of appraisal practices towards enhancement.	3.15	O	3.19	O	3.17	O
12. Implementation of continuous improvement initiatives based on results of quality assurance assessments and performance evaluations.	2.85	O	3.02	O	2.94	O
13. Conducting surveys or feedback mechanisms to gauge public satisfaction with property appraisal processes' transparency, fairness, and professionalism.	3.08	O	2.89	O	2.99	O
14. Monitoring public complaints or grievances trends to maintain public trust and confidence.	2.85	O	3.17	O	3.01	O
15. Utilization of public perception data in decision-making to improve service delivery within the City Assessor’s Office.	2.92	O	2.89	O	2.91	O
Standard Deviation	0.22	O	0.20	O	3.02	O
Composite Assessment	3.04		3.00			

Legend: 3.25 - 4.00 Highly Observed (HO), 1.75 - 2.49 Slightly Observed (SO), 2.50 - 3.24 Observed (O), 1.00 - 1.74 Not Observed (NO)

It implies that the City Assessor's Office in Calamba City places significant emphasis on stakeholder engagement and feedback mechanisms. The most common practice of gathering feedback from barangay captains and other stakeholders suggests a proactive approach to improving property appraisal processes. The Assessor's Office demonstrates its commitment to transparency, responsiveness, and continuous improvement by soliciting feedback from those directly involved and affected by appraisal initiatives.

The least observed aspect, however, is the frequency and effectiveness of communication between the Assessor's Office and barangay captains, indicating a potential information gap. The lack of regular and efficient communication channels may result in misunderstandings, delays, and inefficiencies in property appraisal activities. Barangay captains may feel disconnected from the process without clear and consistent updates, which can impede collaboration and potentially jeopardize the accuracy and fairness of property assessments. Thus, Participant 5 suggests the problem might stem from a lack of basic knowledge among barangay chairpersons. This indicates a need for simplified explanations and educational initiatives to ensure they grasp the importance and benefits of real property appraisal.

These results were supported by the theme **Systemic Challenges in Effective Dissemination of Information.** The shared experience from participants highlights significant challenges in effectively disseminating information about real property appraisal and tax delinquencies to barangay captains and other stakeholders in the community. The observations point to potential communication channel gaps, stakeholder comprehension levels, and the overall sincerity and motivation behind information dissemination efforts. This required simplifying the presentation of information and providing educational initiatives, enhancing communication processes within the Assessor’s Office, and fostering genuine engagement and motivation among stakeholders like the Barangay Chairpersons. Amidu (2008, as cited in Adilieme et al., 2023) found that feedback significantly impacts valuation behavior and judgment accuracy. Client feedback on mortgage lending assignments can distort objective and independent valuation judgments. However, there was no statistically significant relationship between perceived role perception and feedback pressures that clients may apply.

3.2 Comparison of Assessor Personnel and Barangay Captains' Assessment of Real Property Appraisal Observance and Information Dissemination

As seen in Table 3, there was no significant difference between the assessor personnel's and barangay captain's assessments regarding the level of observance on real property appraisal in the City Assessor’s Office of Calamba City relative to real property appraisal law and information dissemination. As shown in the probability values of .308 and .554, which were greater than the significance level at .05, they accepted the null hypothesis.

Table 3. Test of difference in assessor personnel and barangay captains' assessment of real property appraisal observance and information dissemination

Variables	t-test	P value	Remarks	Decision
Real property appraisal law	1.026	0.308	Not Significant	Accept Ho
Information-dissemination	0.594	0.554	Not Significant	Accept Ho

The study by Lestari and Wicaksono (2017) highlights the significant influence of taxpayer awareness on tax compliance. Specifically, the researchers found that an increased awareness of tax obligations leads to higher levels of compliance. However, they observed that tax knowledge, particularly among compliant taxpayers, did not significantly impact their compliance behavior. This suggests that while awareness is crucial, a high level of tax knowledge may not be necessary for compliance. Additionally, the study demonstrated that taxpayers' attitudes significantly affect their likelihood of complying with tax regulations, further emphasizing the role of positive attitudes in fostering tax compliance. Importantly, the study identified a simultaneous effect of three key variables—taxpayer awareness, tax knowledge, and taxpayer attitudes—on overall tax compliance.

Similarly, Hantono (2021) revealed that while tax knowledge was not found to have a significant direct effect on tax compliance, tax awareness was positively correlated with compliance, albeit with a smaller impact. Tax morale also significantly affected compliance, indicating that awareness and morale are important contributors to compliant behavior. The simultaneous testing of these variables showed that tax knowledge, awareness, and morale together explained 71% of the variance in tax compliance, as indicated by an R-squared value of 0.710.

Both studies agree that while tax knowledge alone may not be a key driver of compliance, taxpayer awareness and positive attitudes toward taxation are crucial in promoting compliance behavior. Thus, efforts to improve tax compliance should focus on enhancing taxpayer awareness and fostering positive attitudes toward tax obligations rather than solely increasing technical knowledge of tax laws.

3.3 Challenges Faced on the Real Property Appraisal System

As shown in Table 4, the challenges encountered on the real property appraisal system of the Assessor’s Office in the City of Calamba as assessed by assessor personnel and barangay captain is Encountered as shown in the composite assessment of 3.06 and garnered a standard deviation of 0.32 of the barangay officials and 0.20 of the residents. “Tax Delinquency. Enforcing property tax collection and addressing tax delinquency issues pose challenges for assessors, particularly in cases where property owners fail to pay taxes or dispute the assessed value" got the highest mean score of 3.60 and was interpreted as Highly Encountered. On the other hand, "Comparison of Neighbors. Assessors often face challenges when comparing property values of neighboring properties, as factors such as property condition, size, and location may vary significantly." this garnered the lowest mean score of responses with 2. 76 and was interpreted as Encountered.

Table 4. Descriptive statistics of the challenges faced on the real property appraisal system

Indicators	**Assessor Personnel**		**Barangay Chairperson**		**Composite**	
	Mean	**Interpretation**	**Mean**	**Interpretation**	**Mean**	**Interpretation**
1. Dispute of Ownership. Resolving disputes over ownership of real property can be complex and time-consuming, requiring thorough investigation and documentation.	2.92	E	3.15	E	3.04	E
2. Incorrect Real Property Assessment. Accurate assessment of real property values is essential to maintaining fairness and equity in taxation. Errors in assessment can lead to discrepancies and complaints from property owners.	3.31	HE	2.93	E	3.12	E
3. Comparison of Neighbors. Assessors often face challenges when comparing property values of neighboring properties, as factors such as property condition, size, and location may vary significantly.	2.54	E	2.94	E	2.74	E
4. Double Ownership. Identifying cases of double ownership or overlapping property boundaries requires meticulous examination of legal documents and land records.	3.00	E	2.80	E	2.90	E
5. Legal Proceedings. Assessors may be required to act as witnesses in court proceedings related to property disputes, which can be time-consuming and require extensive preparation.	2.38	SE	3.13	E	2.76	E
6. Real Property Amnesty. Implementing real property amnesty programs to regularize informal settlements and unregistered properties can pose logistical challenges and require significant administrative resources.	2.62	E	2.96	E	2.79	E
7. Lack of Updated Information. Ensuring up-to-date and accurate property records can be challenging, especially in areas with rapid urban development or frequent property transactions.	2.85	E	3.04	E	2.95	E
8. Valuation of Unique Properties. Assessing the value of unique or specialized properties, such as heritage sites or industrial facilities, requires specialized knowledge and expertise.	3.08	E	3.22	E	3.15	E
9. Tax Delinquency. Assessors face challenges in enforcing property tax collection and addressing tax delinquency issues, particularly in cases where property owners fail to pay taxes or dispute the assessed value.	3.69	HE	3.50	HE	3.60	HE
10. Technological Limitations. Outdated technology or inadequate resources for data management and analysis can hinder the efficiency and accuracy of the real property appraisal system. Implementing modern appraisal techniques and software solutions may require investment and training.	3.77	HE	3.35	HE	3.56	HE
Standard Deviation	**0.32**	**E**	**0.20**	**E**	**3.06**	**E**
Composite Assessment	**3.02**		**3.10**			

Legend: 3.25 - 4.00 Strongly Agree – Highly Encountered (HE), 1.75 - 2.49 Disagree – Moderately Encountered (ME), 2.50 - 3.24 Agree – Encountered (E), 1.00 - 1.74 Strongly Disagree- Not Encountered (NE)

It implies that tax delinquency is a widespread problem within the Assessor's Office's real estate appraisal system in the City of Calamba. This challenge is most likely caused by a combination of factors, including economic hardship, disagreements over-assessed values, and a lack of awareness about tax obligations. The complexities of enforcing property tax collection and dealing with delinquency point to several underlying issues that must be addressed, ranging from administrative inefficiencies to socioeconomic factors affecting property owners. Tax delinquency is likely the most common challenge because it directly impacts the city's revenue generation and can result in significant financial losses if not resolved. Assessors must work diligently to enforce property tax collection, which includes tracking delinquent accounts, implementing penalty measures, and potentially resorting to legal action for noncompliance. Due to their complexity and sensitivity, the City of Calamba's assessors prioritize tax collection issues.

On the other hand, the least common challenge of comparing neighboring properties indicates a relatively stable environment in terms of property valuation factors such as condition, size, and location within the assessed area. This could be attributed to consistent urban planning or zoning regulations that govern property development, resulting in fewer differences between neighboring properties. Furthermore, it may reflect assessors' well-defined and consistent appraisal methodology, reducing the need for extensive comparisons between adjacent properties. Comparing neighboring properties may be the least difficult task because assessors have developed efficient methods for assessing property values using standardized criteria, reducing the need for extensive comparisons. Furthermore, if the properties in the area are uniform in terms of size, condition, and location, assessors may encounter fewer discrepancies when determining property values. This implies a simpler appraisal process for assessors, with less emphasis on complex neighbor-to-neighbor comparisons.

These challenges were supported by the theme Comprehensive Strategies for Efficient Communication. The participants' responses within the barangays of Calamba signify a proactive approach towards enhancing communication, promoting compliance, and fostering community engagement regarding the real property appraisal system and taxation regulations. By prioritizing communication channels, gathering feedback, and incentivizing cooperation among barangay officials and residents, there is a clear commitment to transparency, training, and responsiveness. These initiatives aim to update the appraisal process and empower constituents with knowledge, ultimately fostering a more compliant and informed community.

In their study, Fitri et al. (2022) wished to determine the effect of tax knowledge on tax compliance and tax morale and identify tax morale as a moderating variable that can strengthen the relationship between tax knowledge and tax compliance. According to the findings, tax knowledge and morale positively and significantly affected tax compliance. Tax morale significantly moderates the relationship between tax knowledge and tax compliance. Consequently, tax ethics must be incorporated into the educational process. Furthermore, Bhalla et al. (2022) emphasized that taxation is required to grow and develop the economy and businesses. Understanding taxes and approaching them correctly can determine the success or failure of a business. Consequently, this paper examines the relationship between tax knowledge and business performance. This study was conducted based on a survey of 450 registered Indian MSMEs. The empirical findings of Partial Least Square Structure Equation Modeling demonstrate that tax knowledge increases operational efficiency and protects businesses from tax fraud. Moreover, technological advances in the tax system and its knowledge have led to businesses' proper administration and governance of taxes, increasing their productivity. In-depth tax knowledge could benefit policymakers, governments, and businesses by promoting timely tax compliance and reducing tax evasion, avoidance, and fraud.

Likewise, Kurniawan (2020) discovered that 100 students who regularly attend night classes at Politeknik Negeri Batam (Polibatam) and who meet the requirements to be taxpayers demonstrate that tax education substantially impacts tax compliance. The indirect effect of tax education, because of tax knowledge, substantially affects tax compliance. Two students, two tax professors, and one Directorate General of Taxation employee were interviewed to corroborate the quantitative research findings. Conclusion: This study's results are consistent with the social learning theory, which asserts that the environment influences cognition and behavior. According to the theory, tax education can increase taxpayers' tax knowledge and influence their compliance behavior.

3.4 Relationship Between Real Property Appraisal Observance and Challenges Faced

As shown in Table 5, There was no significant relationship between the level of observance on the real property appraisal system and the challenges encountered by the Assessor’s Office in the City of Calamba. The probability values were .120 and .497, greater than the significance level at .05, thus accepting the null hypothesis.

Table 5. Test of the relationship between real property appraisal observance and challenges faced

Variables	r value	P value	Remarks	Decision
Real property appraisal law	0.192	0.120	Not Significant	Accept Ho
Information-dissemination	0.084	0.497	Not Significant	Accept Ho

The research findings indicate that the correlation values ranged from 0.00 to 0.20, suggesting a very small positive correlation between various factors related to the observance of the real property appraisal system and the challenges faced by the Assessor's Office in the City of Calamba. Inam (2022) identified significant positive relationships between several variables: perceptions of the officer-taxpayer relationship, the education level of the officer, perceptions of tax amnesty and social opportunities, and the interplay between these perceptions. Specifically, the study highlighted that an officer's educational background and perceptions of social opportunities correlate with improved relations between the administration and taxpayers.

Oladipo et al. (2022) further emphasize the need for tax authorities to enhance the tax knowledge of both taxpayers and tax collectors through targeted programs, initiatives, and training. In their research, Bornman and Ramutumbu (2019) classified tax knowledge into three categories: general, procedural, and legal. General tax knowledge pertains to the importance of financial literacy; procedural tax knowledge encompasses understanding tax compliance processes; and legal tax knowledge involves familiarity with relevant regulations.

From a practical standpoint, the proposed framework by Oladipo et al. (2022) serves as a valuable tool for future research, providing a structured approach to assessing tax knowledge as a determinant of tax compliance. This framework can assist tax authorities in developing targeted educational outreach programs to enhance taxpayers' understanding of their obligations and the compliance process. Moreover, it facilitates a comprehensive understanding of taxpayer behavior, influencing compliance practices within the taxpayer population.

3.5 Qualitative Findings

Public Misunderstanding and Lack of Awareness

This reveals significant challenges within the real property appraisal system of the Assessor's Office in Calamba City, as articulated by the participants. This theme highlights a prevalent lack of understanding among the public regarding the intricacies of real property appraisal laws and procedures. Participants 1 and 2 emphasize difficulties in comprehending the appraisal process, suggesting a gap in communication and education between the Assessor's Office and the community. This misunderstanding may lead to disputes and resistance from property owners, as Participant 7 notes their struggles to understand the rationale behind delinquency and the necessity of tax payments.

Participant 8 raises concerns about the frequent changes in appraisal guidelines and policies, indicating that such revisions could exacerbate confusion and hinder public comprehension. Without a stable and easily digestible framework, property owners may find it increasingly challenging to navigate the appraisal process, which, as Participant 9 points out, can impede tax collection efforts. Furthermore, Participant 10 identifies each property's technical complexities and unique characteristics as a major challenge. In a city as populous as Calamba, the limited number of assessors face difficulties in accurately appraising diverse properties, potentially leading to discrepancies and disputes regarding appraisal outcomes.

Systemic Challenges in Effective Dissemination of Information

The second theme highlights participants' shared experiences regarding the obstacles they encounter in disseminating information about the real property appraisal system. This theme indicates significant challenges in effectively communicating information about real property appraisal and tax delinquencies to barangay captains and other relevant stakeholders in the community. Participant 1 notes that, despite meetings and assemblies, there remains a lack of comprehensive understanding among barangay captains, suggesting a potential gap in communication channels or the presentation of information.

Participant 5 suggests that the issue may stem from a lack of foundational knowledge among barangay chairpersons, indicating a need for simplified explanations and educational initiatives to ensure they comprehend the importance and benefits of real property appraisal. This implies that current methods of information dissemination may be too complex or inaccessible for some stakeholders. Participant 6 expresses concerns regarding the challenges in conveying information from the Assessor's Office to barangay captains, attributing this to a lack of authority or willingness to share information effectively. This indicates a breakdown in communication processes within the organizational structure, which hinders the flow of essential information to those who require it most.

Additionally, Participant 9 highlights issues of sincerity in information dissemination, suggesting that the motivation behind sharing information may be insufficient. This underscores the notion that merely providing information is inadequate; genuine effort and incentives must encourage stakeholders to engage with the information and take appropriate action.

Comprehensive Strategies for Efficient Communication

The theme reflects a concerted effort among participants to enhance communication and information dissemination within the barangays regarding the real property appraisal system in Calamba. Participants acknowledge the importance of engaging with community assemblies, gathering feedback, and conducting follow-ups to ensure relevant information effectively reaches constituents. Moreover, there is a focus on incentivizing barangay officials to promote compliance with property appraisal and tax regulations. The mention of a reward system indicates a strategic approach to foster cooperation and adherence to the law among property owners. The proposal for seminars and training demonstrates a proactive initiative to educate barangay members about the complexities of the real property appraisal system in an accessible manner. This approach aims to empower residents with knowledge, fostering greater transparency and compliance within the community.

The emphasis on prompt responses to inquiries underscores the importance of timely and accurate information dissemination. A commitment to providing stable and reliable information enhances trust and credibility, facilitating the smoother implementation of policies and procedures related to property appraisal and taxation. Overall, these strategies reflect a holistic approach to addressing the challenges faced by the Assessor's Office and improving taxpayer engagement in Calamba City.

3.6 Proposed Action Plan

An action plan (Table 6) was designed to address the specific areas identified in the study to increase public understanding, awareness, and effective communication. Enhanced communication, regular monitoring, and evaluation of the implemented strategies would ensure ongoing improvement and alignment with the real property appraisal system and information dissemination in the City Assessor's Office of Calamba.

Table 6. Proposed action plan

Key Areas	Objectives	Strategies/ Activities	Frequency	Persons Involved	Source Of Fund	Success Indicators
Public Understanding	Improve communication and information dissemination within barangays regarding the real property appraisal system.	Organize regular community assemblies or town hall meetings to discuss property appraisal procedures, tax regulations, and upcoming changes.	Quarterly	-Barangay Chairpersons -Assessor's Office Personnel -Community volunteers for organizing events and disseminating information	Corporate Operating Budget	90% has increased attendance and participation in community assemblies and seminars.
		Conduct seminars and training sessions for barangay officials and residents to educate them about the real property appraisal system in simplified terms.	Bi-annually			
Public Awareness	Increase awareness and understanding of property appraisal and tax regulations among residents.	Implement a reward system for barangay officials who actively promote compliance with property appraisal	Annually	-Assessor's Office Personnel	Corporate Operating Budget	80% awareness and understanding among residents regarding property appraisal and tax regulations, as indicated by pre- and post-event surveys, has been achieved.

		and tax regulations.				
	Establish effective feedback mechanisms to gather input and address concerns regarding the appraisal system.	Establish a dedicated hotline or email address for residents to submit inquiries and receive timely responses. .	Daily	-Assessor's Office Personnel	Corporate Operating Budget	80% reduction in inquiries and complaints related to misunderstandings or confusion about the appraisal system has occurred.
		Utilize social media platforms and community newsletters to disseminate information about property appraisal and taxation.	Weekly			
Effective Communication	Ensure prompt and accurate responses to inquiries related to property appraisal and taxation.	Conduct follow-up visits and surveys to gather feedback from residents about their understanding of the appraisal system and any areas of confusion or concern. Provide regular updates and reminders about important deadlines, regulation changes, and other relevant information through various communication channels.	Bi-monthly	-Barangay Chairpersons -Assessor's Office Personnel -Community volunteers for organizing events and disseminating information.	Corporate Operating Budget	85% positive feedback from residents about the accessibility and helpfulness of communication channels established for inquiries and information dissemination has been received. Over time, there has been an improvement in property tax compliance rates within barangays.

4.0 Conclusion

The study underscores several key areas within the City Assessor's Office of Calamba City that warrant focused improvements to enhance operational efficiency and public service delivery. While the office has demonstrated a commendable dedication to internal staff development and active engagement with stakeholders, significant gaps persist in its responsiveness to property owners' concerns and communication with barangay captains. These deficiencies, particularly in communication frequency and effectiveness, highlight the pressing need for greater transparency, trust-building, and collaboration between the Assessor's Office and the community it serves. Despite these challenges, there is a strong alignment between assessor personnel and barangay captains in adhering to real property appraisal practices, indicating that the office upholds legal standards and disseminates necessary information effectively. The study also brings attention to the issues of tax delinquency and communication lapses, which call for comprehensive, strategic interventions. Notably, these challenges do not directly stem from the observance of real property appraisal laws, suggesting that while legal compliance is strong, there is room for improvement in community engagement and public communication strategies. The study presents an action plan focusing on raising public awareness, fostering effective communication, and implementing regular monitoring systems to ensure continued alignment with the city's appraisal system. Future research could explore more specific interventions to improve communication channels and tax delinquency management and evaluate these measures' long-term impact on public trust and service efficiency.

5.0 Contributions of Authors

Along with the genuine support from the thesis adviser, the author conceptualized and prepared instruments, collected, performed the statistical analysis, tabulated, and interpreted the data.

6.0 Funding

The research was self-funded by the researcher.

7.0 Conflict of Interests

No conflict of interest.

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Sustainable Development and Human Rights: Christianity as Mediator

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Abstract. This paper aims to show that there is a tension if not a total contradiction, between the notion of sustainable development and the idea of human rights and that Christianity, especially as practiced by Filipinos, can be a starting point for a reflection of a reconciliation of the tension. The paper is divided into four parts. First, a short inquiry into the origin of sustainable development will be made, and it will be shown that sustainable development is closely related to environmentalism. That is to say, caring for the environment is a crucial point of discussion when talking about sustainable development. In the second part, a discussion on human rights will be conducted, especially on human rights, understood as subjective rights usually spoken of using proprietary language. That is to say, human rights are conceived as property. In the third part, it will be shown that sustainable development, understood in tandem with environmentalism, is in tension with the notion of human rights, especially when conceived as subjective rights. The contradiction is usually most apparent in the legal and juridical sphere, and three cases will be given in this regard. In the last part, it is asserted that it is possible to attempt to give some semblance of reconciliation between the two notions above in tension by showing how the specific brand of Christianity practiced by Filipinos, especially as guided by Christian Philosophy, can help least in the theoretical level. It should be noted that what is asserted is not a full-blown solution to the tension. Indeed, Filipino Christianity can only be a starting point of reflection for the reconciliation.

Keywords: Sustainable development; Environmentalism; Human rights; Subjective rights; Filipino; Christianity.

1.0 Introduction

The respective notions of human rights and sustainability are not without issues. It has been argued, for example, whether rights can be properly defended as something universal, inalienable, and exist regardless of legal systems or not. This is the mainstream view on rights. Donelly and Whelan (1989/2020), for example, defend the view that rights are inalienable. Griffin (2008) and Gewirth (1996) associate rights with autonomy and agency. Gould (2004) and Nussbaum (2000) defend the view that rights pertain to active capacities to exercise ourselves viz., rights as positive freedom. Furthermore, Gilabert (2018) defends the view that rights are associated with dignity. However, Lacroix and Panchere (2016/2018), and Mutua (2002) are among those who are skeptical of such a notion of rights. Indeed, rights seem merely to be a social construct that arises as a consequence of society. When such a social construct becomes associated with autonomy and freedom, human rights then begin to emphasize the individual.

On the other hand, sustainability and sustainable development seem to emphasize the social dimension. Sustainability aims to facilitate human co-existence with fellow humans and other organisms on the Earth throughout long periods (Ben et al., 2019). The terms sustainability and sustainable development are often used to mean the same thing: long-term accommodation of the welfare of inhabitants of the Earth, which can be approached at an institutional level through social, economic, and environmental interventions (Meadowcroft, 2024). UNESCO (2015) might distinguish between the two, with the former being about the long-term goal and the latter about the process to achieve that goal. However, using these terms interchangeably for our purposes would be helpful.

If human rights are individual and sustainability social, then a contradiction seems apparent. However, the concord between human rights and sustainable development appears presupposed. For example, the United Nations (UN), on July 28, 2022, adopted a resolution that recognized the universal right to a clean, healthy, and sustainable environment (United Nations, 2022). Furthermore, back in 2015, the UN (2015) also adopted the *17 Sustainable Development Goals* (SDGs), which reference human rights in relation to sustainable development. Indeed, sustainable development always involves environmental issues. This link between environmentalism and sustainable development seems to be the impetus for the UN resolution, recognizing the universal right to a clean, healthy, and sustainable environment. It seems, however, that things are not so simple, and that there is more to be said about the relation between human rights and sustainability, especially sustainability conceived as involving environmentalism and environmental sustainability.

Dr. Siobhan McInerney-Lankford, a Senior Counsel at the Word Bank and an expert in international human rights law, explains that "the MDGS overlapped with economic and social rights, but neglected civil and political rights" (McInerney-Lankford, 2017). The MDGs (Millennium Development Goals) are the UN's development goals for its members, which are targeted to be fulfilled by the year 2015. It is the precursor of the Sustainable Development Goals (SDGs). After 2015, the MDGs were later on replaced by SDGs. Lankford sees that the parallel spheres of human rights and development, that is to say, their divergence, was just as ignored in the SDGs as much as it was in the MDGs. This reflects, Lankford writes, "the fragmentation of international law and the absence of international policy coherence between human rights and development" (McInerney-Lankford, 2017). This divergence between human rights and sustainability is already apparent in Dovers and Handmer (1993), who find a contradiction, among others, between economic growth and ecological limits and between the interests of the individual and the collective.

Furthermore, as Kuhlman and Farrington (2010) discussed, there is a conflict between concerns for welfare, viz., human rights, and environmental protection, which is hidden in current discussions on sustainability. In other words, because sustainability also includes environmental concerns, there is a contradiction between such a notion and human rights. Indeed, when sustainable development is understood in tandem with environmentalism, its contradiction with human rights becomes clearer. Anton and Shelton (2011) show this conflict by arguing that sustainability's endeavors to consider both human rights and environmental concerns necessarily make it conflict with itself. On the ethical level, this contradiction is manifested in the harassment of environmentalists who insist that notions of private property and profits, which are understood as rights, cannot precede environmental concerns following sustainability (Clark, 2013). This tension is also detected in Kerri Woods' *Human Rights and Environmental Sustainability* (2010) where she observes that if human rights and environmental sustainability are in tension with one another, then it may also be the case that "'sustainable development' is itself beset with tensions." (p.1).

This paper wishes to examine this tension, that is, this tension between sustainable development conceived as related to environmental sustainability and human rights, but especially human rights understood as subjective rights. Human rights, when conceived as subjective rights seem to be expressed in proprietary language. Nigel Biggar (2020) thus describes subjective right as a right which is a kind of property which one possesses, which belongs to a subject, and which, through appeal to authority, requires that others act or refrain from acting. With this conception, the tension between human rights and environmental sustainability now seems apparent: environmental sustainability seems to impose limits to human rights as subjective rights even when human rights cannot seem to recognize this limit.

There are many approaches to this tension. One can, for instance, insist that human rights and environmentalism have no contradiction and that a proper understanding of human rights should always include environmental rights (Sachs, 2004). However, this runs counter to the problem already laid bare: rights are often understood in terms of autonomy and the individual. This makes it so that rights are understood as subjective rights. However, the concerns of the individual may run counter to environmental concerns. One can also challenge the idea of universal human rights and insist on prioritizing culture and environment (Freeman, 1996). However, in this case, one will have to give up human rights in favor of local notions of sustainability and environmental concerns. Perhaps one need not abandon human rights, sustainable development, or environmentalism altogether. One needs to look at human rights and sustainable development in terms of hierarchy to prioritize one over the other in cases of conflict (Shelton, 2012). It may also be possible to look at the conflict between human rights and sustainability as a package deal, thus sustaining the conflict between the two (Woods, 2010). This paper aims to contribute to the discussion on the conflict between human rights and sustainability.

The researcher proposes a religiously inspired alternative and discusses the advantages of such an alternative. Religious approaches to the problem are not wanting. It can be shown, for example, that religion can narrate an alternative system wherein there is no contradiction between rights and environmentalism, and therefore, no contradiction between human rights and sustainability precisely because God has harmoniously made humans and nature (Newcomb, 2023). Indeed, a Christian worldview can justify environmental activism (Nita, 2016). This paper gives an alternative that relies on reading human rights as objective rights instead of subjective. The notion of objective rights is the original way in which rights theorists thought about rights and justice (Strauss, 1953). It will then be shown how the notion of rights conceived as objective (instead of subjective) is already manifest in the cultural and political sphere through the psyche of the Filipino Christian. In other words, Filipino Christianity seems already to be operating under the idea of objective rights. This will then be shown to be a good starting point for reflection on the possibility of coherence between human rights, now conceived as objective, and environmental sustainability, and, therefore, sustainable development in general.

2.0 Methodology

This study is purely qualitative and employs simple conceptual and textual analysis to analyze how sustainability is always understood with environmentalism. Journal articles and books, and especially contributions by the United Nations and other institutional authorities concerning sustainability and environmentalism are consulted. As shown in Kerri, Clark, Shelton, Anton, and others, sustainability is always associated with environmental concerns. In particular, Adam's *Green Development: Environment and Sustainability in the Third World* demonstrates the relationship between sustainability and environmentalism. However, these environmental concerns also run counter to the idea of rights. Thus, texts that analyze this conflict between rights and sustainability, understood in tandem with environmentalism, will be examined. These texts will be journal articles from academic journals engaged with the issue of environmentalism and sustainability, such as, among others, *Sustainability Science, Environmental Sciences, Sustainability Sciences, Journal of Sustainable Development, Law & Policy, and Environmental Conservation.* Because human rights are also associated with the legal sciences, journals such as, among others, *Erasmus Law Review* and *Oxford Journal of Law and Religion* are also engaged. In particular, one journal article and four books are examined in this part.

Following the Continental Philosophical mode of reflection, the researcher will show that human rights as subjective rights conflict with sustainability as currently understood. Because the researcher follows the Continental Philosophical tradition, philosophical texts employed will be those written by continental philosophers. Since continental philosophy approaches philosophical problems with particular emphasis on culture, history, and a more immanent mode of reflection, this paper will examine the works of theorists such as John Locke, Thomas Hobbes, Leo Strauss, Nigel Biggar, and John Milbank. Hence, a philosophical recovery of the idea of human rights as objective rights in light of those mentioned above will be employed to ease the tension between human rights and sustainability. In particular, Leo Strauss' *Natural Right and History* is read as a critical text that engages with the history of rights as objective rights. In criticizing the contemporary idea of rights as subjective rights, I employ the thought of Biggar's *What's With Rights?* and Milbank's "Against Human Rights: Liberty in the Western Tradition." Overall, this part of the paper examined three articles and six books.

The understanding of rights as subjective rights creates conflicts at the practical level. The researcher will examine three cases demonstrating the tensions between rights and sustainable development conceived in tandem with environmentalism. These will be cases from Nigeria and Europe. However, the most relevant is the third case, which examines a predicament concerning rights and sustainable development in the Philippine islands. Austin and Eder show this conflict in their article "Environmentalism, Development, and Participation on Palawan Island, Philippines." In this section, five articles and two books were examined.

The critical theoretical and exegetical move here will be to bring in a philosophic-theological narrative, but in particular, Filipino Christian thought and spirituality, and show how this tradition, i.e., Filipino Christian thought and spirituality, already possesses the germ of the reconciliation between sustainability understood in tandem with environmentalism, and human rights now construed as objective. As already mentioned, what is attempted here is not a full-blown solution, but a new starting point for reflections on the reconciliation of sustainability and human rights. Thus, articles from journals concerning spirituality and religion are engaged, such as, among others, *Religions*, *The International Journal of Religion and Spirituality in Society*. In this section, four articles and three books were examined.

3.0 Results and Discussion

3.1 Sustainable Development and Environmentalism

The concept of sustainability can be traced back to the Chinese thought of '*Heaven and People in One*' (Longyu Shi et al., 2019). Already, sustainability is understood concerning environmental degradation, where, especially in the Zhou Dynasty (1000-771 B.C.), the Chinese Emperors saw that it was more appropriate to use natural resources without overexploiting them. In various other civilizations like the Mesopotamian, Egyptian, Greek, and Roman ones, some degrees of environmental degradation of human making from activities such as logging, mining, etc. were observed (Pisani, 2006). Indeed, ancient authors including Plato, Pliny the Elder, and Columnella are well aware of these environmental issues brought about by human activity. Columnella, 4 A.D. – 70 A.D. (1941), for example, tells us that the tragedies of nature, which inevitably affect human conditions, are brought about by humans themselves. For Columnella, humans must try to figure out ways to reduce environmental degradation by practicing more sustainable methods.

By the 18th century, ideas about human progress began to flourish. However, this also meant that there were concerns about whether our resources would be able to keep up with the ongoing progression. In particular, there is the already well-known essay of the English economist and cleric Thomas Malthus (2018/1798) on population entitled *An Essay on the Principle of Population* where he posits that human improvements necessarily lead to population increase, which brings the danger of an increase which might be beyond the world's capacity for subsistence. Further reflections and concerns on human progress were seen in the proceeding century. The 19th-century English philosopher and political theorist best known for his utilitarianism, John Stuart Mill, also wrote about the progressive society. For Mill (2004/1848), progressive society is characterized by humanity's increasing power of dominating nature, but this domination will ultimately lead to what he calls the *stationary state*. It should be noted, however, that the stationary state, for Mill, is not necessarily a state where humans suffer, as opposed to the dystopian tone of Malthus' economic theory on the end of progress. For Mill, the stationary state is simply the state where progress stops but where people are still fulfilled due to a balance of resources and population. What can be learned from Malthus and Mill is the necessity of means to continue development whilst also avoiding the over-exploitation of nature and the environment since it is from these that humans get their subsistence.

The term sustainability originated from the idea of responsible use of natural resources. As is well known, the German mining administrator and tax accountant Carl Von Carlowitz was the first to use the term sustainability (*nachhaltende nutzung*—sustainable use) to encourage a balanced use of forest resources, especially trees. For Carlowitz, humanity must take proper care of trees. Enough seedlings should be planted in logging timber to replace those cut for timbre.

By the 20th century, William Adams (1990) could already affirm this close connection between sustainable development and environmental concern in Europe and America. Adams delineated this idea in history in eight themes. In his *Green Development: Environment and Sustainability in the Third World*, Adams says that these eight themes overlap in time, and expound on the historical link between environmentalism and sustainable development. Three themes seem most relevant to the present discussion and should be enough to drive our point here. First, on nature preservation and the emergence of sustainable development. Adams argues that sustainable development thinking is rooted in wildlife conservation. He observes that some motives for conservation include the idea that conservation allows resources to be appropriated as capital, and as a source for revenue. Concerns over environmental degradation were also a motivation (Adams, 1990).

Another theme explicated by Adams, and which will also be discussed here, is ecology and the balance of nature. Ecology developed as a science towards the end of the 19th century and is closely linked to environmentalism, especially since a lot of the prominent figures of environmentalism during that time were also scientists trained in ecology. This science of ecology allowed experts to give a scientific description of nature and the environment. This made it possible for sustainability to be calculated. This meant that fisheries, for example, could already tell when their harvest would already be an overexploitation of nature. The ideas at play here were equilibrium and stability, where both population and ecology must be managed to balance the two (Adams, 1990).

Finally, the third theme to be discussed here is ecology and economic development. Scientific developments in ecology and the ensuing revolution on the methods employed in resource harvesting to avoid exploitation meant that the technocrats involved in technological advancements of humanity have begun to explore ways to develop technology in an environmentally friendly way. Groups involved in such efforts include the International Union for Conservation of Nature (IUCN) and the Man and the Biosphere Programme (MAB). The idea is that lessons from ecology should not be ignored lest humanity suffers the consequences of over-exploiting nature (Adams, 1990). Thus, the paradigm for sustainable development thinking. It cannot be denied that sustainability necessarily involves environmentalism and environmental sustainability.

In 1987, the UN commissioned experts from developing and developed nations to develop long-term strategies for preserving the environment and continuing development. This group was called the World Commission on Environment and Development (1987), or more famously, the Brundtland Commission. This commission then produced the Brundtland Report entitled *Our Common Future.* This report first defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p.43). This formulation does not seem to have a direct mention of environmental sustainability. However, two bullets explain the point, with the second explaining that the environment sets some limitations on how society ought to think about progress.

However, the link between sustainable development and environmentalism and environmental sustainability became more explicit in the 1992 Earth Summit organized by the UN and hosted by Brazil in Rio de Janeiro. This conference aimed exactly at making advances on sustainability and environmentalism. This conference thus produced the *Rio Declaration on Environment and Development* which affirmed that "in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it" (United Nations General Assembly, 1992, principle 4).

Hence, the above clearly shows that sustainable development should be understood with environmentalism and environmental sustainability. It also shows how concerns over sustainability and environmentalism have become the impetus for the declaration of the right to a clean, healthy, and sustainable environment as a universal human right.

3.2 Human Rights as Subjective Rights

Rights are now thought of in terms of proprietary language. In other words, a right is understood as some property. Nigel Biggar (2020) thus tells us that "[i]t is something that one possesses. It is a liberty claim that belongs to a subject (usually a person, though sometimes a corporate body), through which (s)he acquires the power, through appeal to moral or legal authority, to require others either to refrain from acting or to act (p.132). Biggar summarizes the problem of this conception of rights by enumerating radical individualism and moral subjectivism as its effects. In short, if rights are posited as subjective, it becomes difficult, if not impossible, to see how an individual can transcend subjectivity and become subject to an objective moral order. This order orients everyone to the common good. This problem opens the space for justifying actions that do not contribute or are inimical to the common good.

However, rights talk was not always about subjective rights. As Thomas Mautner (2013) pointed out, subjective rights only became famous by the end of the 1970s. Indeed, Leo Strauss (1953), usually acknowledged to be the pioneer of historical research into rights, in his work *Natural Right and History*, argues that it is evident that there is a need for re-asserting the idea of natural rights, especially since they function to serve as an objective standard for right and wrong. For Strauss, without this objective standard, all would be left at the mercy of positive law, which means that what is moral is ultimately just determined by human courts. Here, it is clear that Leo Strauss had in mind the idea that rights should be viewed as an objective standard and is, therefore, objective. Here, there is no contradiction between the idea of common good and rights, for when right is thought to be based on human nature, then it seems that an individual may freely exercise his/her rights to the extent that human nature allows. Conversely, to the extent that human nature does not allow this or that action, then there are good reasons to coerce individuals into doing otherwise. Now, if human nature is the basis for rights, then it seems that what is good to one will be, in general, good to the many also: the common good.

Strauss (1953) himself reads the English political theorist of the *Leviathan*, Thomas Hobbes (1998/1651), as the originator of the idea of a politics of hedonism, which ultimately translates into a politics without objective standards. In contrast to Hobbes, the other English political theorist, John Locke, at least in Strauss, seems to be the one who was closest to establishing natural rights as appropriate standards for moral and political action. This contradiction between Locke and Hobbes demonstrates exactly how rights can begin to be regarded as subjective. To be sure, a historical genealogy of subjective rights points beyond Locke and Hobbes as originators. However, it will be beyond the scope of the present work to discuss the origins of subjective rights, which deserves to be treated as a separate topic.

(It should be noted here that Contemporary scholarship has shown that the idea of subjective rights has further origins in medieval Franciscan scholastic thought. William Ockham and his voluntarist metaphysics are often said to have contained the seeds of human and subjective rights. See for example, O'Donovan's (2003), "Rights, Law, and Political Community: A Theological and Historical Perspective; see also Brian Tierney's (1997) *The Idea of Natural Rights*. More recent scholarship has further explored with more precision the beginnings of subjective right in the notion of faculty or power of the 15th and 16th-century Pandectistic theologians. See Ana Caldeira Fouto's (2019), "Revisiting Subjectivity in Rights Theorists.")

For Hobbes (1998/1651), the purpose of human existence is self-preservation. The human being, at least for Hobbes, is intrinsically selfish and, therefore, naturally desires freedom and liberty but also dominion over others. Hence, the laws and the state should be designed to constrain man through reward, especially fear of punishment. Hobbes' idea of man as innately selfish is, for Strauss (1953), Hobbes' rejection of the traditional idea of man as a political being. Man, instead, is an a-political being. Thus, in Strauss' placement of Hobbes among the hedonists and the epicureans, Hobbes ultimately suggests that 'self-ownership,' that is to say, this innate drive for self-preservation, this same drive that motivates the want of reward and fear of punishment, is, in man, the most inalienable in the fullest sense of the word, about the state. (Milbank, 2012). Hence, it is apparent how subjective right and its problems proceed from this conception. If man is ultimately concerned with himself only, then thinking of the common good makes no sense. Indeed, Karl Marx (1978) makes the same observation when he posits that rights-talk is ultimately just egoism; humans, because of their rights, human beings are members of a community but belong to it precisely by being separated from it.

Indeed, subjectivism, egoism, and disregard for the common good seem to be the social and political translation of rights conceived as subjective. However, there seems to be a more pernicious political translation of the aforementioned. John Milbank (2012) sees that the ultimate guarantor of the right to self-preservation will be the state and that when conditions arise that will threaten the subjective right to self-preservation of many people, then the state and the sovereign become like the solipsistic individual, granting itself unlimited powers over the subjects as to be able to preserve itself, and therefore require draconian measures to guarantee itself its self-preservation. It is through this same reasoning that the Nazi jurist, Carl Schmitt, perversely approves of authoritarianism and dictatorship. (Milbank, 2012). In short, for Milbank, the liberalism practiced today, which is ultimately based on subjective rights, serves to be the analog for authoritarianism and dictatorship, the effects of which are horrors already replete in human history.

If humanity conceives of human rights, it must conceive of them as objective rather than subjective. This means that rights must be capable of orienting human actions toward the common good. As the researcher mentioned earlier, in the wake of Leo Strauss, if rights are to become objective, then the standard for rights would be human nature, and in so doing, it would be possible to orient humans towards the common good. It seems, however, that the notion of human nature is unclear. What exactly constitutes human nature? This shall be answered concerning the tension between human rights and sustainability in the fourth section of this paper. It seems that how rights are understood today is based on subjective rights. In the next section, the researcher will discuss how subjective rights play out in reality and how this creates tension between sustainability, environmentalism, and human rights.

3.3 The Tension Between Human Rights and Environmental Sustainability

It was mentioned earlier that sustainable development, which necessarily involves environmentalism and environmental sustainability, is closely related to human rights, in that human rights demand that it be universally recognized that everyone should have the right to a clean, healthy, and sustainable environment. In practice, the concord between human rights and sustainable development is not always evident. Indeed, certain actors often disregarded the concept of sustainable development when prioritizing micro-economic self-interests. In Europe, for example, there is an obvious problem in the agricultural sector: transnational corporations often can look for more sustainable and environmentally friendly methods and technologies but employ methods that are not necessarily environmentally friendly and can achieve the highest possible productivity. (Pietrewicz, 2021).

Another example can be seen in the Nigerian clash of ownership versus environmental rights. Sunday Bontur Lugard (2016) tells us that oil is considered a state property in Nigeria and is thus usually leased to other commercial entities such as International Oil Companies (OICs). Because of this, such commercial entities seem to have the right to these resources, even at the expense of the environment and host communities. The appropriate position here is to hold that these commercial entities, while exercising property rights, should recognize that rights over resources such as oil should be considered a collective property and, therefore, consider the various stakeholders in exercising such collective property. The OICs' interest in petroleum over the region should be tempered, if not overridden by concerns about pollution and health concerns, and its effects on biodiversity and climate change. (Lugard, 2016).

Here, the idea of subjective rights is clearly at play. Lugard's analysis of Nigerian ownership of resources relies on Locke's idea of the balance between the commons and private property. Lugard shows that in Locke, as was already read by Strauss, in contradistinction to Hobbes, the right over private property is not absolute, especially since our rights ought to be directed to the interest of all parties involved, in other words, the common good. (Lugard, 2016). However, as seen in the first case of transnational corporations choosing maximum productivity over environmental concerns and later in the OICs of Nigeria, the idea of rights is subjective, albeit implicitly. As shown in the second section, there is an analog between authoritarian states and the subjective individual. The same can be said of commercial entities composed of collective individuals. Because rights are something that proceeds subjectively, a person, but also an individual state or commercial entity, may pursue without limits what are perceived to be its best interests without regard for the common good. However, not only the state or other big entities find themselves in tension with sustainability. It could also be the case that small communities or even individuals can be in tension with sustainability.

For example, in a case analysis from the article *Human Rights Courts Interpreting Sustainable Development: Balancing Individual Rights and Collective Interest*¸ Emelie Folkesson (2013) relates the Fredin vs Sweden case in the European courts. In this case, the individual, Mr. Anders Fredin, seems to have violated environmental laws but within his property. (Fredin v. Sweden, 1991). This again demonstrates the tensions between rights, sustainable development, and environmentalism. The court's ruling favored the state of Sweden since, the court reasons, the state acted in the general interest of environmental protection.

Finally, the last example is relevant because it is a case from our Philippine islands. Rebecca Austin and James Eder (2007) present a case study in the Palawan island. In one of their three case studies, they relate how non-governmental organizations' (NGOs) efforts to address environmental concerns and livelihood among locals sometimes create tension with each other. This suggests that the interests of local communities are not always concordant with environmental interests. In this case, the city government of Puerto Princesa ordered a ban on shifting cultivation as a forest conservation measure. This immediately caused the locals of Palawan hardships in terms of livelihood because they were pressured to look for a lot of non-timbre resources to compensate for their loss of income due to the ban above. Here, not so much property is the issue, but livelihood. The right to a good livelihood seems to have come in tension with sustainability and environmental concerns.

This is a contradiction that Kerri Woods (2010) has attempted to analyze. Woods relates that scholars of human rights and environmental sustainability have problematized that one cannot have both sustainability and human rights (individual freedom and democracy). There is, for example, Garett Hardin (1968), who prioritizes sustainability over human rights. For Hardin (1968), coercion of the individual, violating the individual's supposed rights, is necessary if sustainability is to be achieved in the coming years. It is clear that Hardin shares Thomas Malthus' concerns, but he surpasses Malthus in his advocacy for coercive methods, methods that limit freedom and rights, to achieve sustainability.

On the other hand, Wilfred Beckerman (1999) thinks that this seemingly obsessive amount of care put into environmentalism and sustainability seems to have the effect of disregarding humans. Beckerman is distrustful of deep ecology literature, which seems to echo Hitler's introduction of legislation concerning reverence to the environment, which, at least for Beckerman, is a move towards the irrational and towards an abandonment of the humanist tradition which has dominated our thinking for more than a century already. Moreover, Beckerman (1999) seems to invoke the difficulties of Indigenous groups and little communities, which seem to have become victims of the difficult government ordinances, which, while environmentally concerned, do so at the expense of their livelihood.

Kerri Woods recognizes this tension and proposes her solution. Woods thinks that it is possible to think of Environmental Human Rights. Indeed, one can act as an environmental steward and seek to maintain the environment for future generations. In other words, environmental care does not need to contradict human rights; it must strengthen and affirm them. (Woods, 2010). For Woods, affirming human rights works like a package deal: it involves the recognition of sustainability as a crucial aspect of human rights and the good of society in general. Woods, however, points to some weakness in her position. For example, environmentalist sustainability activists might say that a package understanding of environmentalism also involves affirming human rights. However, in this case, environmentalism is given more emphasis, and therefore, the appeal of rights should be less universal than the appeal of environmentalism and sustainability. (Woods, 2010). This ultimately means that in cases where rights and environmental sustainability clash, the environment gets to have a more significant advantage over the affirmation of rights.

3.4 The Filipino Christian as Mediator

The researcher gives a different argument for easing human rights and sustainability tension. Indeed, it is only possible to speak of an easement because what the researcher proposes here is not a direct solution, one that would reconcile the contradictions mentioned above. The researcher only proposes to give a new perspective on how to think about human rights and sustainability understood in tandem with environmentalism and environmental sustainability. This involves thinking about human rights in terms of objective rights, which do not alienate the individual from others but rather orient them to a common good.

Here, the researcher follows Milbank in understanding objective rights as proper order about other things and not as an order that proceeds from subjectivity. In his reading, this kind of order ultimately means that there is an ultimate standard for order: God Himself, in whom our life and the universe's merely participate. Therefore, awareness of this participation of nature and us in the Divine, which is where Christian philosophy comes in, means that it should be possible to recognize the value in environmentalism while also affirming human rights, which, this time, are conceived as objective rights. This awareness of our participation in the Divine is already present in the Filipino psyche. The Filipino Christian is, therefore, a good starting point for the mediation between human rights and sustainable development, which, as already repeatedly said, necessarily involves environmentalism and environmental sustainability.

What constitutes human nature was asked in the second section of this paper. Here, the researcher follows Jacques Maritain (1949) in positing that human nature derives from the inherent dignity of persons. These best fit the picture of objective rights in that the dignity of persons justifies duties and relations between and among persons. If persons have inherent dignity, then it seems that no amount of subjectivity can give one the excuse not to look out for their (person's) best interests. As Milbank (2012) relates, this is the original meaning of *ius*, the usual Latin equivalent of right. Indeed, this is also how Thomas Aquinas understood ownership: ownership is not of the land itself, but a certain incorporeality of land, that is, that ownership means right distribution (*Summa*, II. II. q.66, a.1.). In other words, or so Milbank (2012) explains, "individual human beings *do not own* usage, but human beings in general *only* own usage." (p.214)

The idea of human nature deriving from human dignity can be further qualified. Kerri Woods (2010) thus traces the notion of human dignity back to Christian theology, where man is understood to be created in the image and likeness of God. Indeed, given this framework, proper distribution, indeed right relation, can be said to be a proper order set there by God, who orders everything according to His Being.

Here, the researcher makes the connection between God, who orders everything, and thus gives rise to rights as right order (objective rights). This endows dignity to things of the universe, especially nature and creation, to which human beings stand in relation. This means that humans also have duties towards nature and creation. Objective rights, then, necessarily abandon subjectivity and orient us to the common good but also orient us to specific duties humanity has towards creation. This is where sustainable development and environmental sustainability come into the picture. Sustainable development and environmental sustainability are humanity's duty towards creation, not simply as stewards, but as persons who, by claiming objective rights, also have duties towards that to which humans claim a right.

Christianity, especially Eastern Christianity, is conscious of the eminence of creation and nature. For example, in the writing of Eastern theologians, there is always a reference to the blessedness and holiness of creatures found in the natural world. (Gibbons, 2019). Indeed, the desert fathers, in their identification of the birds as a sign of God's holiness, fasted not so much as mortification but as a reminder for them that in due time, everything, including birds and animals, will once again be put in a *right relationship* with one another, as in the original paradise where the consumption of animal flesh did not occur. Here, it may be possible to avoid Beckerman's charge of mystifying nature in that nature is not regarded with a high status simply because of itself but because of the proper ordering which God himself sets upon the world with His Being as the Model.

This Eastern tendency is already evident in the Filipino psyche. First of all, as anecdotal evidence, a lot of Filipinos still believe in some supernatural influences not taught by the Christian faith. These supernatural influences influence us, and often, this translates into respect that humanity gives to nature (as when we, for example, say in Cebuano, "*tabi-tabi* when Cebuanos relieve themselves in grassy areas or *libon*). In the ordinary Filipino's life, this seems to deepen spiritual life. As Juan Macaranas (2021) relates, Filipinos practice religion as though God is not out there but right here, directly affecting our daily lives. For Macaranas (2021), this meant that, just like their Asian neighbors, Filipinos understood reality as a whole, where the self is not regarded as a completely separate entity (something which would not have been very obvious had the Filipinos been operating under the idea of subjective rights), but is an integral part of a bigger reality. Indeed, or so says Macaranas, "[i]f the early Filipinos accepted and integrated the Christian doctrines into their spirituality and religious beliefs, it is because they also see its connectedness with God." (p.8.)

This point about Filipino Christianity is further shown in Fides del Castillo's (2015) work on traditional Filipino religion and Catholicism. Castillo demonstrates that there are some clear similarities between traditional Filipino religion and Catholicism, and this made it very easy for the early Filipino pagans to accept Catholicism as a new religion from the Spaniards. This meant seeing the seeds of God's word in the indigenous practices was possible. This idea of the Filipino as belonging in a bigger whole, one in which God reigns, is evident even among young people. Indeed, as demonstrated by del Castillo and Marie Alino (2020), Filipino Catholic youth employ a pattern of positive religious coping, and there is evidence that the Filipino psyche is always ready to accommodate spirituality when dealing with social issues, sustainability, and environmentalism in this particular case.

4.0 Conclusion

At the outset, the researcher has shown that environmentalism is always invoked when considering sustainable development. This is because development always involves consuming our limited resources: the environment. Hence, environmentalism always goes hand in hand with sustainable development. However, care for the environment and sustainability seem to be in tension with human rights, construed as subjective rights. When conceived as such, human rights become individualistic and justify actions that are antithetical to the common good. Furthermore, this allows the state, the ultimate guarantor of human rights as subjective rights, to justify draconian measures to ensure subjective rights. This conflicts with sustainability, which operates under the presupposition of the common good. Suppose one can act not for the common good but according to what one determines to be suitable for herself/himself. In that case, it seems that one cannot hold sustainability together with a subjective conception of human rights. Hence, a recovery of the meaning of rights as objective was attempted. As objective rights, human rights become the basis for pursuing the common good, including sustainability and environmental preservation.

As seen above, the rights at play in the Filipino psyche are objective (instead of subjective). The ordinary Filipino does not understand himself/herself as an isolated individual but as someone responsible for others and creation. The specific brand of Christianity the Filipino practices is very close to Eastern Christianity in locating the divine in creation. Thus, creation is something to which human beings stand and to which human beings bear duties and responsibilities. In Eastern Christianity, but especially the desert mystics, creation is seen given the final reconciliation of everything that the second coming will bring, a reconciliation that will also reconcile us with creation. This consciousness is already operating in the Filipino psyche, especially in the practice of Folk Catholicism, where Christianity is often seen as a narrative of a whole, the individual being merely a part of that whole. Nevertheless, it defines the whole precisely by being an individual, which, as an individual, constitutes a part of the whole. There is no contradiction between the individual and the whole. This Filipino framework of religious thought allows us to hold together sustainability and human rights. The researcher hopes to have shown how human rights and sustainable development, together with environmental sustainability, can be given more harmony under the lens of the spirituality of Filipino Christians.

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The author contributed alone to the paper. The author reviewed and deemed the final work worthy of submission.

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Development and Assessment of Kamote Leaf Extract as Potential Localized pH Paper

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Abstract. Many studies have investigated that natural plant extracts could be used as natural indicators, which are alternatives to commercial pH indicators used in acid-base lessons. However, no study has yet delved into developing and assessing purple sweet potato (Ipomoea batatas L.), locally called kamot,e as a potential material for creating localized pH paper (LpP). Therefore, this study was conducted to develop a pH paper for kamote leaf extract (KLEpP) and compare it with commercial pH paper and kamote leaf extract (KLE) to assess its potential as an LpP. The research is experimental and comparative. It focused on determining how KLEpP compares with commercial pH paper and kamote leaf extract (KLE). Additionally, the study analyzed the purple sweet potato extract for potential anthocyanin content using Fourier Transform Infrared (FTIR) Spectroscopy. Results indicated that the color of KLEpP shifts from light green to pink when immersed in a pH three standard. Further color changes were observed at pH 13 and 14, transitioning from light green to yellow-greenish and yellowish, respectively. While the color changes of KLEpP closely resemble those of KLE, the latter exhibited a wider spectrum of color changes. Notably, PSPLE demonstrated consistent color changes from pH 1 to 5, with a stronger pink at pH 3. The FTIR analysis revealed peaks indicative of various functional groups (hydroxyl groups, aldehyde group, aromatic group, hydrocarbon group, ester group bond, and C-O bond), signifying the presence of anthocyanins. The findings suggested that KLEpP has the potential to be an LpP and a practical alternative to commercial pH paper for teaching acid-base concepts. Furthermore, it could be employed to determine the pH of household materials.

Keywords: Acid-base indicator; Localized pH paper; Natural indicator; pH paper, Sweet potato.

1.0 Introduction

The significance of science and scientific advancement cannot be overstated in our modern world. As a result, science education is crucial in cultivating individuals who possess a comprehensive understanding of science and are equipped with vital 21st-century skills such as problem-solving (Kalogiannakis et al., 2021) and scientific inquiry. To help foster scientific knowledge, the availability of essential supplies is crucial for advancing scientific research and education. However, the world is currently facing difficulties in providing high-quality science education as some students find science difficult to learn (Degorio, 2023), which is evident in the significant decline in students' interest in pursuing careers in science (Dela Fuente, 2019). The decline may be attributed to the insufficient infrastructure and the lack of teaching and learning materials that causes science students anxiety (Fia et al., 2022).

This global issue is also a problem in the Philippines, particularly in areas with limited resources. Students face significant challenges due to a lack of laboratory supplies, such as pH paper (Estipular & Roleda, 2018; Noroña, 2021). This scarcity poses significant challenges to educational institutions and can hinder the quality and progress of education. It can impede scientific inquiry, experimentation, and educational activities, ultimately leading to a decline in students' performance in science. This is evident from the drop in the Philippines' ranking in science proficiency in the Programme for International Student Assessment (PISA, 2022), with Filipino students consistently ranking among the lowest worldwide (Acido & Caballes, 2024). To address this problem, the Department of Education integrated into the K to 12 Curriculum 2016 Guide in Science the usage of local and indigenous materials, which are more affordable and easier to obtain (Abugri et al., 2012). Especially in teaching acid-base lessons for grade seven students, teachers are encouraged to use natural indicators as supplements for expensive pH meters, pH paper, and synthetic pH indicators (Kapilraj et al., 2019), which are toxic (Jabeen et al., 2022).

Many studies have investigated natural indicators obtained from different plants as alternatives to commercial pH indicators, including red cabbage (Pakolpakçıl et al., 2018), purple sweet potato (Laila, 2019; Sohany et al., 2021; Farida et al., 2024), butterfly pea (Wiyantoko & Astuti, 2020), turmeric, rose, beetroot (Jabeen et al., 2022), guinea corn (Abugri et al., 2012), and bougainvillea (Killedar et al., 2017; Kapilraj et al., 2019). Also, Only Syahirah et al. (2018) and Jabeen et al. (2022) have produced pH paper strips using turmeric, rose, beetroot, red cabbage, and butterfly pea. However, no study is currently on developing and assessing kamote leaf extract as a potential material for creating localized pH paper (LpP). LpP presents a cost-effective, locally sourced, easily manufactured tool—like kamote, a common crop and a staple in the Philippines—that can be customized for various pH range requirements, making it a suitable resource for laboratories with limited means. Therefore, this study was conducted to develop a pH paper using sweet potato (Ipomoea batatas L.) leaf extract, locally known as "kamote" (KLEpP), and compare it with commercial pH paper and kamote leaf extract (KLE)to assess its potential as a LpP.

Furthermore, various studies have demonstrated that the active compound anthocyanin, an organic compound that exhibits colors ranging from pink, red, and violet to blue (Laila, 2019; Alappat et al., 2020) and is found in a wide range of fruits, vegetables, flowers, and cereal grains (Wrolstad, 2004), is the primary factor behind the color changes in these natural indicators due to its sensitivity to pH (Tuslinah et al., 2021). Thus, the study also examined the presence of anthocyanin in the extract of purple sweet potato leaves using Fourier Transform Infrared Spectroscopy (FTIR) to assess if anthocyanin was the active compound that caused a color change in KLEpP.

2.0 Methodology

2.1 Research Design

The research design is experimental because it used the standard pH from pH 1-14 and utilized commercial pH paper as a control. The study is also comparative because the KLEpP was compared to the KLE to determine the color change difference. Furthermore, the purple sweet potato leaf extract was also analyzed for the potential presence of anthocyanin using FTIR Spectroscopy (PerkinElmer Spectrum IR).

Development of KLEpP

The sweet potatoes were purchased from the local vegetable market. They were washed, then 25.00g of sweet potato leaves were weighed and transferred to a mortar and pestle. Next, 10.00mL of 90% ethanol solution was added, and the mixture was slowly pestled. The resulting extract was used to soak a piece of prepared paper (bond paper cut into the desired size) and was then dried in a preheated oven at 80°C. Moreover, the remaining kamote leaf extract was centrifuged for 10 minutes at 1940 rpm and was analyzed using FTIR Spectroscopy for the potential presence of anthocyanin.

Extraction of Leaf Extract for KLE

Kamote leaves were washed and extracted using boiled distilled water at a weight-per-volume ratio of 2:1 for 5 minutes.

2.2 Research Analysis Procedure

The constructed KLEpP and KLE were subjected to pH evaluation by dipping the prepared KLEpPs in the different (pH 1-14) standards. Fourteen (14) KLEpP strips were prepared for each pH standard, while five drops of pH standards were dropped into the different test tubes with 2.00mL of prepared KLE for each test tube. Fourteen (14) test tubes were prepared; at the same time, 14 strips of control (commercialized pH paper) were also dipped in the standards. Also, the kamote leaf extract (used in constructing the KLEpP) was analyzed for the potential presence of anthocyanin using FTIR Spectroscopy.

2.3 Ethical Considerations

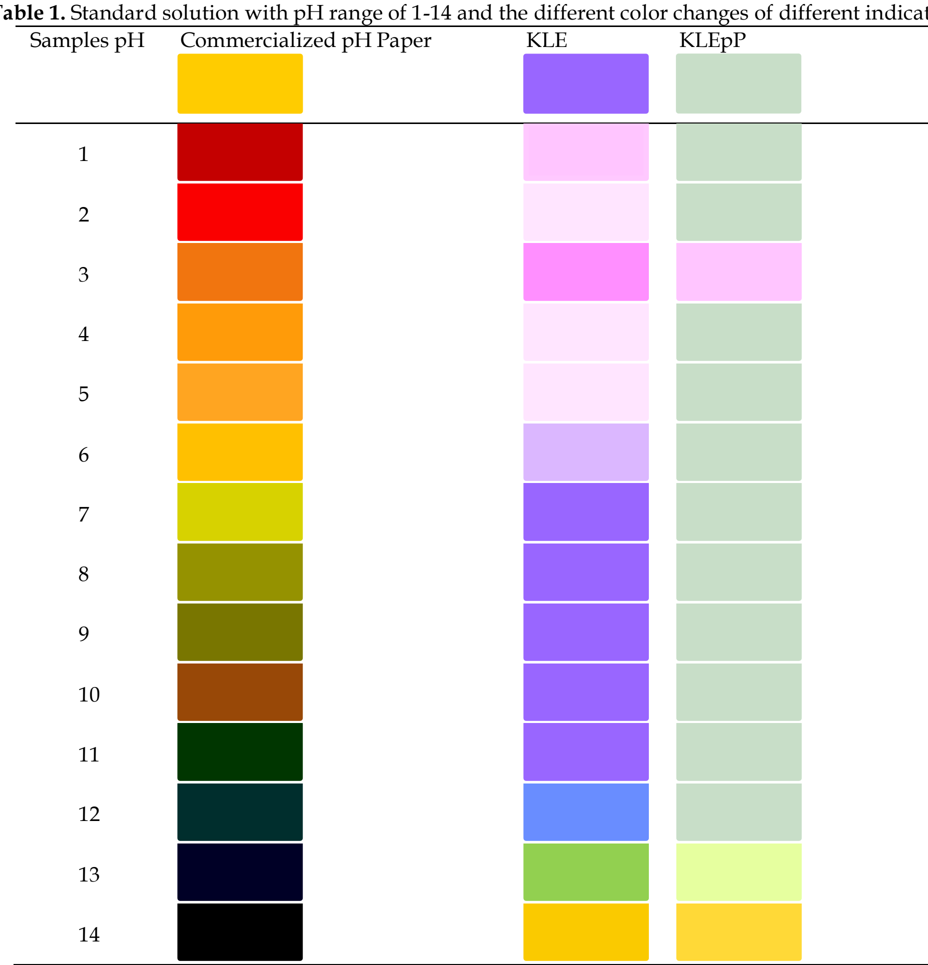
The study ensured that the kamote leaves bought in the public market were harvested sustainably without damaging the ecosystem or endangering the species. Proper plant waste disposal after the experiment was observed to minimize environmental impact. The chemicals used in the test were properly stored or disposed of according to local regulations and guidelines. Above all, the research did not involve any animals, ensuring that animal welfare concerns were not a factor.

3.0 Results and Discussion

3.1 Evaluation of Color Changes on the Sweet Potato Extract pH Paper

The KLEpP was evaluated using pH standards to determine the exact pH at which color change occurs. Moreover, it was compared to the commercialized pH paper and KLE. When dipped in the pH 3 standard, the color of KLEpP changed from light green to pinkish. Color changes also occurred in pH 13 (from light green to yellow-greenish) and 14 (from light green to yellowish color).

Table 1. Standard solution with pH range of 1-14 and the different color changes of different indicators



The resulting color changes on KLEpP were almost identical to those on KLE. However, a wide range of color changes occur on the KLE compared to the KLEpP. However, it must be noted that the KLE produced the same color change from pH 1 to pH 5, except for pH 3, where there was a stronger pinkish color. These color changes were almost the same as the color changes that occurred in the findings of Sohany et al. (2021) on the commercial purple sweet potato root crop anthocyanin (CA) when subjected to different pH (pH 1 to 14). However, there were color changes that did not match, which may have resulted from the different parts of the plant being used, especially since the current study only used the leaf part of the plant. The contrast of colors in the findings further corroborated the results of Kapilraj et al. (2019) that eco-friendly natural indicators showed clear color changes between acids and bases.

These findings on the color change of KLE and KLEpP strongly supported the findings of Abugri et al. (2012), Sanchez et al. (2021), and Jabeen et al. (2022) that using natural acid-base indicators and natural pH-paper indicators could be used in laboratory experiments and may solve the problems of laboratory material unavailability for teachers as they are easy to extract, cheap, and non-toxic, and may enhance student learning. The results were also in line with the findings of Sai-Ut et al. (2021) that using natural indicators showed a wide range of color changes that indicated the pH of a substance and that the color change may be caused by hydrolysis of anthocyanin due to changes in the environmental condition, like the change in the degree of acidity or pH (Wiyantoko & Astuti, 2020). Therefore, the KLE and KLEpP may help the Philippines' problem of the lack of laboratory supplies (Orbe et al., 2018), especially for acid-base experiments. These findings also proved that KLEpP is a potential LpP and a potential alternative for commercialized pH paper.

3.2 Assessment of the Presence of Anthocyanin from the Sweat Potato Extract

The FTIR analysis results indicate that purple sweet potato leaf extract displays seven spectrum peaks between the wavelengths of 876.98cm-1 and 3305.28cm-1.

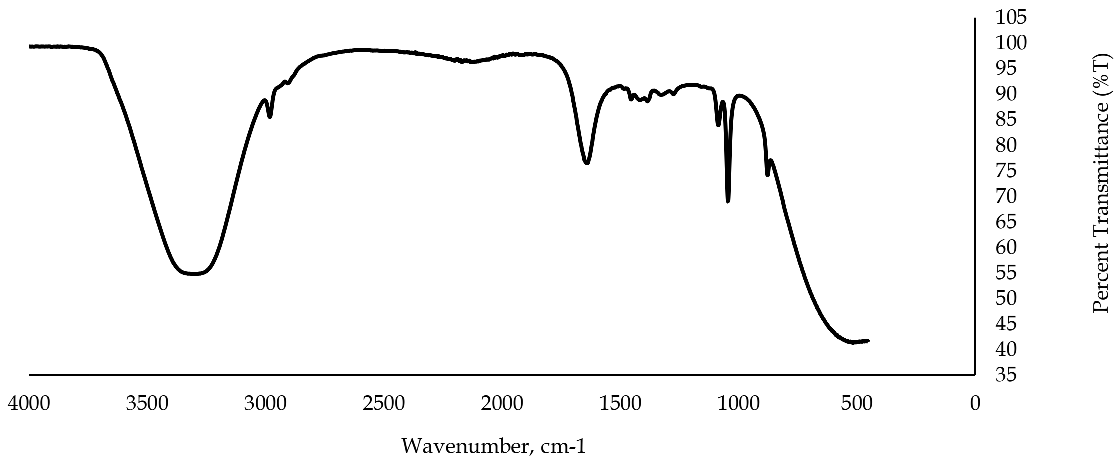


Figure 1. FT-IR transmittance result from the kamote leaf extract

Based on Figure 1, the kamote leaf extract has peaks at 3305.28 cm-1, which indicates the presence of hydroxyl groups (-OH). It also has an aldehyde group (2981.96 cm-1), aromatic group (1638.8 cm-1), Hydrocarbon group (1385.27 cm-1, 876.98 cm-1), ester group or C=O bond (1085.51 cm-1), and C-O bond (1044.29 cm-1), respectively. These results are shown in Table 2.

Table 2. Noticeable peaks produced from the FT-IR Transmittance result.

Peak	Wavenumber, cm-1	Percent Transmittance (%T)	Functional Group
1	3305.28	54.81	Hydroxyl (C-OH)
2	2981.96	85.54	Aldehyde
3	1638.80	76.50	Aromatic
4	1385.27	88.61	Hydrocarbon (C-H)
5	1085.51	83.90	C=O, Ester, C-OH
6	1044.29	68.93	C-O
7	876.98	74.11	Hydrocarbon C-H

This result is an indicator that the kamote leaf extract contains anthocyanins, which are organic compounds that have color varieties from red, violet, and blue (Laila, 2019) and may change color due to its instability to pH changes (Tuslinah et al., 2021). These results were in line with the FT-IR findings of Farida et al. (2024) and Sohany et al. (2021), which concluded that purple sweet potato contained anthocyanin and further specified that there are

14 types of anthocyanins in the purple sweet potato. Similarly, the functional group found in the current FT-IR results coincides with the FTIR findings of Swer et al. (2018) on the extracts of Prunus nepalensis L., which showed the presence of O-H, aromatic rings, and esters and that these were the characteristics of anthocyanin. This further indicates that the Purple sweat potato leaf extract has the characteristics of anthocyanin. This may also prove that the color change in the different pH ranges, both in the KLEpP and the KLE, was caused by anthocyanin.

Moreover, natural anthocyanins have poor color stability and are vulnerable to degradation from environmental factors (Maylinda, 2019), which was also observed in the KLE. However, the shelf-life of KLEpP was more than 30 days. Nevertheless, it must be noted that further analysis must be done on the accuracy of KLEpP's shelf life.

4.0 Conclusion

The findings of this study showed the potential of KLEpP as an LpP, which teachers in the Department of Education and private basic education institutions could use as an alternative for commercialized pH paper for their acid-base lessons. It is then suggested that further research must be done on using the KLEpP in determining pH in different available household materials, which can be useful for teachers in making acid-base activities. Moreover, the findings affirmed the presence of anthocyanin in purple sweet potato leaves, which may help future researchers who look for natural indicators and anthocyanins for their studies.

5.0 Contributions of Authors

The authors declare that they all contributed equally to this study and have reviewed and approved the final paper. Specifically, Mr. Christopher Bernard S. Benong and Mrs. Shery-Ann T. Benong formulated the research framework, methodology, and data collection, ensuring the study's objectives were clearly defined and attainable. Mr. Jesson B. Belen was involved in formulating and assessing the experimentation and data collection.

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7.0 Conflict of Interests

All authors declared that they have no conflicts of interest as far as this study is concerned.

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Enhancing the Numeracy Skills of Grade 8 Students through Quizizz: An Interactive Learning Approach for Improved Mathematical Proficiency

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Abstract. This study aimed to evaluate the effectiveness of Quizizz as a digital game-based learning tool in enhancing the numeracy skills of Grade 8 students at Louella Gotladera Alcoba National High School. Quasi-experimental research designs were employed, and 30 participants underwent pretest and posttest assessments on basic operations involving integers and real-world integer word problems. In this study, using Quizizz as an interactive tool for numeracy lessons was the intervention. Improvement measures in the students' numeracy skills are done by comparing scores for the pretest and posttest assessments. Paired sample t-tests quantitative analysis showed a significant increase in the mean score: from 19.7 (SD = 5.92) for the pretest to 29.2 (SD = 6.63) for the posttest. The t-value is -18.5 with a p-value of <0.001, which means that improvement is significant, and so it rejects the null hypothesis. These findings suggest that integrating game-based platforms like Quizizz can enhance proficiency in numeracy and positively impact students' engagement. Besides the quantitative data, it was supported by the thematic analysis conducted on structured interviews that provided qualitative data about student experiences using Quizizz. The structured interview shows real-time feedback and other competition-related features, like leaderboards, increase engagement and enjoyment. At the same time, the understanding of numerical concepts develops over time for anxious students who want more explicit feedback. Thus, this result indicates that Quizzes will be helpful in the development of numeracy skills because they will attribute an interactive nature to learning and make it more fun. This study supports the idea that digital game-based learning platforms must be integrated into the mathematical education environment to achieve better results for students' development of numeracy skills.

Keywords: Digital game-based learning; Educational technology; Gamification; Interactive learning; Numeracy skills; Quizizz.

1.0 Introduction

In the current environment, the imperative to enhance the numeracy skills of students perhaps calls for urgency more so than ever. Mathematical competency remains essential in any student's educational journey and for solving everyday problems (Nuraini & Humaidi, 2020). However, traditional mathematics instruction tends to fail to strike learners' minds through conventional teaching methods with the potential to demote motivation, resulting in limited learning. This makes teaching method innovation the best way to make learning interactive and exciting. For students with lower mathematical performance, this requires teaching innovative ways. For instance, online gamified learning platforms like Quizizz are being seen as promising tools to enhance student engagement and improve learning outcomes. However, its potential to improve numeracy skills has not been systematically studied.

There is much positive literature about gamified learning platforms in different subjects, such as Quizizz. Studies conducted by Yong and Rudolph (2022) have shown that Quizizz is a great opportunity for power to attract, motivate, and elevate students to achieve better academic results. Most of these studies have focused only on science and linguistic learning, but research concerning how it may specifically affect mathematical ability has received very little attention. Moreover, although gamified learning has been described to encompass positive motivational elements in several prior studies, there is still a rare study regarding the effectiveness of such applications in strengthening core competencies like numeracy skills. Even though related apps such as Kahoot! and Socrative were also researched for their deployment in educational contexts, the comparison shows that Quizizz offers a much more customized learning experience through instant feedback, a student-paced environment, and continuous game mechanics focusing on continuous practice. This unique advantage calls for further study in its application in mathematics instruction.

For instance, the study of Morata and Caballes (2024) showed how ClassPoint, a digital game-based learning platform, can enhance the numeracy of Grade 7 learners in a public secondary school in Sorsogon. Their study sets aside the possibility that digital game-based learning will offer the students an advantage by pointing out the gap in previous research; it did not even compare ClassPoint with other popular learning gamifications, like Quizizz. This creates a gap in our understanding of how other digital tools uniquely contribute or add value to educational outcomes in analogous contexts. In addition, there are few promising findings made by other disciplines and mathematics education fields regarding a systematic study on how Quizizz may improve students' numeracy skills, which are crucial for academic progression. This study seeks to bridge the gap of existing studies by examining the effectiveness of Quizizz as an interactive strategy to enhance numeracy skills among students.

This study aimed to determine whether Quizizz affected students' mathematical proficiency, particularly improving their numeracy skills. Therefore, it attempts to close this knowledge gap by becoming a potential contribution to the presently increasing scientific literature that encompasses new pedagogical approaches regarding how technology could be used to improve learning results. It is crucial to educators wishing to enhance mathematics instruction and policymakers and educational technologists looking to implement successful digital tools in classroom learning.

2.0 Methodology

2.1 Research Design

This quasi-experimental study probed the effectiveness of Quizizz as a learning platform for enhancing numeracy skills among Grade 8 students. Instead, a quasi-experimental design was employed rather than a true experimental design, primarily due to practical and ethical considerations. In this study, the natural grouping of students occurred by classrooms, and they were not assigned randomly. This ensured that the researchers experimented on how the intervention impacted Quizizz under real conditions without sacrificing the nature of a real classroom while at the same time providing fair equity in the treatment of all the students of this study.

Quasi-experimental designs are very apt in educational research, mainly in a school setting, as they are presented as a more practical way through which education intervention effects may be probed under real conditions. This design ensured that student numeracy could be assessed before and after the intervention - pretest and posttest - capture changes because of Quizizz as an instructional tool. By using Quizizz regularly in a classroom, it was possible to assess in this study whether this gamified platform could enhance the students' abilities in basic integer operations and real-life integer word problems. In essence, the pretest/posttest comparison has lit up this potential of the application and hence supports the intent in educational intervention research, being that of design for better numeracy.

2.2 Research Locale
The research was conducted at Louella Gotladera Alcoba National High School, a public secondary school servicing students from various socio-economic backgrounds. The reason for choosing the school was its commitment to integrating technology in teaching inside their classrooms, and it would accommodate the implementation of online platforms like Quizizz. The study was conducted in one of the classrooms where classes of Grade 8 mathematics were held and has the required technological set-up: internet connectivity and available student-friendly devices that can access Quizizz.

2.3 Research Participants
Louella Gotladera Alcoba National High School comprised the grade 8 respondents in the present study. To draw on convenience sampling, 30 students aged 13 to 15 years were selected because they were enrolled in mathematics classes during the research. This sampling method provided a feasible and accessible group. However, convenience sampling can be susceptible to the same kinds of biases that render generalizations challenging - that is, it is not a random selection of participants. To minimize these, an attempt was made to ensure a range of abilities in the sample by including students who varied in their numeracy proficiency levels. Moreover, the fact that the study focused on pretest and posttest assessment helped isolate the effects of the Quizizz intervention across diverse skill levels within the class. Parental consent was obtained from all participants before the study commenced.

For the qualitative component, a sample of 10 students was contacted to undergo structured interviews. The reduced sample was chosen based on some inclusion criteria to ensure relevance. These include willingness to participate in interviews with a subset of students, ability to express experiences with Quizizz, and good representation across different levels of numeracy proficiency.

Overall inclusion criteria for the study were that students must be enrolled in the target mathematics class, have prior foundational knowledge of integer operations, and have parental consent to participate. Exclusion criteria included students with severe absences during the study because their exposure to the intervention through Quizizz would have been minimal, and also students who did not exhibit consistent participation in classroom activities, as their irregular attendance and participation might affect the consistency of their responses.

Although the sampling approach was convenient, it accommodated a representative range of abilities, and the qualitative subset helped provide depth to the quantitative findings by exploring individual experiences and perceptions of Quizizz.

2.4 Research Instrument
This study's primary instruments were pretest and posttest assessments measuring numeracy skills in integer operations and word problems in real-world integer contexts. Tests were developed based on the foundation of numeracy anchored on operations on integers and word problem scenarios involving integers and were specifically designed to assess the skills of interest to this study. Questions were chosen for content validity through collaboration with mathematics education subject matter experts by reviewing the test items against the curriculum standards of numeracy skills. Pretest and posttest questions underwent a pilot test on another group of Grade 8 students to check clarity, appropriateness, and difficulty level, and minor adjustments were made based on the feedback. This process made it possible to establish content validity and reliability; it was set at a satisfactory score obtained on Cronbach's alpha for internal consistency across test items.

Quizizz is an online intervention space supporting both instructional strategies and performance data. More specific aspects of Quizizz features activate student interest and respond to the learning objectives established for these students. Utilized multiple-choice and short answers to help develop integer operations while building skills in working with word problems. All this allows immediate feedback within each question to be comprehensively understood and to encourage further learning. Leaderboards and point-scoring gamification elements also contribute by motivating and engaging people who wish to make learning fun and competitive and build it so that it can aim toward improving numeracy.

For the qualitative strand, structured interview guides collected in-depth feedback from student experiences using Quizizz, including open-ended questions designed to assess students' understanding of the real-time nature of the feedback, perceptions of the leaderboard, and the extent to which this digital tool has affected their confidence and enjoyment of mathematics. The qualitative instrument, too, was reviewed by subject matter experts to ascertain that it focused on all the relevant issues regarding students' engagement with, understanding of, and perceived effectiveness of the chosen digital learning tool.

This study comprehensively evaluated Quizizz's effectiveness in improving the numeracy skills of Grade 8 students by employing both quantitative and qualitative instruments, combining objective performance data with subjective insights into students' experiences.

2.5 Data Gathering Procedure

Data collection was based on four weeks. The first week of the data collection procedure was a pretest administered to all respondents to establish the numeracy skills that the respondents possessed before the training period. After the pretest, Quizizz as an interactive learning tool was introduced to them and incorporated into their mathematics class. For the next three weeks, the students used Quizizz to take quizzes on integers' basic operations and related word problems. These quizzes paralleled the same activities during classroom lessons to help reinforce what had been taught. A posttest of the same format as the pretest was given at the end of the fourth week to measure possible changes to the students' numeracy skills. The pretest and posttest results were compared to determine whether using Quizizz improves mathematical ability.

For qualitative data collection, structured interviews are conducted during the final week with a sub-sample of 10 students to help capture their experiences and perceptions of using Quizizz as a learning tool. It consisted of the use of interview guides. This ensured that repetition questions were kept to a similar pattern but allowed for flexible questioning related to how participants used the tool, their opinions on live feedback and leaderboards, and how everything affected pleasure and confidence levels in mathematics. The setting for conducting the interviews involved a silent room to elicit comfortable and open participants. After obtaining permission from the participants, the meetings were recorded and further transcribed for analysis. Qualitative data added more depth to the quantitative results, so there was an understanding of how the interactive features of Quizizz influenced student's motivation and learning experiences.

2.6 Ethical Considerations

The overall study was in complete conformity with the highest standards of ethics. Informed consent from the parents or guardians and student assent were sought before collecting data. They were briefed on the study's objectives, how Quizizz would be used to deliver the lesson, and their prerogative to withdraw at any moment without prejudice. Scores and results acquired during the quizzes were given codes to conceal the participants' identities. All other information collected from the study was kept confidential for this study only. The school administration gave approval to conduct this study, which followed all established ethical requirements for conducting educational research.

3.0 Results and Discussion

3.1 Students' Numeracy Skills Before the Use of Quizizz

With n = 30, the mean pretest score is 19.7, with a standard deviation 5.92. From the table included with the possible mean range interpretation, a mean score of 19.7 falls in the range of 16 - 20, "Needs Improvement." Hence, students were largely unfamiliar with numeracy concepts prior to the treatment. More specifically, most students failed to master basic operations involving integers and challenging, real-world word problems. Therefore, they would likely make persistent errors and thus require focused support and remediation to improve their numeracy skills.

Table 1. Descriptive statistics of numeracy skills of students before the use of Quizizz

Type of Test	Mean	Standard Deviation	Interpretation
Pretest	19.7	5.92	Need Improvement

A standard deviation of 5.92 indicates that, given that the scores are relatively moderately spread out around the mean, there is some variability in the level of performance on the pretest by the students. Many likely scored within the "Needs Improvement" range; however, some outliers must be higher, and some are lower than the mean. Generally, the pretest results indicate an area where instructional intervention is urgently needed concerning the topic, students' numeracy proficiency, and hence justify the creation and introduction of the Quizizz platform as a new tool for improvement.

This is typical of most of the problems in foundational mathematics, especially for abstract concepts such as integers, as frequently cited as where most students struggle to master, according to studies (Rosyidah et al., 2021). Theories from the constructivist camp show that foundational knowledge is a bedrock for acquiring more complex skills, so a baseline must be built to measure growth (Piaget, 1976). Practically, this emphasizes the role of interactive methods in aid of fundamental skills and demands intake diagnostics that would make it clear what competencies of the individual students are to be dealt with. Until now, research in numeracy intervention has relied more on initial diagnostics for educational input alignment to guarantee that the range of individual needs is appropriately met (Junpeng et al., 2020).

3.2 Students' Numeracy Skills After the Use of Quizizz

For N = 30, the mean posttest score is Mean = 29.2, and its standard deviation is 6.63. According to the mean range interpretation given, a score of 29.2, of a mean, falls within the given range of 26 - 30 (Satisfactory). In addition, it shows that the average students had offered moderate evidence for the mastery of numeracy skills in the posttest session. They could usually perform integer operations and solve related word problems, although possibly with some difficulty in more complex operations or sometimes in errors that frustrated accuracy.

Table 2. Descriptive statistics of numeracy skills of students after the use of Quizizz

Type of Test	Mean	Standard Deviation	Interpretation
Posttest	29.2	6.63	Satisfactory

With a standard deviation of 6.63, the scores are spread out more than in the pretest case, which meant there was variability in the student's performance following the intervention. Though most of the students performed satisfactory scores, most of them must have been exceptional performers, while others must have continued to struggle with the materials, scores which are a distance from the mean.

This finding aligns with the social constructivist view that collaborative and interactive environments promote higher engagement and better comprehension of mathematical concepts (Vygotsky, 1978). Theoretical frameworks supporting gamification also highlight how features like immediate feedback and competition can increase intrinsic motivation and enhance learning outcomes. This was supported by Margallo et al. (2023), who described how Quizizz helps encourage the participation and engagement of the students in Filipino classroom sets. Students' motivation to participate or learn increased through using the application. The total analysis of this research includes interactive features that include real-time feedback from the system, which integrates gamification and facilitates learner engagement and student success. Further results to sustain these findings came from very recent studies stating that in comparison to a more conventionally taught lesson, "game-based learning platforms offer better retention and understanding in mathematics" (Wang et al., 2022). Simply put, digital game-based learning tools can be employed in mathematics curriculums as they give a better understanding.

3.3 Effectiveness of Quizziz in Enhancing the Numeracy Skills of Students

Table 3. Analysis of the difference between the pretest and posttest scores of students in the numeracy test

Type of test	Mean	Standard Deviation	t-value	p-value	Interpretation	Decision to Null
Pretest	19.7	5.92	-18.5	<.001	Significant	Reject
Posttest	29.2	6.63				

α = 0.05 Level of Significance

Table 3 presents the analysis of the differences in the students' numeracy test pretest and posttest scores. It was performed using the t-test for paired samples. The pretest mean score was 19.7, with a standard deviation of 5.92. The posttest scores revealed a better average of 29.2 with a slightly higher standard deviation of 6.63. This large negative t-value associated with a p-value of much less than 0.001 suggests a statistically significant difference between the pretest and posttest scores.

The fact that statistical significance has been achieved may suggest that the intervention was an effective educational program or tool that significantly improved the numeracy skills of the students. Since the p-value is lower than the margin of error cut-off value of 0.05, the null hypothesis of no difference in the mean between the pretest and posttest is rejected. In this way, it is ensured that the change in performance was not brought about by chance occurrence but ascribed to intervention. The study's findings strongly stimulate educational interventions intended to improve the numeracy skills of the students.

This is further supported by Setiyani et al. (2020), who demonstrated how Quizizz improved the learners' mathematical problem-solving skills with significant leaps in achievement through quizzes. Another study explores the gamification dimension of Quizizz further. It illustrates how such a platform, when applied to mathematical game learning, would positively affect secondary students' mathematical skills (Yanuarto & Hastinasyah, 2023). Furthermore, the study of Capinding (2022) focused on implementing Quizizz as a game-based assessment tool for mathematical education. It concluded that such interactive strategies can promote greater engagement and better outcomes than traditional practice strategies. This is widely underlined by Querido's (2023) quasi-experimental study on the effectiveness of an interactive classroom tool, ClassPoint, somewhat like Quizizz, and how these tools improve mathematical skills significantly.

The mean scores were raised significantly from the pretest to the posttest as evidence of the effectiveness of Quizizz in numeracy skills. The features, such as real-time feedback, gamified quizzes, and leaderboards, provided an environment that enhanced both engagement and skill acquisition. The idea of gamification theories reveals that such features make the learning experience more immersive while providing opportunities for practice in a low-pressure testing context, as revealed by Winanti et al. (2021). These features enhance repeated attempts, which agrees with mastery learning principles as repeated practice improves skills under the gamification theories (Bloom, 1976). These results support game-based learning in instruction design, particularly for such subjects as mathematics, where students often have anxiety toward the subject matter (Ongcoy et al., 2023). Moreover, the research explains that digital tools such as Quizizz allow for converting traditional learning settings into lively spaces so that mathematics is more easily approached and seen as a less fearful subject by students, as backed by the study of Medico et al. (2023) that investigates the impact of digital gamification and traditional based learning on students' mathematics achievement as evidence from the Philippines. Lastly, the findings are supported by Osido (2024), who studied the utilization of Quizizz-assisted instructional materials for Mathematics 8, also employing a quasi-experimental design with pretest and posttest assessments; the study reported significant improvements in student performance, leading to the conclusion that Quizizz is an effective tool for developing improving the performance in Mathematics subject among Filipino students.

3.4 Structured Interview on Students' Experience with Numeracy Enhancement Using Quizizz

Students' experiences with Quizizz were probed through the thematic analysis of structured interviews. In this section, the primary objective of this research study will be to understand how the interactive features of Quizizz can influence learning outcomes, student engagement, and emotional response. To do this, first-person accounts from the students were gathered through gaining their impressions and experiences. The significance of the analysis lies in providing strengths and weaknesses regarding Quizizz while contributing to a general discussion about the pedagogical use of technology in an educational setting to maximize learning productivity and student satisfaction.

The thematic analysis of structured interviews with students about their experiences using Quizizz reveals several significant insights into how digital gamification tools influence learning. Students overwhelmingly recognize Quizizz as an engaging tool that enhances the learning experience. This is evidenced by their descriptions of the platform as "fun" and "competitive," which suggests that Quizizz effectively engages students by incorporating elements of play and competition into educational activities. This engagement appears to translate into an Enhanced Learning Experience, as students report that it is "easier to remember stuff for tests" and enjoy the sensory engagement provided by the platform's graphics and sounds.

Table 4. Thematic analysis of the structured interview on the experiences of students in numeracy enhancement using Quizizz

Student's Response	Codes	Categories	Themes
"Quizizz makes learning fun, and I like the competitive aspect."	Fun, Competitive	Engagement	Enhanced Learning Experience
"I feel anxious when the timer is running during quizzes."	Anxious, Timer	Emotional Response	Impact of Gamification
"The immediate feedback helps me understand my mistakes."	Immediate feedback, Understanding mistakes	Feedback Mechanism	Learning and Correction
"Sometimes I don't get why I got something wrong."	Confusion	Clarity of Feedback	Learning and Correction
"It's easier to remember stuff for the tests after using Quizizz."	Easier to remember, Tests	Memory Improvement	Enhanced Learning Experience
"I prefer using Quizizz over traditional homework."	Preference, Traditional homework	Preference for Learning Tools	Learning Preference
"The graphics and sounds make it more interesting than a regular class."	Graphics, Sounds	Sensory Engagement	Enhanced Learning Experience
"I wish there were more topics covered in Quizizz."	More topics	Content-Range	Scope of Content
"It's fun to see who gets the highest score."	High scores, Fun	Competition	Impact of Gamification
"I learn better when I can play and learn at the same time."	Learn better, Play	Learning Methodology	Learning Preference

Another theme that emerged is the Impact of Gamification. Students felt that the competitive aspects of Quizizz and the real-time feedback motivated them a statement from a student "It is fun to see who gets the highest score." some also experienced anxiety, making a statement, "I feel anxious when the timer is running during quizzes." mainly related to time constraints during quizzes. This dual-edged nature of gamification underscores its significant impact on student behavior and emotional responses, demonstrating both positive and negative effects.

The Learning and Correction theme is a clear indication of how Quizizz can be used for teaching, with the appreciation of the students for "immediate feedback," which enables them to "understand mistakes." with a statement from one of the participants, "The immediate feedback helps me understand my mistakes." However, there is also a need for clarity in some areas since, in this study, some were confused about what went wrong with a student making the statement, "Sometimes I do not get why I got something wrong." and this indicates that there needs to be more about the feedback mechanism within this application. The last theme is Learning Preference, which indicates that interactive and dynamic learning and teaching tools are highly preferred over traditional learning. Students will appreciate learning in a playful context and want more content inside the site. Their statements on this theme are "I learn better when I can play and learn at the same time." and "I prefer using Quizizz over traditional homework.".

Qualitative insights support the quantitative analyses to better inform the impact on student learning due to Quizizz. Indeed, by combining competitive elements, immediate feedback, and an interactive learning environment, both knowledge acquisition and motivational levels improved digital game-based platforms may hold a potential promise for mathematics education, reasserting the conclusion that tools like Quizizz for digital game-based learning can make a significant difference in the way students are engaged and impact their education results. Qualitative data enriched insight into how students perceive such tools and which aspects contribute to their learning experiences, validating the good results in numerical skills and attitudes toward learning for students when using Quizizz. This comprehensive analysis confirms the quantitative analysis's outcomes and gives deep insights into the mechanisms through which gamification can enhance educational practice.

This is anchored by the Self-Determination Theory, which states that intrinsic learning motivation will rise when a feeling of competence, autonomy, and relatedness to the learning activity is present in the student (Deci & Ryan, 2000). The real-time feedback from Quizizz meant that the students could see what they got wrong and correct those mistakes. As such, the learning process was reinforced, and math anxiety was eradicated. Hence, it goes per the latest research findings, confirming that instant feedback in gamified platforms helps students grasp concepts and enact active learning (Yong et al., 2020).

These findings have practical implications for educational practice, including the fact that interactive digital tools may increase engagement and numeracy performance and provide confidence in mathematics that relieves mathematics anxiety. Such a trend towards more student-centered learning, emphasizing technology to make complex, hard-to-reach content more accessible, fits more significant education trends (Cespón & Lage, 2022). This encourages educators in need to integrate devices that include giving immediate feedback through gamified techniques in learning and providing a supportive but engaging setting for learning.

4.0 Conclusion

This study concludes that Quizizz is a digital game-based learning tool that supports the numeracy of Grade 8 students to help them enhance their numeracy skills. Quantitative and qualitative analyses found that the students' mathematical proficiency improved after intervention, as indicated by the statistically significant overall differences. Quantitative data output showed an upward trend, as illustrated by the test scores, which showed significant differences between the pretest and posttest scores. This implies that Quizizz can consolidate mathematical ideas and facilitate the students' effective problem-solving of numerical problems.

Qualitative thematic analysis of students' interviews goes deep into their experiences of Quizizz. Through gamification, students are more engaged and enjoy learning because of this system. Something that included real-time feedback, competitive features, and interactive content made students want to learn even more, retain much in their memory, and understand things better. Additionally, students expressed interest in and preference for this interactive learning tool over others and showed potential for it to supplant or complement traditional means of learning altogether.

However, despite the overwhelmingly positive results, some students were anxious about the quizzes, and content coverage would have been better if there had been more explanation and clear feedback on questions that had been answered wrongly. These areas lend themselves to the further development of Quizizz so that more quality time can be made out of it for education.

To put it in a nutshell, the present study confirms that quizzes can be one of the most versatile tools for learning since they promote numeracy skills while transforming the learning experience into a fun and effective one. It also opens avenues for further study towards identifying strategies that can increase the scope of topics in digital game-based learning to suit different ways of learning and needs. In this view, the current research contributes significantly to the educational technology field by taking their cause into integrating gamified learning platforms into educational environments with a highly interactive and rewarding nature for the learning setting.

Quizizz can be integrated into classrooms by practicing for lessons or testing the students through proper lesson plans designed specifically for classes. Teachers can create or choose quizzes that match curriculum standards, using the platform for concept practice and tracking student progress. Educators can use Quizizz as an ice breaker/warm-up, review, or a formative assessment, customizing game settings so that the competition level will suit the classroom dynamics and feedback will fit what they are trying to accomplish. Teachers can identify and mediate these gaps in learning within instruction so that it can become more emergent, responsive to students, and targeted in nature using the real-time data that Quizizz outputs.

Moreover, to stimulate educational benefits at a bigger scale, policymakers could promote actionable learning tools driven by gamified education, a case being Quizizz. For schools to be able to embrace these tools, policies that promote digital literacy training for educators, funding for digital resources, and best practices around technology adoption would be less complicated to bring in." Gamified learning can enable a transition to student-centered learning environments that are often associated with interactive, collaborative, and student-driven education. Accordingly, policymakers can promote the inclusion of gamified learning in curriculum frameworks, which may lead to more engaged students better prepared for higher-level maths.

5.0 Contributions of Authors

The author has encoded, edited, written, and supervised the study. He also collected, analyzed, and interpreted the data.

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7.0 Conflict of Interests
There is no conflict or no conflict of interest.

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Gratitude as Predictor of Psychological Well-Being Among Secondary Students

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Abstract. Gratitude is one of the universal character strengths under the virtue category of transcendence. It is also defined as a sense of thankfulness and happiness resulting from acknowledging desirable opportunities, outcomes, and gifts. Much research has proven that gratitude is linked to less distress and higher life satisfaction (Zhang et al., 2022). The WHO described psychological well-being as a positive state experienced by individuals and societies (Lin et al., 2022). This also pertains to how people feel they function on a personal and social level and evaluate their lives (Michaelson et al., 2012). Both variables play a role in championing adolescents' overall wellness, especially in schools in this age of VUCADD-BANI. This study highlights the dearth of literature in the Filipino context, emphasizing young people's well-being and gratitude. This research quantitatively explored the prediction between gratitude and well-being among secondary students (n=91) in a private school in Manila. The sample size was determined through G*Power 3.1.9.7; the subjects were selected through a random stratified sampling technique. The data was run through JAMOVI version 2.4.14 and found a positive and moderate relationship ($p<0.001$, $r=0.61$) between gratitude and psychological well-being among secondary learners. Moreover, gratitude can predict psychological well-being by 41% among the participants. The findings suggest that fostering gratitude among secondary learners can improve mental health outcomes. Practicing gratitude can lead to greater self-acceptance, personal growth, positive relations, and purpose in life, which mitigates distress among secondary students. This can serve as a basis for gratitude-focused interventions and school counseling programs that enrich students' well-being by flourishing gratitude at the secondary level.

Keywords: Counseling; Gratitude; Positive psychology; Psychological well-being; Secondary students.

1.0 Introduction

During and after the onslaught of the worldwide health issue, the negative impact of the pandemic on people's well-being has become prevalent globally. With this abrupt disruption, understanding young people's mental health, championing well-being, and making it a priority have since then become the top focus of mental health professionals and advocates. Rooted in the tenets of Positive Psychology, it is emphasized that being grateful has a great contribution to predicting self-satisfaction, emotional resilience, and social inter-relationship. There is an emerging lens as to what Positive Psychology can do in dealing with the public mental illness crisis. The wide reception of the media catapulted its prominence inside and outside the field of counseling and psychology. Moreover, with the volatility, uncertainty, complexity, ambiguity, diversity, and dynamics (VUCADD) world now brittle, anxious, non-linear, and incomprehensible (BANI) times, it is vital and essential for people to equip themselves with tools that will combat the challenges and threats that may influence their well-being.

The calls to address the public mental health crises were sought to be widened, and considering the role that positive factors can fulfill in combating mental illness was magnified. Bolstering mental health and building processes and capacities that may help strengthen future mental health has become a priority. Several Positive Psychology factors such as meaning, coping, self-compassion, courage, gratitude, positive emotions, positive interpersonal processes, high-quality connections, and other character strengths have been integrated into new counseling interventions and existing effective programs such as self-administered computer training, mental health first aid, cognitive behavioral therapy groups, social media interventions and delivery of both music therapy and counseling (Waters et al., 2022).

In maintaining or improving a healthy sense of well-being, gratitude is one of the affective traits or emotions that positively impact one's well-being. Gratitude, when continuously practiced, can improve well-being and lead to a reduction of stress and anxiety. According to the American Psychological Association (2018), gratitude is not merely admitted as acceptance of a material gift or service but also an acknowledgment of intangible presents such as emotional support, kindness, or opportunities. Gratitude refers to one's awareness that consciously acknowledges the positive things occurring in one's life, whether these are the result of other people's actions, achievements, or fortunate events. With reflection on such events, most people tend to have increased feelings of happiness, contentment, and satisfaction. Gratitude can be the best complimenting therapeutic intervention for people especially if they feel overwhelmed with life stressors (Diniz et al., 2023). The World Health Organization (2022) describes well-being as a positive state experienced by individuals and societies like health. Determined by social, economic, and environmental conditions, it is a resource for people's daily lives, encompassing quality of life and both an individual and society's ability to contribute to giving the world a sense of meaning and purpose.

Research establishes a strong correlation between gratitude and psychological well-being; for instance, in the educational setting, adolescents with high levels of gratitude tend to experience greater life satisfaction and a heightened sense of purpose (Li et al., 2023). Expressing gratitude can be an interdependent relation behavior that enhances social relationships and encourages prosocial conduct, creating a positive spiral cycle wherein the giver and receiver receive rewards in return (Algoe et al., 2020). Further studies conducted on the beneficial effects of practicing gratitude among young people have proven its positive influence and relationship to the improvement of one's psychosocial well-being. Gratitude is associated with the hope that when the former elevates, the latter increases (Aggarwal, 2023). It has also increased life satisfaction (Datu & Bernardo, 2020). Alongside psychological well-being, gratitude is also significantly related to happiness (Jayakumar & Gupta, 2021). As an estimator variable of psychological well-being and happiness, an individual possessing the attitude of gratitude has higher levels of psychological well-being, happiness, and sound mental health throughout their life. Another study involving young adults found that gratitude can help strengthen a person's character strengths and increase well-being when boosted with happiness (Kharbanda & Mohan, 2021). The study of Handa and Rikhi (2022) found the relationship between gratitude and happiness, which concluded that a happier person expresses more gratitude than an unhappy person. Gratitude can become the most predictive variable for psychological well-being when paired with hope, optimism, and life satisfaction (Kardas et al., 2019). Additionally, heightened gratitude and increased resilience result in improved psychological well-being (Panhwar & Malik, 2023).

Furthermore, gratitude shown to have a direct and positive impact on academic engagement (Zhen et al., 2021). Grateful students have better learning-related outcomes, such as higher levels of autonomous motivation, engagement, and achievement (King & Datu, 2018). In a recent study by Yudiani et al. (2023), a significant and positive relationship was found between gratitude and academic self-efficacy on academic engagement - the higher the gratitude, the higher the students' academic engagement will be. Evidence of gratitude in improving motivation among high school students was documented wherein learners who frequently expressed gratitude for their benefactors' actions helped keep them motivated and satisfied with their lives over a semester (Armenta et al., 2022). Gratitude can also positively predict learning engagement among adolescents (Jin & Wang, 2019).

Gratitude and grit were found to protect the subjective well-being of college students, resulting in better-coping abilities against the pandemic adversity (Bono et al., 2020). Additionally, gratitude was also proven to be significantly associated with decreased psychological harm and greater resilience. When it comes to suicide risk among college students, gratitude was related to less risk of suicide via beneficial associations with hopelessness, depression, social support, and substance misuse (Kaniuka et al., 2020). In the Philippines, grateful individuals are likely to experience positive affective states as gratitude gives way to opportunities to establish new interpersonal connections and commemorate and maintain existing social ties (Datu et al., 2022). The necessity for integrating gratitude when formulating support programs targeted at students' holistic success was suggested (Mason, 2019). Regarding improving eating behavior among adolescents and young adults, gratitude-based interventions like writing activities also facilitated improvements in healthy eating behavior (Fritz et al., 2019). Lastly, gratitude and self-esteem can predict the mental well-being of adolescents (Jindal et al., 2022).

Studies have been conducted, evidencing the relationship between gratitude and well-being. However, there is a lack of analysis of these variables in the local or Filipino context. Furthermore, an insufficient study ventured into the population of secondary students. Additionally, literature often neglects the prediction of gratitude for psychological well-being. This research will serve as a post-pandemic reference to the relationship between gratitude and psychological well-being among young people. The results of this study can be used as a basis for interventions and other programs around school counseling, such as social and emotional learning (SEL) and values education, all aimed at flourishing gratitude and enriching psychological well-being among Filipino students, especially at the secondary level.

2.0 Methodology

2.1 Research Design

This study used a quantitative method, specifically the correlation-regression design, to investigate the relationship and prediction between gratitude and psychological well-being. This research design investigates relationships and predictions between variables without the researcher directly controlling or manipulating any variables. A correlation reflects the strength and direction of the relationship between gratitude and psychological well-being among secondary students. Also, the direction of a correlation can be either positive or negative. In this study, gratitude will be the independent variable or predictor, while psychological well-being is the dependent variable or the outcome.

2.2 Research Locale

The study was conducted in one of the oldest private schools in Manila, Philippines.

2.3 Research Participants

Data from this study was collected from Grade 7 to Grade 10 students. Through G*Power 3.1.9.7, the researchers determined that the ideal sample size of the study would be equal to or greater than 89 respondents. G*Power is a free software widely used to determine the precision of research sample sizes. This power analysis software supports various statistical methods and is valued for its time-saving capability and user-friendliness. An estimated 48,000 articles were published between 2017 and 2022 reporting its use (Thibault et al., 2024). The researchers set the effect size at 0.15, the statistical power at 0.95, and the significance level at 0.05. In this case, there is a 95% chance that the real value is within ±5 margin of error of the measured value. A random stratified sampling technique was utilized for the study. Stratified random sampling is a widely used technique that divides a population into strata before randomly sampling from each stratum (Nguyen et al., 2020). In this study, the researchers divided the respondents into four strata based on the grade level of the students, namely, grade 7, grade 8, grade 9, and grade 10. Moreover, the researchers divided the participants into three substrata based on the number of sections per grade level. Four general strata and twelve substrata are created to ensure the sample's representativeness. Through sample size proportion, it was determined that 20 students would be recruited from Grade 7, 26 students would be coming from Grade 8, 21 students from Grade 9, and 24 from Grade 10. The researchers used a wheel of names application to select the participants randomly per section and grade level. Hence, the random stratified sampling technique utilized in this research increased the estimation precision of the participants and is more efficient than simple random sampling (Zaman, 2020).

2.4 Research Instrument

The researchers utilized two valid and open-access questionnaires for this investigation. First, participants completed a self-report questionnaire called the Gratitude Questionnaire (GQ-6) (McCullough et al., 2002). It is a 6-item scale with a 7-point Likert scale ranging from "1 - Strongly Disagree" to "7 - Strongly Agree." It measures the tendency to recognize, respond, and experience gratitude. Statements such as "I have so much in life to be thankful for" and "If I had to list everything that I felt grateful for, it would be a very long list" are included in the scale. It was reported as having good internal consistency with coefficient alphas between .82 and .87. Two negatively formulated items (3 and 6) are reverse-coded. The scores can range from 6-42, which implies that the higher the score, the higher the gratitude disposition. The second scale utilized in this study is Ryff's Psychological Well-being Scale. Participants answered the shortened version of the scale, which has a total of 18 items with a 7-point Likert scale ranging from "1 - Strongly Agree" to "7 - Strongly Disagree" (Ryff & Keyes, 1995). It is a self-report instrument that measures six dimensions of psychological well-being: autonomy, environmental mastery, self-acceptance, personal growth, positive relations with others, and purpose in life. Items such as "I like most parts of my personality" and "I judge myself by what I think is important, not by the values of what others think is important" are included in the instrument. For scoring, items 1, 2, 3, 8, 9, 11, 12, 13, 17, and 18 must be reverse-coded before summing the score to get the overall measures of Psychological Well-being. A higher score means a higher level of psychological well-being. The scale was reported to have Cronbach's Alpha ranging from 0.72 to 0.80 (Crouch, 2016). Permission from the authors to convert these scales into Google Forms was sought.

2.5 Data Gathering Procedure

The researchers wrote a letter of permission to conduct the study and get the necessary demographic data of the students in the chosen secondary school. This letter was addressed to the OIC Principal and noted by the High School Academic Coordinator. Once approved, the researchers disseminated a parent consent letter to each student and provided it to their legal guardians. The nature and purpose of the research were written on the Parent Consent Form. After two weeks, all the parent consent forms were collected, and the researchers administered the two research questionnaires to students who secured parents' consent. It is important to note that the measurement tools were converted into Google Forms for the convenience of the students. The results gathered from the instruments were cleaned, coded, analyzed, and interpreted. Initially, the researchers conducted data cleaning and coding. The researchers determined that there were no missing data gauges from the respondents. Afterwards, all the texts from the respondents' demographic data were retained. In contrast, the texts from the point-Likert scales were removed before coding the data for easy reference in the statistical software. The researchers used the JAMOVI 2.4.14 to run the descriptive, correlation, and linear regression analysis. First, the frequency table was created for the demographic profile of the respondents in terms of grade level and age. Second, the means and standard deviations of gratitude and psychological well-being were analyzed to determine the levels of these two variables. Third, the researcher ran a correlational analysis to determine the significant relationship between gratitude and psychological well-being, which must be equal to or less than the probability value of 0.05. The R-value was also determined to understand the strength and direction of the relationship between gratitude and psychological well-being. Lastly, a linear regression analysis was run to determine the coefficient of determination between gratitude and psychological well-being among secondary students.

2.6 Ethical Considerations

This research study followed ethical guidelines. The terms of voluntary participation, nature, and purpose of the research were outlined on the Parent Consent form to ensure ethical standards. The researchers explained that answering the questionnaires is by personal choice and that students are free to decline the surveys without negative consequences. Participants can withdraw their responses during and after the data-gathering procedure if requested. Furthermore, the principle of anonymity was also adhered to by making the respondents' names optional. The researchers guaranteed that students' data would remain confidential and only be shared with parties involved in this research undertaking. Additionally, the researchers stated that there is no risk of harm in completing the survey questionnaires. All the collected demographic data were freely obtained from the subjects and were clearly explained in verbal and written form to abide by the Data Privacy Act of 2012. Lastly, the research results are promised to be shared in the school and will be communicated to the student participants.

3.0 Results and Discussion

3.1 Demographic Profile of the respondents in terms of Grade Level and Age

The results (see Table 1) show the frequency and percentage of participants regarding grade level and age. Grade 8 students have the highest number (f=26, %=28.6%) compared to the other three grade levels: 7 (f=20, %=22.0%), 9 (f=21, %=23.1), and 10 (f=24, %=26.4%). Participants aged 14 are the highest (f=33, %=36.3%), while those aged 17 are the lowest (f=2, %=2.20%).

Table 1. The demographic profile of the respondents in terms of grade level and age

Grade Level	Frequency	Percentage (%)

7	20	22.0
8	26	28.6
9	21	23.1
10	24	26.4
Age		
12	9	9.9
13	15	16.5
14	33	36.3
15	21	23.1
16	11	12.1
17	2	2.20
Total	**91**	**100.0**

3.2 Description of the Gratitude

The data reveals in Table 2 that participants generally recognized a strong sense of gratitude, as specified by high mean scores for statements like "I have so much in life to be thankful for" (mean = 6.03) and "As I get older, I find myself more able to appreciate the people, events, and situations that have been part of my life history" (mean = 6.11). These responses proposed that, on average, participants documented and valued the positive aspects of their lives and relationships. Gordon et al. (2021) researched that gratitude can lead to positive social relationships. This is associated with high mean scores for statements such as "I am grateful to a wide variety of people," which suggest that being grateful strengthens social support networks and mental health by establishing interactions with others. The standard deviations (around 1.3 to 1.4) for these items showed that most participants had a similar level of agreement. However, some distinctions indicated that while gratitude was common, individuals may have experienced it with divergent strengths.

Table 2. The means, standard deviations, and interpretations of gratitude

Indicators	Mean	SD	Interpretation
1. I have so much in life to be thankful for.	6.03	1.41	Agree
2. If I had to list everything I felt grateful for, it would be very long.	5.64	1.46	Agree
3. Looking at the world, I do not see much to be grateful for.	5.45	1.52	Slightly Agree
4. I am grateful to a wide variety of people.	5.78	1.47	Agree
5. As I age, I find myself more able to appreciate the people, events, and situations that have shaped my life.	6.11	1.28	Agree
6. A long time can go by before I feel grateful for something or someone.	3.81	1.78	Neutral
Overall	**5.47**	**1.49**	**Slightly Agree**

However, certain statements, such as "When I look at the world, I do not see much to be grateful for" (mean = 5.45) and "Long amounts of time can go by before I feel grateful to something or someone" (mean = 3.81), reflected a more nuanced or fluctuating relationship with gratitude. These items, particularly the latter with a high SD of 1.78, revealed greater variability, indicating that some participants steadily moved gratitude while others experienced it less recurrently or occasionally. Overall, the weighted mean of 5.47 and a moderate SD of 1.49 reflected that participant slightly agreed with the gratitude statements, acknowledging gratitude in their lives even if it was not universally strong. This suggested that while gratitude was generally a positive aspect of their viewpoints, discrete experiences varied, giving importance to gratitude as a somewhat flexible, personal response to life’s conditions. Kleiman et al. (2018) investigated how gratitude improved mental health outcomes, particularly emphasizing how it lessened anxiety and depressive symptoms. Gratitude has been shown to increase life satisfaction and positive affect, reducing the risk of developing depressive symptoms. The high mean scores associated with statements about gratitude that represent good life perspectives correspond with results indicating gratitude has beneficial effects on psychological well-being, which this study supports.

3.3 Description of the Psychological Well-being

Table 3 shows that the overall weighted mean of 4.90, which explains a "Little Agree" interpretation, implies that participants had moderate psychological well-being. It also suggests significant areas of ambivalence even when participants maintained some satisfaction with their own personalities and life circumstances.

Table 3. The means, standard deviations, and interpretations of psychological well-being

Indicators	Mean	SD	Interpretation
1. I like most parts of my personality.	5.52	1.14	Somewhat Agree
2. When I look at the story of my life, I am pleased with how things have turned out so far.	5.45	1.41	A Little Agree
3. Some people wander through life, but I am not one of them.	5.02	1.56	A Little Agree
4. The demands of everyday life often get me down.	3.24	1.73	A Little Disagree
5. In many ways, I feel disappointed about my achievements in life.	4.19	2.01	Neither Agree nor Disagree
6. Maintaining close relationships has been difficult and frustrating for me.	4.04	1.95	Neither Agree nor Disagree
7. I live life one day at a time and do not think about the future.	4.46	1.99	Neither Agree nor Disagree
8. In general, I feel I am in charge of the situation in which I live.	4.96	1.41	A Little Agree
9. I am good at managing the responsibilities of daily life.	4.91	1.53	A Little Agree
10. I sometimes feel as if I have done all there is to do in life.	5.04	1.93	A Little Agree
11. life has been a continuous process of learning, changing, and growth.	6.42	0.92	Somewhat Agree
12. I think it is important to have new experiences that challenge my thinking about myself and the world.	6.46	0.83	Somewhat Agree
13. People would describe me as giving and willing to share my time with others.	5.35	1.36	A Little Agree
14. I gave up trying to make big improvements or changes in my life long ago.	4.89	1.97	A Little Agree
15. I tend to be influenced by people with strong opinions.	3.21	1.57	A Little Disagree
16. I have not experienced many warm and trusting relationships with others.	4.64	1.92	A Little Agree
17. I have confidence in my own opinions, even if they differ from how most other people think.	5.36	1.58	A Little Agree
18. I judge myself by what I think is important, not by the values of what others think is important.	5.04	1.60	A Little Agree
Overall	**4.90**	**1.58**	**A Little Agree**

A degree of acceptance of oneself and control is suggested, for instance, by statements like "I like most parts of my personality" (mean = 5.52) and "In general, I feel I am in charge of the situation in which I live" (mean = 4.96). Vallerand and Verner-Filion (2020) pinpoint how fulfilling the basic psychological needs outlined in self-determination contributes to psychological well-being and self-acceptance. It indicated that individuals who control their lives experience better overall well-being. However, other statements such as "Some people wander through life, but I am not one of them" (mean = 5.02) and "I live life one day at a time and do not think about the future" (mean = 4.46) show individuals' differing perspectives on life direction and future planning. Individuals who agree may see themselves as actively participating in life rather than passively cruising the first statement. It had a comparatively high mean score and implied an impression of meaning and purpose. This is consistent with showing how crucial establishing target goals and having a clear purpose are related to psychological wellness (Delle Fave & Bassi, 2018).

Furthermore, the variability in responses is presented by the standard deviations, with values ranging from 0.83 to 2.01. For instance, the item "For me, life has been a continuous process of learning, changing, and growth" had a high mean score of 6.42 and a low standard deviation of 0.92, indicating strong agreement and consensus among participants about the importance of growth and learning in their lives. Wang and Shi (2019) found that emotional intelligence plays a significant role in fostering interpersonal relationships and enhancing psychological well-being. This finding is relevant to the item "I have not experienced many warm and trusting relationships with others," which had a mean score of 4.64 in the current study, as the higher standard deviation of 1.92 indicates significant variability in participants' perceptions of their social connections, revealing a divide between those who feel adequately supported and those who struggle to form meaningful relationships. These findings reflect a bound result between positive self-regard, a desire for growth, and the challenges of navigating relationships and life's demands.

3.4 Relationship between Gratitude and Psychological Well-being

Table 4 shows the relationship between Gratitude and Psychological Well-being among secondary students. It shows that the probability obtained (<0.001) is less than the probability criterion of 0.05. The researchers, therefore, rejected the null hypothesis and inferred that there is a significant relationship between Gratitude and Psychological Well-being.

Table 4. Relationship between gratitude and psychological well-being

Variables	R-value	p-value	Decision	Remarks
Gratitude Psychological Well-being	0.64	<0.001	Reject Ho	Significant

Moreover, this association is positive and moderate (r = 0.64), which means that as Gratitude increases, Psychological Well-being also increases. Consequently, when Gratitude decreases, the Psychological Well-being decreases too. The findings of the study are consistent with the research of Taruna et al. (2022), wherein it was found that gratitude and hope have been found to predict psychological well-being among emerging adults positively. Gratitude is also associated with increased life satisfaction and psychological well-being among Filipino undergraduate students, mediated by academic self-efficacy (Buenconsejo et al., 2024). Moreover, gratitude interventions, particularly gratitude journaling, have improved overall well-being and reduced negative affect, stress, and anxiety among college students (Tolcher et al., 2022).

3.5 Regression Analysis of Gratitude on Psychological Well-being

The results in Table 5 show the prediction of Gratitude to Psychological Well-being. The regression coefficient for Gratitude is 0.46. Moreover, the standard error obtained is 0.06, while the t-value is 7.83 for the predictor.

Table 5. Linear Regression of Gratitude on Psychological Well-being

Predictor	Estimate	SE	t-value	p-value	Remarks
Intercept	2.38	0.33	7.30	<0.001	Significant
Gratitude	0.46	0.06	7.83	<0.001	Significant

R^2 = 0.41, Adjusted R^2 = 0.40, ANOVA for regression = 61.4

Furthermore, ANOVA for the regression model gauges an F-value of 61.4 with a probability value of <0.001, suggesting that gratitude explains the significant variance in the psychological well-being among secondary students. It revealed that the coefficient of determination obtained is 0.41, meaning that 41% of Gratitude can predict Psychological Well-being among secondary students. This finding supports the study of Zhang et al. (2022), wherein the cognitive-affective structure of gratitude reveals that general and affective gratitude positively predicts subjective well-being, while cognitive gratitude shows negative associations. Daily diary studies indicate that gratitude positively relates to both hedonic and eudaimonic well-being on the same day and predicts improved well-being the following day. This finding underscores the significance of fostering gratitude to support students' well-being. Contemporary studies featured the role of gratitude in predicting psychological well-being among adolescents and secondary students. Gratitude has been found to predict psychological well-being and happiness among undergraduate students (Bilong et al., 2021). Higher gratitude experience enhanced psychological well-being alongside social support and self-esteem (Moltafet & Sharifi, 2021). In this study, it was confirmed that gratitude can predict psychological well-being by 41%. Interestingly, this data is higher than the 21.1% contribution of gratitude to psychological well-being among adolescents (16-20 years old) in Indonesia (Reza et al., 2024).

4.0 Conclusion

The study concluded that gratitude predicts psychological well-being among secondary students. This study suggests encouraging students to practice gratitude can improve learners' mental health outcomes. Gratitude flourishes in autonomy, environmental mastery, self-acceptance, personal growth, positive relations with others, and purpose in life, which are shown to alleviate mental health problems that secondary students commonly experience. Gratitude is one of the affective traits or emotions that positively impact people's well-being; it also plays a crucial role in maintaining and improving a healthy sense of well-being. When continuously practiced or exhibited, gratitude improves wellness and helps reduce exam-related stress and anxiety among students (Jain, 2020). Adolescents possessing high levels of gratitude were proven to be experiencing greater life satisfaction, while grateful students may attain a heightened sense of life purpose and well-being (Yang et al., 2020). The researchers recommended that school counseling programs focus on cultivating gratitude among secondary students by implementing activities that will promote gratitude and enhance well-being. The case of Meyer & Stutts (2023) shows that domain-specific gratitude interventions were particularly beneficial for psychological health, decreasing stress and negative emotions while increasing positive affect. Moreover, school counselors are encouraged to guide students in exploring gratitude and encourage the flourishing of this positive trait to increase psychological well-being. In the case of Bono et al. (2020), it was emphasized that gratitude intervention, such as psychoeducation through a social media approach, could lead to improvements in gratitude, mental health, and personal/social well-being of high school students. In the review of Adiwinata and Yustiana (2023), it was proposed that school counselors should facilitate activities like counting blessings, three good exercises, and gratitude visits to help develop gratitude among adolescents. Future researchers should select other school stakeholders, such as teachers and administrators, to study their gratitude and psychological well-being. It is also best to determine the prediction of gratitude to psychological well-being across educational levels: elementary, senior high school, undergraduate, and graduate students. Moreover, sophisticated statistical analysis such as mediation, moderation, and structural equation modeling is recommended to explore the association between gratitude and psychological well-being thoroughly.

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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7.0 Conflict of Interests

One of the authors is a High School Guidance Mentor at the chosen secondary school during the data gathering completion. Other than that, the authors declare no conflicts of interest in the publication of this paper.

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Commuters' Preferences and Willingness to Pay for Modern Public Utility Vehicle (MPUV)

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Abstract. This study investigates commuters' preferences and predicts their Willingness to Pay (WTP) for Modern Public Utility Vehicles (MPUVs), focusing on comfort and convenience factors in an urban setting. A descriptive, quantitative approach was adopted, utilizing a tool-validated structured questionnaire based on the Contingent Valuation Method (CVM). Data were gathered from 324 respondents, consisting of senior high school students and teachers from two nearby private and public schools. Results indicate that while commuters' overall satisfaction with traditional PUVs was moderate, there was a dissatisfaction with environmental sustainability and safety features. Binary Logistic Regression (BLR) analysis identified personal and economic factors as positive predictors of commuters' willingness to pay for MPUVs, although these indicators were not statistically significant. However, two factors— the amount commuters were willing to pay and the overall importance placed on PUVs—showed a significant relationship with WTP. These indicators predict a positive change in the BLR model to answer —Yes, respondents are willing to pay for additional MPUVs. Also, it suggests that as the commuters find the commuter's comfort and convenience factors less important, their willingness to pay decreases. Thus, the findings suggest opportunities to enhance transportation infrastructure and services, recommending a shift toward a market-driven policy approach.

Keywords: Comfort and convenience; Contingent valuation; Modern Public Utility Vehicle; Willingness to pay.

1.0 Introduction

Transportation is a crucial aspect of modern society, enabling individuals to travel efficiently and meet their daily needs. With increasing urbanization and population growth, commuting has become a significant part of people's lives. Commuters face various transportation options, including private vehicles, public transport, cycling, and walking. Understanding the factors influencing commuters' transportation preferences is essential for urban planners, policymakers, and transportation providers to develop effective strategies and improve the overall commuting experience. Ensuring safe, affordable, and accessible commuter transport is also a key target under Sustainable Development Goal 11.

Several factors affect the commuter's transportation satisfaction, including personal preferences, convenience, environmental concerns, and socioeconomic factors. Among these factors, income plays a significant role in shaping individuals' transportation choices. One of the key ways in which income affects transportation choice is through affordability. Recent studies on the relationship between income and the choice of transportation highlight how income levels impact the choices and include the implications for transportation planning and equity. The study of Ume et al. (2023) found that the respondents' monthly income significantly impacts commuters' willingness to pay. Most respondents rated security as the most critical factor in determining how much extra fare they would pay. Furthermore, higher-income individuals typically have greater financial resources, allowing them to afford and maintain private vehicles. In contrast, lower-income individuals opt for public transit and most often experience health risks due to pollution on the road (Shi et al., 2022).

Some research has demonstrated that commuters' perceptions and satisfaction levels can be influenced by many factors, including the specific characteristics of their travel experiences and their attributes and attitudes (Jang & Ko, 2019). Historically, increases in the fare matrix were brought mainly by increases in fuel prices rather than by consumers' preferences. However, recent research suggests that commuters' preferences and willingness to pay for public transit services can significantly impact the fare structure (Ren & Huang, 2020). Commuters only reveal a higher willingness to pay (WTP) if they see the value of paying more for better transportation facilities and services. In another study, the importance commuters place on their preferences can significantly impact their willingness to pay for public transit (Tepmanee & Siridhara, 2020).

In the Philippines, the factors that impact commuters' transport mode choice have shown that regardless of age, gender, income, and travel intent, people's safety is ranked first over accessibility, cost of travel, comfort, and environmental concern. Private and semi-private for-hire vehicles are highly ranked over various mass transport systems when all factors are simultaneously considered, despite the worsening traffic conditions and increasing cost of travel. (Mayo and Taboada, 2020). Moreover, in a study by Gue et al. (2021) on the analysis of the mode choice of the commuters in Baguio City, the role of income in both modes of choice for public and private vehicles is said to be related to the career level and life stage or age of the individual. Very few studies have yet to be conducted regarding the commuters' preferences for the current mode of transportation in Baguio City, which this study intends to explore.

Baguio City is popularly known as a mountain resort in the Philippines for its cool climate and scenic landscapes. It has dealt with criticism for being one of the most polluted cities in the country. Over the past few decades, vehicle emissions have been the primary source of pollution in the city's central business district. Another environmental problem the city faces is poor air quality, which affects health and life-related concerns, as the Department of Environment and Natural Resources (DENR) reported in 2020. Also, in a recent study on the city air quality dispersion, the spatial distribution of PM10 with high concentrations is evident on roads with high vehicular emissions (Ramos & Blanco, 2019). This reputation stems from traffic congestion, rapid urbanization, and topography. Despite these challenges, efforts are being made to address pollution in Baguio. Initiatives include improving public transportation and implementing stricter regulations on vehicle emissions.

The transportation system in Baguio City is characterized by a mix of public and private vehicles navigating through its narrow, winding roads. Despite being a relatively small city, it faces transportation challenges, especially during peak tourist seasons and holidays. The city encountered severe traffic congestion, compounded by limited road infrastructure. The primary modes of public transportation in Baguio are jeepneys and taxis. While these are essential for mobility, they contribute to traffic congestion and air pollution. Modern transit systems, such as buses, were absent only when the modern PUV was introduced in 2020.

The Philippine government launched the Public Utility Vehicle Modernization Program (PUVMP) under the Department of Transportation (DOTr) to improve public transportation nationwide. This program intends to update the nation's public transportation infrastructure. To improve the standard of public transportation and benefit commuters and operators, the PUVMP aims to replace outdated PUVs with brand new ones with safety features and more environmentally friendly vehicle models (Estipular, 2020). Additionally, the initiative seeks to professionalize the PUV industry by encouraging a culture of dependability, efficiency, and safety among PUV operators and drivers. Existing literature on the topic emphasizes that the program is not merely about replacing old vehicles with newer, more environmentally-friendly ones but a comprehensive restructuring of the entire road-based public transport system (Sunio et al., 2020). The program features a range of components, including regulatory reform, route planning, and fleet modernization, all aimed at creating a more sustainable and efficient public transport system. (Guno et al., 2021)

The gap between a government-determined fare matrix and a market-driven fare matrix is a critical issue in public transportation policy. The difference between market-driven fares and government-determined fare structures is a critical consideration in public transportation policy. The Government, particularly the Land Transportation Franchising Regulatory Board, determines the fare prices often aim to achieve social objectives such as affordability and accessibility, ensuring that low-income passengers can use public transit (Bakri et al., 2021). The fare prices determined by the government are typically lower than market-driven fares and may be subsidized by the government to cover the difference between operational costs and revenue. The proposed bill, Magna Carta for commuters and transportation, supported all the challenges or issues mentioned. In essence, the bill is a call for "a shift from infrastructure and public policy that are car-centric to sustainable transport and mobility," emphasizing that the latter must "provide safe access and mobility to all, promote economic development, protect and preserve the environment, and uplift the life of the Filipino commuter." reported by Top Gear Philippines, 2022.

On the other hand, market-driven fares are determined by supply and demand, reflecting the actual cost of providing the service and the passengers' willingness to pay. This can lead to higher fares, especially during peak times or on popular routes, but it also encourages efficiency and can generate higher revenue for reinvestment in the transportation system. Bridging the gap between these approaches requires careful consideration of economic sustainability and social equity, potentially through hybrid models incorporating dynamic pricing within a regulated framework.

The paper intends to determine the conversion of commuters' preferences into a higher WTP. Several factors affecting commuters' transportation preferences explain an array of payment choices. By examining these factors, we aim to gain insights into the decision-making process of commuters and understand how the different elements influence their transportation mode choice. Studies show stylized evidence of factors affecting commuters' decisions to ride different modes of transportation. (Litman, 2023) According to Oliviera & Dias (2019), the influence of demographics on the consumer preferences for alternative fuel vehicles (AFV), wherein no consistent result was found on the consumers' income and age; however, in terms of gender, education level, and family size, the consumers with higher educational level, women and consumer with more prominent families have higher preferences for AVF.

The study utilizes consumer choice theory, including Marginal Utility Theory, which examines consumers' increase in satisfaction from consuming an additional unit of a good. Utility represents that consumers get a specific level of happiness or satisfaction from consuming goods or services; the marginal utility is the benefit of consuming an extra unit. Utility and Price are the monetary values used to measure utility. Additionally, assuming that a household has an income, this income is allocated to expenses, which is explained by Mental accounting theory. It is a tendency to assign different mental values to the same sum of money. Additionally, to estimate the economic value of the comfort and convenience of using the MPUV, it incorporates the Contingent valuation method, which measures the willingness to pay for a good or service with economic value.

The study framework shows how the following variables in the figure are interrelated. Under the demographic characteristics of the commuters are the personal and economic variables that determine the commuter preferences, extent of satisfaction, and importance of comfortable and convenient transportation. Also, personal and economic variables such as educational level, age, and employment status affect WTP, and one aspect of the economic variables that significantly influences the WTP of the commuters is the household monthly income, backed by a recent study by Umme et al. (2023).

Personal factors are associated with what influences the consumption choices of the consumer, according to IGI Global (2019), such as classification, gender, sex, do they own a car, and their preference for comfort and convenience. Economic factors also relate to the pooled household income and transportation expenses. Both demographic characteristics and stated preferences of the commuters are the independent variables that affect the dependent variable: their willingness to pay for additional Modern PUV, which is comfortable and convenient transportation. The guiding framework of the study uses the contingent valuation method, which estimates the monetary value of a good or service. In this case, the transportation comfort and convenience services are estimated using a contingent valuation method questionnaire.

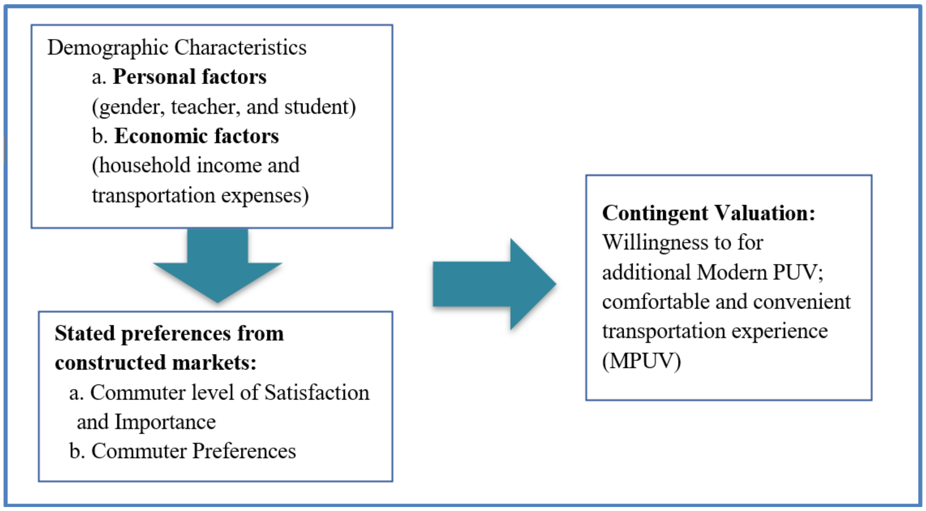

Figure 1. Conceptual Framework

The significance of the study is to help the city government evaluate the willingness to pay for the implementation of the modern PUV vehicle that was rolled out in 2020 (Llanes, 2020). Understanding its citizens' preferences for the current mode of transportation, which includes traditional PUVs and Taxis in Baguio City, helps the Local Government Units to discuss with the transport providers to effectively allocate resources by prioritizing improvements that the commuters value and are willing to pay. Furthermore, the study result could give insight and recommendations for a market-driven policy fare matrix to the Land Transportation Franchising Regulatory Board (LTFRB) as a promulgating agency providing public transport prices to the operators and commuters. Consequently, Modern PUV suppliers can improve their payment schemes, transport systems, and physical and ergonomic designs to suit passengers' needs.

Nearly all public transportation users in Baguio City currently have two alternatives: jeepneys or taxis during the global pandemic. Jeepneys are inexpensive, spartan, and time-and-route-restricted. Taxis are more expensive in exchange for being considerably more comfortable and time or route unrestricted. Both traditional jeepneys and taxis have their pros and cons. Existing research suggests that market demand exists for a third alternative: time or route-restricted modern PUV with fares roughly comparable to jeepneys, comfort roughly comparable to taxis, and considerably lower environmental impact than either taxis or jeepneys. However, precise consumer preferences, demand for modern PUVs, and whether the fare increases over jeepneys remain undetermined. The study focuses on determining the commuter's preferences and determinants of the commuters' Willingness to pay (WTP) for an improved transportation experience.

2.0 Methodology

2.1 Research Design

The study uses a descriptive-quantitative approach to measure the variables, such as income and transportation expenses. It describes frequency and means and compares and tests hypotheses between relationship variables. To predict the willingness to pay for additional Modern PUVs in terms of economic and personal factors such as comfort and convenience of the MPUV. The study uses the Contingent valuation method (CVM) in which respondents are asked to declare their preferences in hypothetical or contingent marketplaces, allowing researchers to estimate demand for items or services not sold on the open market. In general, the poll draws on a sample of people who are asked to assume that there is a market where they may purchase the items or services under consideration. (OECD, 2018)

2.2 Research Locale

The study was conducted in a private school and a public school in Baguio City, Philippines.

2.3 Research Participants

The study's target population was the education sector because, according to the Philippines Statistics Authority (2023), based on the population pyramid, the bulk of the age group in Cordillera has a younger population, around 15-18 years old and 20-24 years old. In this age bracket, individuals are mainly still studying and some work. Thus, the study considered senior high school students and teachers, with 334 respondents from both schools.

2.4 Research Instrument

A tool-validated structured survey questionnaire with sets of closed and open-ended questions is created, which consists of a Likert scale, multiple answer, and dichotomous questions. The survey questionnaire was patterned based on the Contingent Valuation Method. First, the attitude of the respondents is established by determining their level of satisfaction and importance regarding the following preferences. The second part is the use of goods or transportation, such as how often, what the purpose is, and when the commuters use the current mode of transportation. The third part is the valuation scenario, which includes the situation and whether there would be improvement. Respondents are asked if they are willing to pay and how much they are willing to pay. This part gives value to a better transport experience like the Modern PUV. The fourth and last part is the mode of payment and demographic information. The survey questionnaire was validated, and reliability testing was conducted before it was administered for the actual data-gathering

2.5 Data Gathering Procedure

This study follows specific steps to gather data from the schools. Upon the ethics reviewer's approval of the Ethics Clearance, the researcher sought endorsement from the Graduate Program Coordinator of the School of Advance Studies and completed the Request for Data Gathering form. A letter of communication was sent to the private and public schools. Then, following the school's process, the concerned school or office granted permission, and the researcher proceeded to administer the printed questionnaire. In the selection of participants, the administrators randomly select available classes during the time of data gathering.

2.6 Ethical Considerations

The researchers administered a printed survey form to the respondents, and the answers took about 10-15 minutes. In the survey form, the respondents were given informed consent, which consisted of information about the study, such as its purpose and the researchers' guarantee of their confidentiality by ensuring that the researcher only had access to the data. At the same time, the anonymity of their names was secured. Moreover, at any point during the survey, the respondents may withdraw if they feel uncomfortable, and the researchers are not forcing them to answer. The researchers highly value the respondents' dignity and well-being. The researchers cannot use gathered information and analyze data for other purposes, only for research purposes.

3.0 Results and Discussion

The processed data provides the background of the respondents, which targeted two proximate schools: a public school with 112 respondents (35%) and a private school with 212 respondents (65%). During the gathering of data, the researcher retrieved 324 responses. Out of 324 respondents from schools, 312 students and 10 teachers at the senior high school level responded. Almost 80% of the respondents say they use the traditional PUV (Jeepney) daily as a means of transportation. The commuters use modern PUVs once to twice a week (49%). Meanwhile, on average, commuters ride taxis one to two times a month (66%). Respondents are primarily students and teachers; their main reason for commuting is going to school. The average commute time varies depending on the location or barangay they are currently living in and the peak hours of their travel time. Also, approximately 38% of the sample owns a car and still commutes using public utility vehicles. The most preferred mode of payment is still cash (70%), and some respondents preferred Cash and BEEP (11%) as the preferred modes of payment. Other modes of payment such as E-wallet, Online Banking, and Credit cards are less preferred because the systems and transaction process are not yet set and ready, such as the need for internet or data in the commuters' cellular phone to access the following applications.

Commuters' satisfaction with the current mode of transportation (Traditional Jeepney, Taxi, and modern PUV)
Commuters' satisfaction level is often based on their travel experiences. Commuters will likely be highly satisfied when they find the travel experience comfortable and convenient. A five-point Likert scale is used to quantify the commuters' satisfaction level with the city's current mode of transportation (traditional PUV, taxi, and modern

PUV). The survey shows that respondents who answered yes are willing to pay (57%) for additional modern PUV, which is slightly higher in numbers compared to those who answered they are not willing to pay for additional modern PUV.

Table 1 below answers the study's first objective and presents a detailed comparison of commuters' satisfaction in using the traditional PUV and taxi between respondents who are willing to pay and those who are unwilling to pay. When the respondents are classified according to their WTP, the weighted mean of satisfaction of those who answered yes and no is almost proportionate.

Table 1. Commuters' level of satisfaction with the traditional PUV and taxi as per willingness to pay

Descriptive Statistics									
Indicators (Jeepney Satisfaction)	**Did not indicate N=2**		**Yes, WTP N=185**		**Not WTP N=137**		**Total N= 324**		**Descriptive Interpretation**
	M	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	
1. Crowdedness	2.000	1.414	2.746	1.145	2.650	1.179	2.701	1.159	Just right
2. Air Ventilation	3.000	1.414	2.935	1.009	2.905	1.097	2.923	1.046	Just right
3. Cleanliness	2.500	0.707	3.205	0.897	3.255	0.940	3.222	0.914	Just right
4. Seat Comfort	3.000	1.414	3.049	0.940	3.197	0.961	3.111	0.951	Just right
5. Loading and Unloading	4.000	1.414	3.827	1.039	3.978	1.067	3.892	1.052	Satisfied
6. Availability	3.500	0.707	2.962	1.144	3.000	1.266	2.981	1.193	Just right
7. Environment Friendly	3.000	1.414	2.503	1.017	2.438	1.028	2.478	1.021	Dissatisfied
8. Safe and Security	2.500	0.707	2.362	1.163	2.453	1.219	2.401	1.183	Dissatisfied
9. Social Accessibility	3.500	2.121	3.443	1.155	3.489	1.106	3.463	1.136	Satisfied
Overall Mean	**3.000**	**1.257**	**3.004**	**1.056**	**3.041**	**1.096**	**3.019**	**1.073**	**Just right**
Indicators (Taxi Satisfaction)	**Did not indicate N=2**		**Yes, WTP N=185**		**Not WTP N=137**		**Total N= 324**		**Descriptive Interpretation**
	M	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	
1. Air Conditioning	3.500	0.707	3.627	0.919	3.861	0.893	3.725	0.912	Satisfied
2. Cleanliness	3.500	0.707	3.686	0.840	3.869	0.847	3.762	0.845	Satisfied
3. Seat Comfort	4.000	0.000	4.022	0.834	4.102	0.798	4.056	0.816	Very Satisfied
4. Loading and Unloading	4.000	1.414	3.832	1.026	3.891	0.968	3.858	1.001	Satisfied
5. Availability	2.000	1.414	2.870	1.002	2.766	1.073	2.821	1.034	Just right
6. Environment Friendly	3.000	1.414	3.000	0.897	2.905	0.931	2.960	0.912	Just right
7. Safety and Security	3.500	2.121	3.962	0.969	3.912	1.047	3.938	1.006	Satisfied
8. Social Accessibility	3.500	2.121	3.627	0.993	3.650	1.012	3.636	1.003	Satisfied
Overall Mean	**3.375**	**1.237**	**3.578**	**0.935**	**3.620**	**0.946**	**3.595**	**0.941**	**Satisfied**

*Scale Range: (4.50 – 5.00) Very Satisfied, (3.50 – 4.49) Satisfied, (2.50 – 3.49) Just Right, (1.50 – 2.49) Dissatisfied, (1.00 – 1.49) Very Dissatisfied.

The respondents' current satisfaction with the mode of transportation, traditional PUV and taxis, presents a different result when using both public utility vehicles, which provide different comfort and convenience to the commuters. It can be viewed in Table 1 that the total or overall satisfaction for traditional PUV was just right (M=3.019, SD= 1.073). The respondents rated environment-friendly, safe, and security indicators as dissatisfied because the traditional PUV still emits pollution, and no dashcams are installed. Moreover, in a study on the City, air quality dispersion, through spatial distribution of PM10 concentrations with high concentrations, was evident on roads with high vehicular emissions (Ramos & Blanco, 2019). The satisfaction per indicators for traditional PUV, particularly in seat comfort, was rated just right (M=3.111, SD= .0951), suggesting that the commuters were neither satisfied nor dissatisfied. A recent study by Gumasing et al. (2020) mentioned that the traditional PUV cabin passenger is poorly designed and lacks proper ergonomic features, which makes commuters likely to experience discomfort.

The overall mean taxi level satisfaction was rated satisfied with M=3.59, SD=0.941. Respondents are satisfied with commuter preferences regarding air conditioning, cleanliness, loading and unloading, and social accessibility. The taxi's most-rated commuter preference feature is seat comfort (M=4.056, S=0.816). While taxis provide more satisfaction because of their features of comfortable seats, air-conditioned, cleanliness, safety, and social accessibility, commuters only ride the taxi one to two times a month (66%) on average, based on the responses. Commuters rarely use taxis because the fare is expensive compared to traditional PUVs.

Commuters' perception of the importance of a comfortable and convenient travel experience shows how they value the different aspects of comfort and convenience when using transportation and reflects what they consider crucial indicators for their satisfactory travel experience.

Table 2. Commuter's Preferences level of Importance as per willingness to pay

Indicators	Did not indicate N=2		Yes, WTP N=185		Not WTP N=137		Total N= 324		Descriptive Interpretation
	Descriptive Statistics								
Comfort and Convenience	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	
1. Crowdedness	3.000	1.414	3.914	1.124	3.599	1.292	3.775	1.207	Important
2. Air Conditioning	3.000	1.414	4.119	0.877	3.876	1.067	4.009	0.972	Very Important
3. Cleanliness	3.500	0.707	4.514	0.700	4.409	0.845	4.463	0.768	Very Important
4. Seat Comfort	3.000	1.414	4.411	0.725	4.314	0.945	4.361	0.834	Very Important
5. Physical Condition	3.000	1.414	4.368	0.784	4.292	0.901	4.327	0.843	Very Important
6. Loading and Unloading Area	3.000	1.414	4.314	0.827	4.139	1.023	4.231	0.924	Very Important
7. Availability	3.500	2.121	4.459	0.807	4.526	0.832	4.481	0.827	Very Important
8. Environment Friendly	3.500	2.121	4.486	0.815	4.401	0.943	4.444	0.880	Very Important
9. Safety and Security	3.500	2.121	4.654	0.650	4.584	0.660	4.617	0.669	Very Important
10 Social Accessibility	3.500	2.121	4.476	0.774	4.460	0.805	4.463	0.796	Very Important
Overall Mean	**3.250**	**1.626**	**4.371**	**0.808**	**4.260**	**0.931**	**4.317**	**0.872**	**Very Important**

*Scale Range: (4.50 – 5.00) Very Important, (3.50 – 4.49) Important, (2.50 – 3.49) Moderately Important, (1.50 – 2.49) Slightly Important, (1.00 – 1.49) Unimportant.

Table 2 provides results for objective 2, where the commuter preference level of importance is the total or overall mean rating (M=4.317, SD=0.872) of Very important. At most, Safe and security (M=4.617) were rated the highest, second Availability (M=4.81, SD=0.827), the third highest, Social accessibility (M=4.463, SD=0.796), and followed by Environment Friendly (M=4.444, SD=0.888). In the study by St-Louis et al. (2014), commuter perceptions and satisfaction are critical in the transportation sector as researchers and policymakers seek to encourage the widespread use of public and active transportation modes. Knowing what the commuters find more important among their preferences helps understand their attitude toward the comfort and convenient features of PUVs. We can see in Table 2 that commuters willing to pay have slightly higher mean ratings than those unwilling to pay.

Commuters experience many challenges on their way to school or work. Table 3 presents the top five most common challenges or issues. To answer objective 3, the study used frequency and percentage. Respondents were allowed to check all challenges and issues that apply to their experiences.

Table 3. What are the issues and challenges encountered by commuters

Challenges / Issues	Frequency	%	Ranks
1) Longer travel time	205	14%	**5**
2) Waiting time is too long during peak hours	289	20%	**1**
3) Unsafe for waiting passengers along sidewalks	87	6%	6
4) Unpredictability of the arrival of Taxi and PUJs	184	13%	**4**
5) Stressful and Tiring	222	16%	**3**
6) Exposure to Pollution (especially for open jeepneys)	237	17%	**2**
7) Physically inconvenient/not ergonomically design of the PUJ	78	5%	7
8) Not PWD friendly	52	4%	8
9) Unwelcome sexual advances from co-passengers or driver	68	5%	7
	1422	100%	

Table 3 presents the top-most selected challenges or issues the commuters encountered and ranked the following items. First is "the waiting time is too long during peak hours" (20%). Commuters wait longer for public vehicles during peak hours due to the increased volume of passengers who travel simultaneously. This could lead to traffic congestion and even delays for passengers. Other reasons are the limited transport service, capacity, or the scheduling and timing of transportation services. Travel time includes waiting for the vehicle to arrive, consequently becoming the commuters' stressors. As Loo and Tsoi (2024) have noted, travel time is highly associated with the transport stressor of the passengers. Second is "exposure to pollution" (17%), as the city is a tourist destination with more vehicles on the road, resulting in traffic congestion, especially during peak hours. The gasoline combustion in diesel fuel cars, jeepneys, and buses contributes to air pollution. Vehicular emission is the primary source of pollution on the road, as mentioned by Ramos and Blanco (2019). Third is "stressful and tiring" (16%). Stress and being tiresome during and after commutes are the underlying effects of all the challenges and issues mentioned by commuters. Fourth, "longer travel time" (14%) dramatically affects commuters' satisfaction, whereas the study by Humagain and Singleton (2020) found that longer travel time lowers commuters' satisfaction. Fifth is the Unpredictability of the arrival of taxis and PUJs (13%). Commuters also mentioned that based on their verbatim challenges and issues, the over-crowdedness in traditional PUV leads to discomfort or inconveniences with other co-passengers.

Based on the city Land Transportation Franchising and Regulatory Board's current fare matrix as of 2024, traditional PUV is 13 pesos while modern PUV is 14 pesos for regular passengers at a short distance with a 20% discount for students, senior citizens and personnel with Disabilities. Given the current price, the respondents were asked how much additional pesos or pesos they are willing to pay for modern public utility vehicles to ply in the city. Table 4 presents the summary distribution of the commuters' additional pesos for which they are willing to pay for additional Modern PUVs.

Table 4. Additional amount commuters' willingness to pay for Modern PUV

3.3 Amount WTP	Frequency	Percent
Did not indicate	4	1%
NO WTP	162	50%
YES WTP - 1.00	75	23%
YES WTP - 1.50	10	3%
YES WTP - 2.00	39	12%
YES WTP - 2.50	10	3%
YES WTP - 3.00	19	6%
YES WTP - 3.50 Pesos & Above	5	2%
Total	**324**	**100%**

Approximately half of the respondents are not willing to pay (50%), and almost half responded that they are willing to pay (49.8%) for additional Modern PUVs to ply in Baguio City. The common reasons respondents are unwilling to pay, based on their verbatim answers, are that their allowances are insufficient for a fare increase and that traditional PUVs are cheaper and work the same with lower fares. We see in Table 4 that most students are willing to pay 1 peso, which is about (75), 23%, and those who are willing to pay 2 pesos (39), 12% for additional Modern PUV. It was observed in the data that some respondents who live from longer distances, such as Philex (Tuba), Ambiong (La Trinidad), and Taloy Norte (Tuba), are the ones who are willing to pay an additional amount for Modern PUV due to lack of availability and accessibility of other PUVs in the area.

Table 5 shows the result of the Binary Logistic Regression Model, which shows the impact of the independent variable, WTP, on the following dependent variables (Expense, Amount of WTP, Gender, Classification, Pooled household Income, Car ownership, Satisfaction of Jeepney and Taxi, and Importance of PUV).

Table 5. Personal and economic factors affecting the willingness to pay for additional Modern PUV

	B	S.E.	Wald	df	Sig.	Exp(B)
(Monthly Transportation Expense)	.258	.241	1.149	1	.284	1.294
Amount WTP	-4.285	.533	64.505	1	.000	.014
Gender (Did not mention)			1.575	3	.665	
Gender (Female)	-3.061	2.548	1.443	1	.230	.047
Gender (Male)	-.563	1.001	.316	1	.574	.570
Gender (Non-Binary)	-.631	1.014	.387	1	.534	.532
Classification (Did not mention)			2.644	2	.267	
Classification (Student)	2.453	4.144	.350	1	.554	11.622
Classification (Teacher)	2.129	1.311	2.637	1	.104	8.410
Pooled Household Income (DNM)			5.222	5	.389	
Pooled Household Income (10k – 20k)	-1.219	.737	2.737	1	.098	.295
Pooled Household Income (21k – 30k)	-.003	.688	.000	1	.996	.997
Pooled Household Income (31k – 40k)	-.521	.743	.492	1	.483	.594
Pooled Household Income (41k – 50k)	-.226	.867	.068	1	.795	.798
Pooled Household Income (51k – above)	-.756	1.018	.552	1	.458	.469
Do you own a car? (Did not mention)			1.061	2	.588	
Do you own a car? (Yes)	-.404	2.412	.028	1	.867	.668
Do you own a car? (No)	-.430	.420	1.047	1	.306	.651
Overall mean Jeep Satisfaction	.135	.373	.131	1	.717	1.144
Overall mean Taxi Satisfaction	.456	.408	1.248	1	.264	1.578
Overall mean PUV Importance	-.850	.412	4.264	1	.039	.427
Constant	**6.104**	**2.990**	**4.169**	**1**	**.041**	**447.664**

-2 Log likelihood = 176.172. Chi Square test (with 8 DF) = 18.467; corresponding p value is $p < 0.018$. Nagelkerke R Square 0.753

Objective 5 utilizes Binary logistic regression. The BLR Model predicts outcomes and has only two possible values (1 or 0, yes or no) based on the values of a set of predictors (categorical variables). In this case, we establish the Binary Logistic Model to predict whether the commuters are willing to pay for additional Modern PUVs to ply the various routes of Baguio City or not, concerning personal (gender, car, importance, traditional PUV and Taxi satisfaction) and economic factors (expense and income). The equation takes the form:

$$\log\frac{(1)}{1-\mathrm{p}} = \beta 0 + \beta 1\mathrm{X}1 + \beta 2\mathrm{X}2 + \cdots + \beta \mathrm{nXn} \qquad \text{Eq (1)}$$

Where:

p= is the probability of the event occurring. The probability that a commuter is willing to pay for MPUVs.

$\log\frac{(1)}{1-\mathrm{p}}$ = Odds of the event occurring.

β0 = Intercept term, which represents the log-odds of the outcome when all predictors are 0.

β1, β2, ..., βn = Coefficients for each predictor variable, showing the effect of each variable on the log-odds of the outcome.

X1, X2,..., = Predictor variables are the personal (gender, with car, importance, traditional PUV and Taxi satisfaction) and economic factors (expenses, income level)

The Omnibus test of the model coefficient (P=0.000) shows a significant improvement in fit compared to the null model. Therefore, the model is showing a good fit. In another test of goodness of fit, Nagelkerke r square likelihood statistics is 0.753, nearly 1, indicating a good fit of the model. Table 5 presents the probability of falling into the target group if the odds ratio in Exp (B) exceeds 1. Then, the event is likely to occur. The binary logistic model shows the transportation expenses, classifications, and satisfaction with the current mode of transportation, predicting a positive change in the commuters' willingness to pay for modern PUVs, but it is not significant. All other variables are not statistically significant except for "WTP Amount" and "Overall mean of Importance level of PUV."

In Table 5, we can see the model, the additional amount willing to pay was significant (B= -4.285, W=64.50, p= .000, Exp (B) = .014), indicating a trend where decreasing in additional amount the commuters are willing to pay is associated with lesser odds of the willingness to pay. This validates the statement that as the commuters pay less for the additional amount, commuters are willing to pay decreases; the possibility to answer 0 or No is that they are willing to pay for Modern PUV. This finds affirmation in the study of Tepmanee and Siridhara (2020), wherein the level of importance commuters place on their preferences can significantly impact their willingness to pay for public transit. Because most of the respondents are students, the possibility that their answer would be no is that they are willing to pay for an additional amount, but at a minimum, an additional amount in pesos for the modern PUV.

The overall mean on the level of importance of commuter's preferences perceived by the commuters shows a negative coefficient in the Binary Logistic Regression Model and an odds ratio less than 1 (B= - 0.850, W= 4.264, p = 0.39, Exp (B) = 0.427), this means that when respondents find PUV commuters' preferences less important, the odds ratio is closer to 0 or No, which means they are not willing to pay for additional Modern PUV. Alternatively, the more commuters find the PUV important, the more likely they are to pay additional pesos for modern PUVs in the city. There is a direct relationship between the perceived level of importance of the commuters' comfort and convenience preference and their WTP for MPUV. The result confirms the assumption from the research framework on the marginal utility theory that an increase in satisfaction level leads to an increase in WTP, and customers are willing to pay more for better services or goods. Furthermore, in a similar application, Caplis & Lopez's (2020) findings suggest that the higher the satisfaction level of commuters, the greater their willingness to pay for the proposed Automated Guideway Transit.

4.0 Conclusion

The study's main findings on the precise student and teachers' commuters' preferences in Baguio City and demand for modern PUV through the willingness to pay were revealed. By determining their satisfaction level and what comfort and convenience features they perceive as important in Riding PUV. The result shows moderate student and teacher commuters' overall satisfaction levels with jeepneys. They are mostly dissatisfied with the environment-friendly and safe or security features of traditional PUVs or Jeepneys since these are still emitting carbon dioxide because Traditional PUVs are mostly made with a second-hand Deisel engine. Thus, promoting sustainable transportation modes and infrastructure can benefit the environment and individuals of all income levels, contributing to more equitable and sustainable transportation systems.

Regarding the willingness to pay for additional modern PUVs, the binary logistic model shows the transportation expenses, classifications, and satisfaction with the current mode of transportation, predicting a positive change in the commuters' willingness to pay for modern PUVs. However, these indicators are not statistically significant. Conversely, two indicators in the model have a significant relationship with WTP. The first is the additional amount willing to pay, wherein the lesser the additional the commuters have to pay, the chances are that commuters will answer No, they are not willing to pay. The second indicator that yields significant results is the overall level of importance perceived in the preferences of the commuters. The result shows that when commuters perceive the PUV commuters' preferences as less important, they are unwilling to pay for additional PUVs. This means an inverse relationship exists between the perception of the commuter's preferences importance and their willingness to pay for additional modern PUVs. Like the concept, customers pay more when they find value in the service or goods. The higher the satisfaction level of the commuters, the greater their willingness to pay for additional modern PUVs.

The study failed to prove the association between household income and willingness to pay for additional Modern PUV because most respondents were students. Consequently, the study suggests further study on other types of commuters, such as tourists, those working in other industries, colleges, senior citizens, and PWDs. As highlighted in the result, one concern of the commuters is pollution. Thus, the research also recommends the following programs that mitigate the impact of air pollution on people.

a) Promote Sustainable Transport Practices. Create programs for schools to have a car-free day once a month. Less use of private cars reduces carbon emissions and encourages the use of public utility vehicles, which carry more passengers than private cars.
b) Enhance Transport Service Reliability and Frequency. To reduce waiting times, especially during peak hours, and ensure that PUV arrives more frequently and on time, real-time tracking and communication systems should be implemented to minimize delays and provide accurate information to commuters.
c) Additional Modern Public Utility Vehicles. Increase the number of modern PUVs in some locations or barangays with no to fewer PUVs or long distances and limited transport in some city areas.
d) Better public transport system and services for the comfort and convenience of commuters.

Lastly, this research suggests that the city government consider a market-driven policy fare matrix. A market-driven policy fare matrix based on demand for such high-quality services means better commuters' utility or satisfaction, which could be proportionate to their willingness to pay.

5.0 Contributions of Authors

This research is a thesis paper. Author 1 contributed to the conception of the study, data gathering, data analysis, and interpretation, as well as editing revisions. Author 2 contributed to the conception of the study, designed the methodology, and performed data analysis and interpretation.

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7.0 Conflict of Interests

The author declares that no conflict of interest is associated with this research

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The Influence of Digital Skills and Family Financial Resources on Educational Outcomes among Senior High School Students

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Abstract. This study explored how digital skills and family financial resources impacted educational success among senior high school students. Given the increasing role of technology in education and the influence of socioeconomic factors on academic performance, this research addressed the gap in understanding how these variables correlated with students' educational outcomes. Data were collected from senior high school students using a quantitative research design. Pearson correlation analysis was applied to determine the direction and strength of relationships between digital skills, family financial resources, and educational success. With a sample size of 30, the findings revealed a moderate positive correlation between digital skills and financial resources ($r = 0.503$, $p = 0.388$), though it was not statistically significant. Further analysis indicated a weak negative correlation between digital skills and educational success ($r = -0.067$) and a weak positive correlation between financial resources and educational success ($r = 0.400$). None of these correlations reached statistical significance at the 0.05 level. These results suggested potential associations among the variables, although not robust enough to draw definitive conclusions in this study. The lack of statistical significance highlighted the need for further research to clarify these dynamics, incorporating additional factors such as school environment, teacher quality, and student motivation. This study contributed to discussing technology and socioeconomic influences in education, emphasizing the complex interplay affecting students' academic performance.

Keywords: Digital skills; Family financial resources; Educational outcomes; Socioeconomic factors; Technology in education.

1.0 Introduction

Information and communication technology (ICT) has transformed the educational landscape, making digital skills crucial for students to thrive in the modern world. Historically, educational systems focused on traditional literacy, numeracy, and foundational knowledge. However, as digital technology became integral to daily life and work, schools increasingly recognized the importance of digital skills in equipping students for future academic and career demands. For senior high school students, digital skills represented a cornerstone of their ability to access information, complete assignments, and engage in collaborative learning, often with direct implications for academic success.

In addition to digital skills, a student's family's financial resources influence their access to educational tools and learning opportunities. Socioeconomic status (SES) often shapes students' experiences and achievements by determining access to digital devices, internet connectivity, quality learning materials, and extracurricular support. While digital and financial resources have individually been studied for their role in educational success, fewer studies have examined the interplay of these factors in shaping academic outcomes, creating a gap in understanding their combined effects.

The existing literature underscored the importance of both digital skills and financial resources. Research by Sidupa et al. (2018) showed that students with stronger digital skills tended to perform better academically, benefiting from access to information, timely assignment completion, and improved collaboration. Conversely, Schneider and Droege (2014) highlighted how low-income students often faced limited access to technology, leading to challenges in building digital competencies. Family economic status, meanwhile, emerged as a critical determinant in students' educational experiences, influencing access to learning resources, supportive environments, and technology-based opportunities (Pearce, 2020).

More recent studies provided further insights. Jiang et al. (2019) and Harrison, Skryabin, and Chiu (2020) demonstrated a positive correlation between SES and digital proficiency, indicating that students from higher-income families often had stronger digital skills. However, these studies primarily focused on high-income contexts, leaving questions about the applicability of their findings to more diverse socioeconomic settings. Harrison and Skryabin's research also suggested that digital skills could mediate the relationship between family financial resources and academic performance, further supporting the need for a comprehensive analysis of these interacting factors.

This study aimed to fill these gaps by examining the correlations among digital skills, family financial resources, and educational outcomes in a sample of senior high school students. Through this correlational analysis, the research provided insights into how these variables independently and collectively impacted academic success, helping to illuminate the complex ways technology and economic resources influence students' learning experiences. The significance of this study lies in its potential to inform educational strategies and policies, contributing to equitable access to digital literacy and academic resources across diverse student populations.

2.0 Methodology

2.1 Research Design

This study employed a correlational research design to examine the relationships between digital skills, family financial resources, and educational outcomes among senior high school students. A correlational design was selected as it allows for analyzing the strength and direction of associations between these variables without manipulating them, making it well-suited for exploring naturally occurring relationships in educational settings. This design aligned with the study's objectives, as it aimed to determine whether variations in students' digital skills and family financial resources could predict differences in academic performance. By focusing on correlations, the study provided insights into potential associations and patterns among these factors, contributing to a better understanding of their combined impact on students' educational success.

2.2 Research Locale

The study was conducted in San Jose Community High School, Gen. Mariano Alvarez, Cavite. San Jose is a public high school with students from various backgrounds. Therefore, it is a good setting to test the relationship between digital skills and educational outcomes for students with different socioeconomic profiles. The school's availability of digital tools and the demographics of its students offered a representative context to examine the influence of digital skills and other financial resources on academic success.

2.3 Research Participants

The study participants comprised 30 senior high school students from San Jose Community High School in Gen. Mariano Alvarez, Cavite. Participants were selected through simple random sampling from a pool of enrolled students with ICT integration experience in their academic work. The selection criteria focused on students currently enrolled in the senior high school program, aged between 17 and 19, to ensure they represented the age group targeted in this study. Moreover, the school serves a diverse community, which provides a range of family financial backgrounds likely reflective of varied access to digital resources. This variability in background was anticipated to influence outcomes related to digital skills and educational success. Before data collection, ethical standards were observed by obtaining parental consent and student assent to ensure voluntary and informed participation.

2.4 Research Instrument

The study employed a structured questionnaire divided into three main sections. Part 1 measured digital skills using an adapted version of the digital skills assessment tool from Indiwara et al. (2022). This tool was modified to include items relevant to senior high school students' use of digital resources in academic contexts. Part 2 collected information on family financial resources, including household income, parents' employment status, and the availability of educational support resources at home, providing a snapshot of financial factors that may affect students' educational experiences. Part 3 gathered data on students' educational outcomes, including final grades from the last school term, attendance, and participation in extracurricular activities.

To ensure reliability and clarity, the questionnaire was pilot-tested with a small group of students, similar to the study sample. Feedback from the pilot test led to minor adjustments in wording and format to enhance the instrument's clarity. This validation process confirmed the tool's suitability for the target demographic and improved its effectiveness in capturing accurate data.

2.5 Data Gathering Procedure

Data collection was conducted over three weeks, during which the researcher administered the questionnaires directly to senior high school students of San Jose Community High School. Participants were approached through scheduled meetings arranged with school administration, where they received a brief overview of the study's purpose and were reminded that participation was voluntary. The researcher ensured that each participant fully understood how to complete the questionnaire and emphasized that all responses would remain confidential.

To support participant comfort, students were given ample time in a neutral and relaxed environment to complete the questionnaire, ensuring they felt no pressure. Upon completion, the questionnaires were collected directly by the researcher and securely stored to maintain confidentiality. Data were analyzed using statistical software, SPSS. The analysis involved descriptive statistics to summarize participants' digital skills, family financial resources, and educational outcomes. Pearson correlation analysis was then applied to determine the strength and direction of relationships between the variables: digital skills, family financial resources, and educational outcomes. This method allowed for examining potential associations without implying causation, consistent with the study's correlational design. Additionally, reliability testing was conducted on the questionnaire items to confirm consistency in measuring each construct. These statistical methods ensured a rigorous approach to analyzing the data and supported the study's objectives.

2.6 Ethical Considerations

Ethical standards were rigorously maintained throughout the study. Before participation, informed consent was obtained from the student participants and their parents or guardians. Each participant received a clear explanation of the study's purpose and procedures, with assurances of confidentiality and anonymity. Participation was entirely voluntary, and students were informed of their right to withdraw from the study at any time without any consequences.

Data were securely stored, with access limited solely to the researcher, ensuring confidentiality. Findings were reported in aggregate form to further protect participant identity, with no identifiable information presented. The study received ethical approval from the San Jose Community High School research ethics team, and necessary administrative permissions were secured before data collection began.

3.0 Results and Discussion

3.1 Level of Digital Skills among Senior High School Students

The study assessed students' digital skills through self-reported confidence across several ICT-related tasks. Table 1 presents descriptive statistics for each skill indicator. The overall mean score of 3.45 (SD = 0.17) indicates a "neutral" level, suggesting that students generally felt moderate confidence in their digital skills.

Table 1. Descriptive statistics on the level of digital skills among senior high school students

Indicators	Mean	SD	Interpretation
1. I am confident in using computer hardware and software.	3.40	1.248	Neutral
2. I can effectively use the internet to search for information.	3.67	1.093	Agree
3. I am familiar with common office applications (e.g., Word, Excel, PowerPoint).	3.40	1.248	Neutral
4. I can troubleshoot basic computer problems on my own.	3.20	1.215	Neutral
5. I can safely and responsibly use social media platforms.	3.43	1.135	Neutral
6. I can create and share digital content (e.g., videos and presentations).	3.67	1.093	Agree
7. I regularly update my knowledge of ICT tools and trends.	3.37	1.273	Neutral
Overall Mean	**3.44**	**0.168**	**Neutral**

Among the specific skills measured, students showed moderate confidence in using hardware and software (M = 3.40, SD = 1.248) and were neutral regarding their ability to troubleshoot basic computer issues (M = 3.20, SD = 1.215). Interestingly, the students expressed higher confidence in effectively using the internet for information retrieval and creating digital content, with mean scores of 3.67 (SD = 1.093), indicating a more positive response.

These findings highlight areas of strength, such as internet use and digital content creation, while revealing gaps in technical skills, like troubleshooting and regularly updating ICT knowledge. This aligns with Delizo's (2019) findings, which indicated that Filipino students demonstrated average self-assessed digital skills but struggled with more technical tasks. This pattern suggests that while students may feel competent in general digital tasks, they require targeted support for more complex digital skills, indicating a need for comprehensive digital literacy programs.

3.2 Family Financial Resources Concerning Access to ICT Tools and Learning Opportunities

The study also analyzed how family financial resources impacted students' access to educational and digital tools. Table 2 summarizes the relevant indicators. The overall mean of 3.22 (SD = 0.05) suggests that family financial support for ICT tools and educational resources was generally "manageable." Most students reported having access to personal devices (M = 3.30, SD = 1.317) and internet services (M = 3.23, SD = 1.331), although affordability varied.

Table 2. Descriptive statistics on family financial resources concerning ICT tools and learning opportunities

Indicators	Mean	SD	Interpretation
1. Family's ability to afford school-related expenses	3.17	1.341	Manageable
2. Access to personal computers or laptops at home	3.30	1.317	Devices for Personal Use
3. Affordability of Internet services at home	3.23	1.331	Occasionally
4. Affordability of new school-related equipment	3.23	1.331	Occasionally
5. Financial support for education	3.17	1.341	Adequate Support
Overall Mean	**3.22**	**0.053**	**Financially Manageable**

These results imply that while basic ICT access was available to most students, there were limitations. Agaton and Cueto (2021) similarly noted that, despite efforts to improve ICT accessibility, rural students faced challenges accessing reliable internet and modern digital tools. This underscores the need for policies addressing financial and technological support, particularly for under-resourced communities.

3.3 Educational Outcomes of the Senior High School Students

Educational outcomes were measured through GPA, engagement, and ICT usage. Table 3 shows that students had an average GPA score of 3.00 (SD = 1.531), corresponding to a satisfactory performance range of 80%-84%. Their engagement with school activities scored higher, with a mean of 3.53 (SD = 1.252), suggesting moderate involvement.

Table 3. Descriptive statistics on educational outcomes of senior high school students

Indicators	Mean	SD	Interpretation
1. GPA or average grade in the last semester	3.00	1.531	Satisfactory
2. Level of engagement in schoolwork and extracurricular activities	3.53	1.252	Engaged
3. Frequency of ICT tool usage in academic projects and assignments	4.20	1.031	Frequently
Overall Mean	**3.57**	**0.601**	**Above Average**

Notably, ICT usage in academic tasks scored an average of 4.20 (SD = 1.031), indicating frequent use of digital tools. This result aligns with Hori and Fujii's (2021) study, which found that students who frequently engaged with ICT tools achieved better cognitive engagement and academic performance. However, given the variability in GPA scores, additional factors beyond ICT use may influence academic outcomes, suggesting areas for further research on the impact of engagement and extracurricular activities.

3.4 Correlation Analysis Between Digital Skills, Family Financial Resources, and the Educational Outcomes among Senior High School Students

Pearson correlation analysis was conducted to determine relationships between digital skills, family financial resources, and educational outcomes (see Table 4). The correlation between digital skills and family financial resources showed a moderate positive relationship (r = 0.503), though it was not statistically significant (p = 0.388). This suggests that while a higher level of family financial resources might support digital skill development, this association was not strong enough to be conclusive.

Table 4. Analysis of the relationship between digital skills, family financial resources, and educational outcome

Variables		Pearson R	Sig Value	Interpretation	Decision to Ho
1.	Level of Digital skills * Family Financial Resources	0.503	0.388	Not Significant	Accept
2.	Level of Digital skills * Educational Outcome	-0.067	0.957	Not Significant	Accept
3.	Family Financial Resources * Educational Outcome	0.400	0.738	Not Significant	Accept

α = 0.05 Level of Significance

The correlation between digital skills and educational outcomes was weakly negative (r = -0.067) and not statistically significant (p = 0.957), indicating little to no meaningful association. Similarly, the relationship between family financial resources and educational outcomes was weakly positive (r = 0.400) but insignificant (p = 0.738). These findings are consistent with Teves et al. (2024), who found limited evidence linking digital skills directly to higher academic outcomes in high school students.

These results suggest that while digital skills and family resources may contribute to students' education, other factors—such as instructional quality, motivation, and engagement—likely play crucial roles. Badol et al. (2019) observed that financial stability alone does not guarantee academic success, emphasizing the need for a supportive learning environment and motivational factors. This highlights potential limitations in the study, such as sample size and external influences, which may have affected the strength of observed relationships.

The study suggests that while students are confident in basic digital skills, gaps exist in technical competencies that could impact their readiness for advanced ICT use. Addressing these gaps through targeted training programs could enhance overall digital skills. Additionally, since family financial resources moderately support educational needs, expanding government and school initiatives could improve access to digital resources for all students, particularly those in underserved areas.

Future research might explore larger and more diverse samples, examine longitudinal effects of ICT skill development on academic performance, and investigate additional factors, such as teacher support and learning environments, that could mediate these relationships. The current findings provide a foundation for understanding digital and financial influences on education but underscore the complexity of factors contributing to academic success.

4.0 Conclusion

The findings of this study revealed no statistically significant relationships between digital skills, family financial resources, and educational outcomes among senior high school students. Although a moderate positive correlation was observed between digital skills and family financial resources, this association was not strong enough to suggest a meaningful impact. Similarly, weak correlations between digital skills and educational outcomes and between family financial resources and educational outcomes indicate that these factors alone may not directly influence students' academic performance in this sample.

These results contribute to the broader understanding of educational success, underscoring that combining factors beyond digital skills and financial resources likely influences student outcomes. The findings suggest that while digital competencies and family support are important, their effects on academic success may depend on additional elements, such as the school environment, access to quality education, and students' intrinsic motivation. These insights reinforce the complexity of educational outcomes and imply that comprehensive strategies addressing multiple dimensions are necessary to support student achievement effectively.

This study addressed the research questions by assessing digital skills, family financial resources, and their potential associations with educational outcomes. However, limitations such as sample size and the focus on self-reported data may have impacted the results. Future research should consider larger and more diverse samples. It could explore additional factors, such as teacher support and school resources, to better understand the interplay of influences on academic success. Additionally, longitudinal studies might provide insights into how digital skill development and financial stability contribute to educational outcomes over time.

In conclusion, this study highlights the importance of looking beyond individual factors when assessing contributors to academic success. By recognizing the multifaceted nature of educational outcomes, researchers and educators can develop more targeted interventions that integrate various elements, ultimately fostering a more supportive and effective learning environment for students.

5.0 Contributions of Authors

Mr. Jan Angelo G. Morata edited, wrote, supervised, encoded, and analyzed the data. Mr. Jeric M. Rima designed the study and collected the data. Both authors revised, reviewed, and approved the final work.

6.0 Funding

This study received no specific grant from any funding agency.

7.0 Conflict of Interests

There is no conflict or no conflict of interest.

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Enhancing Students' Experience at Sultan Kudarat State University

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Abstract. This study addresses the gap in understanding student satisfaction at Sultan Kudarat State University - Palimbang Campus, focusing on the effectiveness of academic programs and support services. The primary objective is to evaluate the factors influencing student satisfaction and identify areas for improvement. Utilizing a descriptive survey research design, data were collected from 78 undergraduate students enrolled in the Bachelor of Science in Agribusiness and Bachelor of Elementary Education programs. The survey assessed various dimensions of satisfaction, including course content, teaching quality, resource availability, and support services. Results indicate a high level of satisfaction regarding course relevance and faculty accessibility; however, significant areas for enhancement were identified, particularly in practical learning opportunities and resource availability. The study concludes that improving these aspects can lead to higher student engagement and academic performance. Additionally, the research highlights the importance of considering community stakeholders, as their perspectives can provide valuable insights into the broader impact of educational offerings. The study is anchored in the student engagement theory, which posits that the quality of educational experiences and support systems influences satisfaction. By integrating feedback from students and community stakeholders, the university can better align its programs with the needs and expectations of its diverse population, ultimately contributing to the institution's success and the holistic development of its students.

Keywords: Students' satisfaction' Students' experience; State university; Philippines.

1.0 Introduction

Student satisfaction is critical to academic success and institutional effectiveness in higher education. As universities strive to provide quality education, understanding the factors contributing to student satisfaction has become increasingly important. Research indicates that various elements, such as course relevance, teaching quality, and support services, significantly influence students' perceptions of their educational experiences (Oliveria et al., 2024). However, despite the growing body of literature on student satisfaction, there remains a notable gap in research addressing the unique context of Sultan Kudarat State University - Palimbang Campus (SKSU-Palimbang).

Previous studies have highlighted the importance of aligning academic offerings with students' career aspirations and fostering a supportive learning environment (Sutherland et al., 2018). However, many of these studies focus on larger institutions or different educational contexts, leaving a void in understanding how these factors play out in regional universities like SKSU-Palimbang. Furthermore, while student satisfaction is often viewed through the lens of individual experiences, the perspectives of community stakeholders—who are also impacted by the university's offerings—are frequently overlooked. This oversight presents an opportunity to explore how community engagement can enhance educational quality and relevance.

The urgency of this study is underscored by the need for SKSU-Palimbang to adapt its programs to meet the evolving needs of its diverse student population and the surrounding community. By systematically evaluating student satisfaction and incorporating stakeholder feedback, the university can identify critical improvement areas that align with academic and community expectations.

This research aims to assess the satisfaction levels of students enrolled in the Bachelor of Science in Agribusiness and Bachelor of Elementary Education programs, focusing on key factors such as course content, teaching quality, and support services. This study aims to fill the existing gaps in the literature by providing insights specific to SKSU-Palimbang, ultimately contributing to the development of more effective and student-centered educational programs. The significance of this research lies in its potential to inform institutional policies and practices, fostering a more engaging and supportive learning environment that benefits both students and the broader community.

2.0 Methodology

2.1 Research Design

This study employed a descriptive correlational research design to systematically assess student satisfaction and its relationship with academic performance at Sultan Kudarat State University - Palimbang Campus (SKSU-Palimbang). This approach allows for exploring the connections between various factors influencing student satisfaction and their academic outcomes.

2.2 Research Locale

The research was conducted at Sultan Kudarat State University - Palimbang Campus, located in Palimbang, Sultan Kudarat, Philippines. Established in 1990, SKSU-Palimbang serves a diverse student population and offers a range of academic programs, including a Bachelor of Science in Agribusiness and a Bachelor of Elementary Education. The campus environment, characterized by its commitment to academic excellence and community engagement, provides a rich context for exploring student satisfaction. This locale is particularly relevant for this study, as it reflects the unique challenges and opportunities faced by students in a regional university setting.

2.3 Research Participants

The study targeted 78 students enrolled in the Bachelor of Science in Agribusiness and Bachelor of Elementary Education programs. A stratified random sampling technique was utilized to ensure that the sample accurately represented the diverse demographics of the student population, including variations in age, gender, and year level. Participants were informed about the study's purpose, and their voluntary participation was sought, ensuring a representative sample that reflects the broader student body.

2.4 Research Instrument

Data were collected using a structured questionnaire to evaluate key dimensions of student satisfaction, including course content, teaching quality, resource availability, and support services. The questionnaire was developed based on a thorough review of existing literature and validated through a pilot study involving a small group of students. This validation process ensured the reliability and relevance of the survey items, with a Cronbach's alpha coefficient exceeding the acceptable threshold of 0.70, indicating good internal consistency.

2.5 Data Gathering Procedure

The data-gathering procedure involved several systematic steps to ensure the integrity and reliability of the data collected. The structured questionnaire was distributed to the selected participants during scheduled class sessions, ensuring a conducive environment for completion. Participants were provided with clear instructions on how to fill out the questionnaire and were assured of the confidentiality of their responses. Data collection was conducted over two weeks, allowing sufficient time for participants to respond. Upon completion, the questionnaires were collected and analyzed using statistical methods to derive meaningful insights into student satisfaction levels and their correlation with academic performance.

2.6. Data Analysis

Statistical analysis was performed using appropriate software to examine the relationship between student satisfaction and academic performance. Descriptive statistics were calculated to summarize the data, while correlational analyses, particularly the Chi-Square Test of Inequality, were conducted to identify significant relationships between the variables.

2.6 Ethical Considerations

Ethical considerations were paramount throughout the research process. All participants were given informed consent, ensuring they were fully aware of the study's purpose, procedures, and right to withdraw without penalty. Participants were assured of the confidentiality and anonymity of their responses, with data reported in aggregate form to protect individual identities. The study adhered to ethical guidelines for research involving human subjects, and approval was obtained from the Campus Director and Campus Research Coordinator before data collection.

3.0 Results and Discussion

3.1 Profile of Respondents

The socio-demographic profile revealed that most respondents were aged 18-24, with a balanced gender distribution. This demographic diversity is consistent with findings from previous studies, which indicate that age and gender can influence educational experiences and satisfaction levels (Oliveria et al., 2024). Moreover, this demographic is typical in higher education settings, where younger students comprise most of the population (Pascarella & Terenzini, 2005). Understanding the demographic characteristics of students is essential for institutions to tailor their programs and support services effectively. The predominance of students enrolled in the Bachelor of Science in Agribusiness (BSAB) suggests a strong interest in agricultural studies, which may reflect regional economic trends and job market demands (Sutherland et al., 2018). Institutions should consider aligning their offerings with these trends to enhance student engagement and satisfaction.

Table 1. Descriptive statistics of the profile of the respondents

Age	**Frequency**	**Percentage**
Below 20	24	30.77
21-25	50	64.11
26-30	2	2.56
31 and above	2	2.56
Sex		
Male	19	24.36
Female	59	75.64
Course		
Bachelor of Elementary Education	29	37.18
Bachelor of Science in Agribusiness	49	62.82
Year Level		
First year	18	23.08
Second year	21	26.92
Third year	21	26.92
Fourth year	18	23.08

3.2 Level of Student Satisfaction

In terms of Program Offerings

Table 2 analyzes students' ratings regarding various aspects of Sultan Kudarat State University (SKSU) 's program offerings.

Table 2. Descriptive statistics of students' satisfaction with program offerings in terms of program offerings

Items	**Mean**	**Interpretation**
1. I am satisfied with the relevance of the courses offered at SKSU Palimbang Campus.	3.80	Agree
2. I am satisfied with the teaching methods used by the faculty.	3.96	Agree
3. I am satisfied with the availability of faculty members for consultation purposes.	4.89	Strong Agree
4. I am satisfied with the availability of resources (such as textbooks, technology, laboratories, and recreational facilities) to support learning.	3.41	Agree
5. I am satisfied with the support services provided by SKSU (Professional Teaching, Talent, and Skills and Counselling).	3.69	Agree
6. I am satisfied with the overall quality of the program offerings at SKSU.	3.50	Agree
Grand Mean	**3.86**	**Agree**

The results indicate that students perceive the relevance of courses offered positively, with a mean score of 3.80, suggesting that the curriculum aligns well with their academic and career goals. This positive perception implies that SKSU should continue to engage in regular curriculum reviews to ensure it meets the evolving needs of students and industry trends, as Bridgstock (2009) highlighted regarding the importance of aligning educational offerings with career preparation.

The teaching methods employed by faculty received a high mean score of 3.96, indicating student satisfaction with instructional techniques. This finding underscores the importance of effective teaching strategies in promoting student engagement and comprehension, as Hake (1998) noted. To maintain and enhance this positive outcome, SKSU should invest in faculty development programs that encourage innovative pedagogical approaches.

A particularly noteworthy result is the mean score of 4.89 for the availability of faculty members for consultation, reflecting strong agreement that faculty are accessible and supportive. This accessibility fosters a positive learning environment and encourages student engagement. This suggests that SKSU should continue to promote faculty availability and consider implementing structured office hours or mentorship programs to enhance student-faculty interactions further. The significance of faculty support in student success is well-documented, emphasizing the need for approachable faculty to provide guidance and mentorship.

The mean score of 3.41 indicates moderate satisfaction in terms of resource availability, suggesting that while students generally agree on the adequacy of learning resources, there is room for improvement. This finding implies that SKSU should assess and enhance the accessibility of resources such as textbooks, technology, and laboratory facilities to support students' academic performance better. Access to well-equipped facilities is crucial for facilitating learning and research, as noted by Oblinger (2006).

The support services provided by SKSU received a mean score of 3.69, reflecting a positive perception among students regarding the assistance available for their personal and professional growth. However, there may be opportunities to expand these services or improve their visibility to ensure that all students are aware of and can access the support offered (Kakay, 2021). Emphasize the importance of support services in meeting students' unique requirements and fostering a positive learning environment.

Finally, the overall quality of program offerings received a mean score of 3.50, indicating general satisfaction and highlighting potential areas for enhancement. To improve student satisfaction and academic success, SKSU should focus on enhancing resource accessibility, continuously updating the curriculum, and expanding support services. The university can better prepare students for their future careers and ensure a high-quality educational experience by addressing these areas. As suggested by the study's recommendations, continuous evaluation and adaptation of programs and services will be essential in meeting the changing needs of students and the demands of the job market.

In terms of Academic Support

Table 3 presents the frequency and percentage distribution of respondents' ratings regarding academic support at Sultan Kudarat State University (SKSU).

Table 3. Descriptive statistics of students' satisfaction with program offerings in terms of academic support

Items	Mean	Interpretation
1. Program Offerings adequately prepare for future career.	3.78	Agree
2. SKSU Program offerings are enough opportunities for practical application of learning.	3.67	Agree
3. SKSU resources for academic programs (library, laboratory facilities, etc.).	3.73	Agree
4. Students are satisfied with the support services provided by SKSU for the program (Talent and Skills, Professional training, and Counselling).	3.61	Agree
5. The support services are provided by SKSU for academic advising and career services.	3.61	Agree
Grand Mean	**3.68**	**Agree**

The overall grand mean score of 3.68 falls within the "Agree" category, indicating that students generally express satisfaction with the academic support services provided by the university. This finding is significant as it highlights the importance of effective academic support in enhancing student satisfaction and success, aligning with research that emphasizes the role of such services in promoting positive educational outcomes (Tinto, 2012; Pascarella & Terenzini, 2005).

The specific ratings reveal that the highest mean score of 3.78 pertains to the effectiveness of program offerings in preparing students for future careers. This suggests that students feel confident that their academic experiences at SKSU are relevant and beneficial for their professional development. The implication is that institutions must continuously align their curricula with industry needs to ensure that students acquire the necessary skills and knowledge for their future careers (Sutherland et al., 2018).; Bridgstock, 2009). This alignment is crucial, as it enhances student satisfaction and improves employability outcomes (Kakay, 2021).

Additionally, the mean score of 3.67 for the availability of opportunities for practical application of learning indicates that students appreciate hands-on experiences that complement their theoretical knowledge. This finding underscores the necessity for universities to integrate experiential learning opportunities, such as internships and practical projects, into their programs to enhance student engagement and employability (Kolb, 2014; Hake, 1998). Research has shown that the practical application of learning is essential for bridging the gap between theory and practice, thereby fostering the development of real-world skills (Oblinger, 2006).

The mean scores for resource availability, such as libraries and laboratories, at 3.73, and support services for talent and skills development, at 3.61, further reflect a generally positive perception among students. However, the slightly lower academic advising and career services score, also at 3.61, suggests that there may be room for improvement in these areas. Effective academic advising is crucial for student retention and success, as it helps students navigate their educational paths and make informed decisions (Gordon, 2014; Cook, 2009). Therefore, enhancing these support services could improve student satisfaction and outcomes.

Further, the results indicate that while students at SKSU are generally satisfied with the academic support services, specific areas require attention, particularly in academic advising and career services. By addressing these areas and ensuring that program offerings remain relevant and provide practical learning opportunities, SKSU can further enhance the educational experience and support its students' academic and professional success.

Furthermore, despite the positive feedback, the study identified critical areas needing enhancement. Notably, only 60% of students felt satisfied with the availability of learning resources, such as textbooks and online materials. This finding echoes concerns raised in prior research, highlighting that inadequate resources can hinder student learning and satisfaction (Oliveria et al., 2024). Furthermore, 55% of respondents indicated dissatisfaction with the support services provided, particularly regarding academic advising and mental health resources. This aligns with the literature that underscores the necessity of comprehensive support systems to address students' diverse needs (Cerado et al., 2020).

Lastly, the reasons for dissatisfaction were further explored through open-ended responses, revealing common themes such as limited access to practical learning opportunities and insufficient communication between faculty and students. These insights are critical, as they provide actionable areas for improvement. For instance, enhancing practical learning experiences can significantly boost student engagement and satisfaction, as supported by research indicating that hands-on learning opportunities are vital for student success (Sutherland et al., 2018).

3.3 Relationship Between Student Satisfaction and Academic Performance

Table 4 revealed a significant correlation between student satisfaction and academic performance, with higher satisfaction levels associated with better academic outcomes. This finding is consistent with previous studies that demonstrate the positive impact of student satisfaction on academic achievement (Tinto, 2012). The results suggest that when students feel supported and satisfied with their educational experience, they are more likely to engage actively in their studies, seek help when needed, and utilize available resources effectively.

Table 4. Relationship between the level of student satisfaction and the respondents' academic performance.

X^2	Critical value	Level of significance	Remark	Decision
84.79	26.29	5%	Significant	Reject the Null Hypothesis

To address the identified areas of dissatisfaction, it is recommended that SKSU-Palimbang prioritize initiatives to enhance resource availability and support services. This could include increasing access to learning materials, improving academic advising, and fostering better communication between faculty and students. Regular assessments of student experiences and satisfaction levels should also be conducted to ensure that the university remains responsive to the evolving needs of its student body.

Finally, while the study highlights several strengths in the educational offerings at SKSU-Palimbang, it also underscores the necessity for continuous evaluation and enhancement of programs and services. By addressing the identified gaps and fostering a supportive learning environment, the university can significantly improve student satisfaction and academic performance, ultimately contributing to its students' long-term success and well-being.

4.0 Conclusion

This study provides valuable insights into student satisfaction at Sultan Kudarat State University - Palimbang Campus (SKSU-Palimbang), highlighting strengths and areas for improvement within the academic programs. The findings indicate a generally high level of satisfaction among students regarding course relevance and teaching quality, which are critical components of a positive educational experience. However, the study also identifies significant gaps, particularly in resource availability and support services, which must be addressed to enhance student satisfaction and academic performance. One of the key contributions of this research is establishing a clear correlation between student satisfaction and academic performance. This relationship underscores the importance of creating a supportive and responsive educational environment prioritizing student needs. By focusing on enhancing the quality of teaching, ensuring curriculum relevance, and providing adequate support services, SKSU-Palimbang can foster higher levels of student engagement and success.

Future research could expand on this study by incorporating industry settings and employment opportunities as critical factors influencing curriculum offerings. Understanding how well academic programs align with job market demands can provide deeper insights into student satisfaction and career preparedness. Additionally, longitudinal studies could be conducted to track changes in student satisfaction over time, particularly in response to implemented improvements. Moreover, future studies could explore the impact of specific interventions to enhance practical learning opportunities and support services. By capturing a broader range of factors influencing student satisfaction, researchers can contribute to a more comprehensive understanding of the educational landscape at SKSU-Palimbang and similar institutions.

5.0 Contributions of Authors

Author 1 provided invaluable guidance and supervision throughout the data analysis process.
Author 2 was responsible for editing, writing, encoding, and conducting the data analysis for this research.

6.0 Funding

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7.0 Conflict of Interests

There is no conflict of interest associated with this research.

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Technological and Pedagogical Knowledge in Relation to Teaching Proficiency among Criminology Faculty

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Abstract. The transition from traditional face-to-face to online learning as an alternative course during the pandemic shifts different factors toward educators. This study determined the technological and pedagogical knowledge about teaching proficiency among criminology faculty. Quantitative research using a descriptive-correlational design involved 103 respondents from the selected schools offering criminology programs in the province of Misamis Oriental who were selected through purposive sampling. The instruments used in this study were the Technological Survey Questionnaire, the Pedagogical Survey Questionnaire, and the Teaching Proficiency Evaluation adopted from Witting. The findings showed that most of the respondents were young adults, mostly females with master's degree units, served less than five years and had contractual employment. The level of technological knowledge among criminology faculty was average. Somehow, the level of teaching proficiency among criminology faculty was high. The teachers' technical knowledge of word processing was significant to pedagogy, multimedia to course packages, and basic internet to course packages. Integration, communication technology, and assessment were significantly related to mastery of content and pedagogy. Teachers' motivation was significant to the integration and communication technology; instruction was highly significant to mastery of content, pedagogy, and integration and communication technology. The assessment was significant for mastery of content, pedagogy, and ICT integration. It is recommended that further studies be conducted using strong qualitative tools to investigate deep technological and pedagogical knowledge about teaching competence.

Keywords: Pedagogical knowledge; Teaching proficiency; Technological knowledge.

1.0 Introduction

The pandemic has prompted the development of technological learning approaches to address new challenges and meet the Education System's needs. The pandemic has prompted a global exploration of pedagogical learning strategies, aiming to adapt and create a resilient educational system by combining technology-based learning approaches. All levels of education, from the K12 program to the tertiary education system, are mandated to continue educational classes through diverse platforms and are compelled to adopt online learning. The technology based education, particularly online learning highlights the shift towards online education during COVID-19 pandemic. Accordingly, Oke and Fernandes (2020) affirmed that students from public schools in the 21st generation rely mostly on the influence of technology because it permeates every aspect of their interest and helps them learn. As a result, classroom instruction that relies exclusively on technological pedagogy is acceptable delivery in classrooms nowadays.

The challenges and benefits of online learning and technology-based knowledge are examined, and the importance of adapting teaching methods to suit the online environment is examined. This emphasizes the need for teachers to be flexible and skilled in integrating technology into their teaching practices, determining the significance of embracing technology to enhance student learning outcomes and improve the educational experience. Caena and Redecker (2019) confirmed that teachers adapt teaching practices to different societal events to meet students' changing needs, improve their technological skills, and design appropriate learning activities for their technical competency level.

Integrating information and communication technologies (ICT) in the contemporary educational landscape is paramount. This necessitates a pedagogical approach emphasizing collaboration, communication, and developing 21st-century skills. The effective implementation of ICT in education significantly enhances student learning outcomes. To facilitate this, educators must possess a high level of technological literacy, enabling them to employ diverse pedagogical strategies that leverage the potential of ICT (Stein et al., 2020). Baran and Uygun (2016) confirmed that the Technological Pedagogical Content Knowledge (TPACK) concept underscores the importance of fostering creativity, collaboration, and accountability in learning environments. This framework emphasizes the interconnectedness of content knowledge, pedagogical expertise, and technological proficiency, highlighting the crucial role of teachers in navigating the complex landscape of 21st-century education.

Integrating technology in education, which translates those findings into real-world classrooms, particularly in tertiary education, presents a significant challenge. This would exist because the successful implementation of technology often depends on factors beyond the technology that face difficulties in integrating technology into their teaching practices. This can be due to a lack of training, support, or even resistance to change within the teaching culture. Technology integration can sometimes make teachers feel less effective as they grapple with new tools and approaches introduced to them. This can lead to a sense of frustration and a reluctance to embrace technology fully. Bridging these inquiries requires a deeper understanding of the specific challenges teachers face in tertiary education and developing strategies to address these challenges. This includes providing adequate training, support, and resources to help teachers effectively integrate technology into their teaching practices while fostering a more supportive and adaptable teaching culture (De Vera et al., 2020).

The study identifies the technological and pedagogical knowledge about teaching proficiency among criminology faculty, assessing the online teaching infrastructure and teachers' experience in online-based teaching. It aims to assess the impact of teachers' self-belief in technological and pedagogical knowledge during the pandemic on the teaching and learning process. Further, it explores the relationship between teachers' technological and pedagogical knowledge and their teaching proficiency in law enforcement curricula, understanding how teachers' knowledge and beliefs influence their effectiveness in online teaching.

2.0 Methodology

This study utilized the quantitative approach and the correlational design. It is an inferential analysis of identifying the significant relationships of the dependent variables as influenced by the independent variables. The respondents of this study were the criminology faculty members, both full-time and part-time, from the three selected colleges offering criminology courses. Respondents were selected through complete enumeration methods, with 103 total respondents from Tagoloan Community College having 22 criminology faculty, Misamis Oriental Institute of Science and Technology with 13 criminology faculty, and 68 criminology faculty from PHINMA-Cagayan de Oro College that were hired during the first semester school year 2021-2022.

Instruments were adopted and utilized, including the Technological Knowledge Questionnaire to assess faculty members' technical skills, the Pedagogical Knowledge Questionnaire to evaluate their teaching methods, and the Teaching Proficiency Evaluation tool to assess their overall performance. The study goes through proper channeling of approvals before the distribution of questionnaires to Criminology faculty members via Google Form Survey. Data collection took one to two weeks, with responses tallied using MS Excel for analysis. Through permission from the school's Department Head of Office for teachers' evaluation, confidentiality is ensured through data coding, electronic storage with password protection, and hard copy storage privacy and confidentiality.

Considering the pre-engagement procedure, the conduct of the study should receive all approved letters from the appropriate authorities, including the participant's full consent. Throughout the study, it ensures compliance with the Data Privacy Act of 2012 to protect personal data and other information. The researchers prioritized the dignity of the participants, keeping all information confidential and not disclosing any names to the public.

3.0 Results and Discussion

3.1 Demographic Profile of Respondents

Table 1 presents the demographic profile of the Criminology faculty, indicating that the majority of the respondents are a young, predominantly female group with a majority holding master's degree units and have been in for 1-5 years of service and are employed on a contractual basis. Despite their varied backgrounds, the faculty members exhibit resilience and believe in their teaching abilities. They consider demographic areas as crucial in their teaching pedagogy and proficiency as teachers, enabling them to adapt to changing learning modalities like technology and ensure quality academic performance for their students. The study on teaching proficiency and its effectiveness among faculty members confirmed the importance of age, gender, education, and experience as demographic key factors in enhancing teaching effectiveness (Aban et al., 2020).

Table 1. Descriptive statistics of the profile of the respondents

Variables	Frequency	Percent
Age		
20-25 years old	4	4.00
26-30 years old	25	24.00
31-35 years old	21	20.00
36-40 years old	13	13.00
41-45 years old	13	13.00
46-50 years old	12	12.00
51 years old and above	15	14.00
Sex		
Male	42	41.0
Female	61	59.0
Educational Attainment		
Bachelor’s Degree Holder	17	16.00
With Master’s Degree Units	48	47.00
Master’s Degree Holder	22	21.00
With Doctoral Units	12	12.00
Doctoral Degree Holder	4	4.00
Length of Service		
1-5 years	56	54.00
6-10 years	17	17.00
11-15 years	24	23.00
16-20 years	1	1.00
21-25 years	5	5.00
26-30 years	-	
Type of Employment		
Contractual	74	72.00
Probationary	9	9.00
Regular	20	19.00

3.2 Technological Knowledge Among Criminology Faculty

Table 2 on the level of assessed technological knowledge of criminology faculty members reveals an average overall mean of 3.15 and a standard deviation of 0.65. This demonstrated proficiency in word processing; they showed average skills in basic internet use, spreadsheet preparation, presentations, and multimedia applications. It suggests further training to enhance faculty members' technological skills, especially in areas beyond word processing. The study already confirmed that the areas of technology have revolutionized education across various areas, such as e-learning, interactive learning, and pedagogical and technological aspects. According to Farros (2019), improving the educational process is closely linked to pedagogical knowledge and its application in modern virtual learning environments.

Table 2. Descriptive statistics of the level of technological knowledge among criminology faculty

Construct	Mean	SD	Remark
Basic Internet	3.32	0.48	Average
Word Processing	3.41	0.52	High
Spreadsheets	2.98	0.77	Average
Presentation	3.16	0.71	Average
Multimedia	2.89	0.76	Average
Overall	**3.15**	**0.65**	**Average**

Scale: 4.21-5.00 (Very High); 3.41-4.20 (High); 2.61-3.40 (Average); 1.81-2.60 (Low); 1.00-1.80 (Very Low)

3.3 Pedagogical Knowledge Among Criminology Faculty

Table 3 shows the level of pedagogical knowledge that demonstrates proficiency in motivating students. Further development is needed to set clear objectives, deliver effective instruction, and assess student performance. This highlights the faculty's adaptability to online learning during the pandemic. It also emphasizes the need for continued professional development to enhance their pedagogical skills and meet the evolving demands of online education. De Vera et al. (2021) believe pedagogical competence is essential for quality education. This involves teachers' ability to create effective learning environments, design activities for different learning styles, and employ appropriate teaching strategies.

Table 3. Descriptive statistics of the level of pedagogical knowledge among criminology faculty

Construct	Mean	SD	Remark
Objectives	3.29	0.51	Average
Motivation	3.49	0.48	High
Instruction	3.39	0.34	Average
Assessment	3.30	0.37	Average
Overall	**3.37**	**0.43**	**Average**

Scale: 4.21-5.00 (Very High); 3.41-4.20 (High); 2.61-3.40 (Average); 1.81-2.60 (Low); 1.00-1.80 (Very Low)

3.4 Teaching Proficiency Among Criminology Faculty

Table 4 presents the level of teaching proficiency among Criminology faculty, who possess a high level of teaching proficiency and demonstrate strong skills in content mastery, pedagogy, ICT integration, and assessment. However, they showed average proficiency in developing comprehensive course packages aligned with the institution's vision, mission, and goals. This draws an essential faculty's dedication to delivering quality instruction and their ability to adapt to online learning, which recommends development in creating course packages that fully integrate institutional objectives. Aslan and Zhu (2017) state that a good attitude toward educational technology consistently indicates proficient teaching skills. Effective integration of educational technology into teaching and learning requires a positive mindset.

Table 4. Descriptive statistics of the level of teaching proficiency among criminology faculty

Construct	Mean	SD	Remark
Course Package	3.39	0.36	Average
Mastery of Content	3.59	0.35	High
Pedagogy	3.44	0.40	High
ICT integration	3.42	0.44	High
Assessment	3.56	0.47	High
Overall	3.48	0.40	High

Scale: 4.21-5.00 (Very High); 3.41-4.20 (High); 2.61-3.40 (Average); 1.81-2.60 (Low); 1.00-1.80 (Very Low)

3.5 Difference in the Teaching Proficiency Among Criminology Faculty when Grouped by Profile

Table 5 presents the significant difference in the teaching proficiency among the Criminology Faculty when grouped by Profile, which showed significant differences in teaching proficiency related to age and gender concerning course packages, content mastery, pedagogy, ICT integration, and assessment. As it aged in the experience, this was viewed as more credible than younger instructors due to their years of experience and knowledge in the field. This perception often led to age-related experiences being seen as factors that affect the teaching proficiency of the instructor, ultimately influencing students' perceptions of their abilities. This implies the importance of recognizing and valuing the expertise that comes with age in certain professions. Semlak and Pearson (2008) affirmed that older instructors, with their wealth of experience, are perceived as more credible by students than younger instructors. This credibility stems from their deeper understanding of the subject matter and effective teaching methods developed over time. As a result, students tend to have higher classroom satisfaction levels and success rates when taught by experienced instructors.

Table 5. Difference in the teaching proficiency when grouped by profile

5.1 Age and:			
Course Packages	F = 2.281*	0.042	Significant
Mastery of Content	F = 0.881	0.512	Not Significant
Pedagogy	F = 1.963	0.078	Not Significant
ICT Integration	F = 1.472	0.196	Not Significant
Assessment	F = 0.608	0.724	Not Significant
5.2 Sex and:			
Course Packages	t = 0.015	0.988	Not Significant
Mastery of Content	t = 2.171*	0.032	Significant
Pedagogy	t = 0.951	0.344	Not Significant
ICT Integration	t = 0.564	0.574	Not Significant
Assessment	t = 2.504*	0.014	Significant
5.3 Educational Attainment and:			
Course Packages	F = 0.686	0.603	Not Significant
Mastery of Content	F = 0.779	0.541	Not Significant
Pedagogy	F = 1.601	0.180	Not Significant
ICT Integration	F = 0.498	0.737	Not Significant
Assessment	F = 1.600	0.180	Not Significant
5.4 Length of Service and:			
Course Packages	F = 0.681	0.606	Not Significant
Mastery of Content	F = 0.545	0.703	Not Significant
Pedagogy	F = 0.738	0.568	Not Significant
ICT Integration	F = 1.127	0.348	Not Significant
Assessment	F = 0.533	0.712	Not Significant
5.5 Type of Employment and			
Course Packages	F = 0.628	0.536	Not Significant
Mastery of Content	F = 1.884	0.157	Not Significant
Pedagogy	F = 0.674	0.512	Not Significant
ICT Integration	F = 0.001	0.999	Not Significant
Assessment	F = 0.396	0.674	Not Significant

Legend: Relationship Strength Scale: 1.00 (Perfect); 0.80-0.99 (Very Strong); 0.60-0.79 (Strong); 0.40-0.59 (Average); 0.20-0.39 (Weak); 0.01-0.19 (Very Weak); 0.00 (No Relationship)
Probability Value Scale: **p<0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant)

3.6 Relationship Between Technological Knowledge and Teaching Proficiency Among Criminology Faculty

Table 6 presents the significant relationship between Criminology faculty's technological knowledge and their teaching proficiency. This shows that the faculty members skilled in basic internet knowledge showed a significant relationship to the course package and provided significant value in the mastery of content and its teaching pedagogy. It also provides that word processing enhanced pedagogy and multimedia correlates to course package delivery. This implication proves that incorporating technology into teaching practices provides the potential for positive learning outcomes. Obar (2014) claimed that using technology in the classroom for teaching and learning can positively impact students' learning in all areas: cognitive, affective, and psychomotor. The study recommends encouraging the use of technology in education.

Table 6. Relationship between technological knowledge and teaching proficiency

6.1 Basic Internet and:				
Course Packages	0.249*	Weak	0.011	Significant
Mastery of Content	0.325**	Weak	0.001	Highly Significant
Pedagogy	0.263**	Weak	0.007	Highly Significant
ICT Integration	0.218*	Weak	0.027	Significant
Assessment	0.202*	Weak	0.041	Significant
6.2 Word Processing and:				
Course Packages	0.004	Very Weak	0.971	Not Significant
Mastery of Content	0.161	Very Weak	0.105	Not Significant
Pedagogy	0.206*	Weak	0.037	Significant
ICT Integration	0.171	Very Weak	0.084	Not Significant
Assessment	0.066	Very Weak	0.509	Not Significant
6.3 Spreadsheets and:				
Course Packages	0.061	Very Weak	0.540	Not Significant
Mastery of Content	0.026	Very Weak	0.797	Not Significant
Pedagogy	0.132	Very Weak	0.183	Not Significant

ICT Integration	0.151	Very Weak	0.127	Not Significant
Assessment	0.135	Very Weak	0.173	Not Significant
6.4 Presentation and:				
Course Packages	0.092	Very Weak	0.357	Not Significant
Mastery of Content	0.053	Very Weak	0.593	Not Significant
Pedagogy	0.086	Very Weak	0.385	Not Significant
ICT Integration	0.175	Very Weak	0.076	Not Significant
Assessment	0.050	Very Weak	0.614	Not Significant
6.5 Multimedia and:				
Course Packages	0.208*	Weak	0.035	Significant
Mastery of Content	0.030	Very Weak	0.765	Not Significant
Pedagogy	0.106	Very Weak	0.286	Not Significant
ICT Integration	0.184	Very Weak	0.063	Not Significant
Assessment	0.008	Very Weak	0.933	Not Significant

Legend: Relationship Strength Scale: 1.00 (Perfect); 0.80-0.99 (Very Strong); 0.60-0.79 (Strong); 0.40-0.59 (Average); 0.20-0.39 (Weak); 0.01-0.19 (Very Weak); 0.00 (No Relationship)

Probability Value Scale: **p<0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant)

3.7 Relationship Between Criminology Faculty's Pedagogical Knowledge and Teaching Proficiency

Table 7 revealed a significant relationship between criminology faculty's pedagogical knowledge and their teaching proficiency, which showed a significant relationship in the motivation variables towards ICT integration. It demonstrates that the instruction variable correlates highly with mastery of content, pedagogy, and ICT integration. The assessment also proves a significant relationship to the mastery of content and is highly significant to pedagogy and ICT integration. This implies a strong correlation was found between the variables presented, which indicates areas that drive improvements in teaching strategies and student engagement.

This suggests that the criminology instructor's key success areas to effectively achieve the teaching process considering knowledge and proficiency are shown through the skills and knowledge of using digital technologies in education. (Jala, 2019). These findings imply the importance of pedagogical expertise in delivering quality instruction, adapting teaching practices based on assessment outcomes and utilizing technology effectively in the classroom. Positively implies that educational technology in the teaching and learning process validates teachers' proficiency and positive attitude toward technology (Panigrahi et al., 2018).

Table 7. Relationship between pedagogical knowledge and teaching proficiency

7.1 Objectives and:				
Course Packages	0.077	Very Weak	0.441	Not Significant
Mastery of Content	0.045	Very Weak	0.651	Not Significant
Pedagogy	0.090	Very Weak	0.367	Not Significant
ICT Integration	0.040	Very Weak	0.686	Not Significant
Assessment	0.088	Very Weak	0.375	Not Significant
7.2 Motivation and:				
Course Packages	0.034	Very Weak	0.736	Not Significant
Mastery of Content	0.168	Very Weak	0.090	Not Significant
Pedagogy	0.152	Very Weak	0.126	Not Significant
ICT Integration	0.203*	Weak	0.040	Significant
Assessment	0.174	Very Weak	0.080	Not Significant
7.3 Instruction and:				
Course Packages	0.084	Very Weak	0.399	Not Significant
Mastery of Content	0.295**	Weak	0.002	Highly Significant
Pedagogy	0.324**	Weak	0.001	Highly Significant
ICT Integration	0.355**	Weak	0.001	Highly Significant
Assessment	0.166	Very Weak	0.093	Not Significant
7.4 Assessment and:				
Course Packages	0.072	Very Weak	0.468	Not Significant
Mastery of Content	0.221*	Weak	0.023	Significant
Pedagogy	0.290**	Weak	0.003	Highly Significant
ICT Integration	0.267**	Weak	0.006	Highly Significant
Assessment	0.099	Very Weak	0.319	Not Significant

Legend: Relationship Strength Scale: 1.00 (Perfect); 0.80-0.99 (Very Strong); 0.60-0.79 (Strong); 0.40-0.59 (Average); 0.20-0.39 (Weak); 0.01-0.19 (Very Weak); 0.00 (No Relationship)

Probability Value Scale: **p<0.01 (Highly Significant); *p<0.05 (Significant); p>0.05 (Not significant)

4.0 Conclusion

The majority of the Criminology faculty are young adult women with master's degrees units, and they have been working as contractual employees for between one and five years. They possess a high level of teaching proficiency and average technological and pedagogical knowledge. This teaching proficiency is significantly valued in age and its course package, sex, mastery of the content, and assessment value. Furthermore, the level of technological knowledge and teaching proficiency on basic internet knowledge is highly correlated to variables of mastery of the content and pedagogy. Somehow, it also showed a significant relationship to the course package, ICT integration, and assessment. Also, the variables of word processing knowledge are significantly related to its pedagogy and multimedia to its course package mastery.

Pedagogical knowledge and teaching proficiency showed a strong relationship with motivation, while the variable of ICT integration toward instruction and assessment showed a highly significant relationship. Both the methodology and the topic mastery have a strong significant relationship between teaching and assessment, and this proved to have a significant impact on each variable. With the findings, the Criminology faculty should prioritize ongoing professional development and related training on technological strategy engagement to foster a dynamic and effective learning environment. This includes actively participating in ICT-integrated workshops, training programs, webinars, and pursuing advanced studies to refine their teaching skills and stay abreast of emerging pedagogical approaches. As gleaned, the Higher Education Institutions (HEIs) supporting this endeavor promote programs that regularly organize seminars and webinars to enhance pedagogical knowledge and equip faculty with the necessary technological skills to integrate technology effectively into classroom engagement.

5.0 Contributions of Authors

The authors contributed equally to each part of the study. The writers approved the final works. Reviews were done as a research team to ensure accuracy and consistency. The collaborative effort between the authors resulted in a comprehensive and well-rounded study that was ready for publication.

6.0 Funding

Any organization did not fund this research. Therefore, the researchers had complete control over the study design and results.

7.0 Conflict of Interests

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

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Efficiency on the Move: Assessing Operation Management Practices and Developing a Strategic Plan for Bus Companies in a Philippine Provincial District

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Abstract. This study assessed bus companies' operation and management practices in a provincial district in the Philippines, focusing on human resource management, facility management, safety protocols, and reservation systems. A descriptive-quantitative approach was employed to gather data from bus personnel, operators, and commuters, providing a comprehensive evaluation of the effectiveness of these practices. The research findings reveal significant operational inefficiencies in bus companies within the provincial district, particularly in safety practices, facility management, and human resource practices. Issues such as the lack of safety tools, poor maintenance schedules, and inadequate training for personnel lead to accidents and poor customer service, while outdated technological practices, like the absence of an online reservation system, further hinder operational effectiveness. Despite bus operators being content with current practices, commuters and personnel express dissatisfaction, highlighting a disconnect between stakeholders. Overall, the study underscores the need for safety, human resources, and facility management improvements to enhance operational effectiveness, customer satisfaction, and business performance. As a result, this study facilitated a collaboration with industry experts to create a comprehensive strategic operations management plan that contains the implementation of robust safety protocols, the establishment of a comprehensive facility management system, continuous staff training programs, the adoption of modern technological solutions, and enhancement of stakeholder communication channels which is progressively adopted by bus companies A, B, and C.

Keywords: Bus companies; Operation management; Public transportation.

1.0 Introduction

Public transportation, particularly buses, is essential for societal mobility, offering accessible and affordable travel to destinations like schools and workplaces. In the studied provincial district, various bus companies operate ordinary and air-conditioned buses servicing routes to the National Capital Region (NCR) and surrounding areas. Despite their importance, challenges such as increasing commuter demand, operational inefficiencies, and safety concerns necessitate an examination of bus companies' management practices.

The importance of an efficient and reliable transportation system is well-established in research. Olamigoke and Emmanuel (2013) highlight that a functional transport system drives local economic development by facilitating access to markets and enhancing productivity across various sectors. Transportation is vital for economic growth, as it opens avenues for trade and urbanization. Gallego, Gamboa, and Luistro (2015) also emphasize the role of buses in promoting economic mobility and societal development, while noting the need for ongoing improvements in public transportation to meet the demands of a growing population (Munzilla et al., 2013; Manalo, 2018).

Population growth during peak periods, especially holidays, increases pressure on bus services, with Capulong et al. (2018) noting a 26% rise in Christmas trips. This demand leads to congestion at bus stations, particularly in Pasay City, where 3,000 passengers crowd terminals daily (Boquet, n.d.). Delays are common due to slow bus turnover and fully booked routes (CNN Philippines, 2016). Additionally, road safety is a significant challenge, with high accident rates linked to lax enforcement and older vehicles (Meixler, 2018). In 2015, the Philippine Statistics Authority reported 10,012 traffic fatalities, prompting temporary bus operation suspensions by the LTFRB.

Despite challenges, the bus industry has seen positive changes over the past decade. Major manufacturers are producing eco-friendly, safer vehicles designed for public transportation (Casayuran, 2019) and advancements in online reservation systems and mobile applications are transforming the public transportation landscape, addressing some operational challenges faced by bus companies (Hynes, 2016).

In the studied provincial district, bus operations face risks from a high-accident highway, congestion during peak periods, and overloading, alongside the need to evaluate bus stop conditions and personnel performance. Moreover, there are limited studies exist on local operational practices, commuter experiences, and the effectiveness of safety measures. Thus, this study aims to assess the operational management practices of local bus companies, analyze current methods, and propose a strategic operation management plan to address inefficiencies, safety concerns, and rising demand. The findings are expected to enrich discussions on public transportation management and offer practical insights for similar contexts.

2.0 Methodology

2.1 Research Design

This study employed a descriptive-quantitative research methodology to assess the operations management practices of bus companies operating within a provincial district in the Philippines. The descriptive approach was deemed appropriate for this research as it facilitated an accurate representation and detailed examination of the operational practices among selected bus companies by means of inferential questions. This method is suitable for identifying and documenting facts, enabling a comprehensive interpretation of data relevant to the operations management context.

2.2 Research Participants

The study targeted three groups of respondents: commuters, bus personnel, and bus operators. Commuters were considered key respondents due to their role as customers, while bus personnel (drivers, conductors, and employees) and bus operators provided insights from an operational perspective. The total sample size was 750 respondents, consisting of 300 commuters and 450 bus personnel (150 drivers, 150 conductors, and 150 other employees, including operators). The study used random stratified sampling to select major bus operators within the provincial district, ensuring a representative sample for accurate insights into the bus industry. Convenience sampling was used for respondent selection. Given the transient nature of commuters and bus personnel at terminals and bus stops, willing and available participants were chosen during the data collection period. Bus employees and operators, whose schedules varied, were surveyed according to a pre-arranged schedule provided by the operations manager of each participating bus company.

2.3 Research Instrument

The research instrument was a self-made structured questionnaire designed based on the research objectives and informed by an extensive literature review. The questionnaire was divided into three parts. Part 1 gathered demographic details such as the type of respondent (commuters and bus personnel), age, gender, educational background, and occupation. Part 2 focused on four key dimensions of operations management: safety, reservation systems, facilities, and human resource management. Each dimension included at least five statements designed to evaluate the extent of operations management practices employed by the bus companies. Part 3 assessed the perceived effectiveness of the identified operations management practices. Before formal data collection, the structured questionnaire underwent Lawshe's content validity assessment, improving its CVI score from 0.70 to 0.90, indicating strong expert consensus and a pilot test with 15 non-target respondents confirmed the questionnaire's reliability, yielding a Cronbach's alpha of 0.875, demonstrating high internal consistency.

2.4 Data Gathering Procedure and Analysis

Following the pilot test, a consent letter and the questionnaire were sent to bus company administrators (e.g., owners, operations managers, and human resource heads) for review and approval. The researcher administered the survey in person upon receiving the consent of the participating companies. Respondents completed the questionnaire within 5 to 10 minutes. After data collection, the responses were processed and analyzed using IBM SPSS Statistics 21, with results further validated through manual checking by the researcher and a statistician.

3.0 Results and Discussion

3.1 Background Characteristics of Respondents

Commuters

Table 1 provides the background characteristics of the commuters of the bus companies in the studied provincial district.

Table 1. Background characteristics of commuters

Profile	Detail	Frequency	Percentage
Type of Commuter	Walk-in	300	100%
Age	Below 25-30 years old	254	84.7%
	31-40 years old	27	9%
	41.50 years old	15	5%
	51 and above years old	4	1.3%
Sex	Male	155	51.7%
	Female	145	48.3%
Educational Background	Elementary graduate	1	0.3%
	High School graduate (Old Curriculum)	29	9.7%
	Senior High School graduate	49	16.3%
	Vocational-Technical	18	6%
	College Undergraduate	94	31.3%
	Bachelor's Degree	102	34%
	Master's Units	3	1%
	Master's Degree	1	0.3%
	Others	3	1%
Occupation	Student	16	5.3%
	Private Employee	7	2.3%
	Government Employee	6	2%
	None	271	90.3%

The information reveals that there is no reservation system within the bus companies involved. Moreover, the data gathered suggest that most of the commuters are young male job seekers with a bachelor's degree who utilize buses to traverse to nearby municipalities or cities that may have job opportunities or who are just recently unemployed and are going home to their respective towns, given that contractual jobs are still vastly used by companies in the country. Information from the Urban Institute supports such claims, given that job seekers and newly hired employees' distance from work to home and vice versa is at least 6.3 miles or 10.2 km (Bliss, 2019). On the side of contractualization in the Philippines, up to this date, there is no viable law to extinguish 'endo' in the archipelago (Generalao, 2019). Furthermore, the information collected may indicate that 31 and above years old have master's units up to doctoral degrees, and private and government employees may prefer another mode of transport (e.g., UV Express, carpooling, etc.) or may have a private vehicle that they use to travel to their respective destination.

Bus Personnel and Operators
Table 2 shows the background characteristics of bus personnel and operators.

Table 2. Background characteristics of bus personnel and operators

Profile	Detail	Frequency (%)				
		Driver	Conductor	Employee	Operator	Total
Age	Below 25 – 30 years old	11 (7.3%)	77 (51.3%)	58 (41.4%)	2 (20%)	148
	31 – 40 years old	111 (74%)	55 (36.7%)	53 (37.9%)	3 (30%)	222
	41 – 55 years old	28 (18.7%)	18 (12%)	29 (20.7%)	5 (50%)	80
Sex	Male	149 (99.3%)	150 (100%)	65 (46.4%)	7 (70%)	371
	Female	1 (0.7%)		75 (53.6%)	3 (30%)	79
Educational Background	Elementary graduate	12 (8%)	11 (7.3%)			23
	High School graduate (old curriculum)	26 (17.3%)	60 (40%)			86
	Vocational-Technical	112 (74.7%)	79 (52.7%)	41 (29.3%)		232
	Bachelor's Degree			89 (63.6%)	9 (90%)	98
	Master's Units			10 (7.1%)	1 (10%)	11

The data suggests that the bus companies studied continue to traditionally prefer male drivers and conductors, as this has been a norm in the bus industry for decades. Furthermore, these companies may pair experienced drivers with younger conductors to mentor them on various aspects of road operations (e.g., routes, specific stops, driving, etc.) and to help bridge the generational gap within the workplace. Additionally, many employees may have been offered scholarships by their respective companies to pursue the National Certificate III (NCIII) in Driving, issued by the Technical Education and Skills Development Authority (TESDA). However, the rollout of such scholarships may still be ongoing.

Historically, the profession has been male-dominated for many years (Couto et al., 2011). Moreover, TESDA has actively encouraged bus companies, drivers, and conductors to obtain the NC III Driving certification, occasionally offered with free training and assessments nationwide (TESDA, 2015). In contrast, the bus companies studied tend to prefer middle-aged females, often with educational backgrounds in business and management, for operations, particularly clerical functions (e.g., documentation, finance, accounting, etc.). Male and some female employees with technical-vocational qualifications are typically deployed as bus inspectors or mechanics, while those with postgraduate units may hold managerial positions or lead specific divisions.

Gershon (2015) explains that employers have favored female employees for clerical roles for decades due to various perceived advantages, such as efficiency and a higher tolerance for routine tasks, which aligns with the data collected. Furthermore, the father is often the key figure in the operational management of family-owned bus companies. Operators aged between 25 and 40 are likely children or siblings of the primary operators, being groomed as successors and receiving mentorship from their parents or relatives.

3.2 Operation Management Practices

Safety Practice
Table 3 illustrates the extent of safety practices by the studied bus companies. It may suggest that the buses of the stated companies have minimal or no visible emergency tools (e.g., first aid kits, fire extinguishers, emergency exits, etc.). Data from 2014, 2015, and 2019 strongly support the findings, indicating that road accidents resulting in fatalities have steadily increased over time (Corrales, 2014; Meixler, 2018; Ibay et al., 2019; MDRRM, 2019). The lack of adequate emergency tools on buses, particularly during critical moments such as accidents, has exacerbated the fatality rate among severely injured passengers and bus personnel. This includes the absence of immediate first aid, challenges evacuating injured passengers and personnel, and difficulties in extinguishing fires.

On the other hand, there is a possibility that security tools on buses, such as CCTV cameras and dashboard cameras, are visible and properly utilized by drivers and conductors. Additionally, it is plausible that the buses operating within the district are either hybrid (HV) or electric vehicles (EV), or at least the latest diesel-powered buses available in Asia (Olchondra, 2013; Shah, 2018; Casayuran, 2019).

Table 3. Descriptive statistics of the assessment of safety practices

Indicators	Commuter		Driver		Conductor		Employee		Operator	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
1. The bus company uses security tools in their buses (CCTV cameras, dashboard cameras, GPS, etc.)	3.40	Much extent	3.86	Much extent	4.48	Great extent	3.70	Much extent	4.10	Much extent
2. The bus company uses safety tools (seatbelts, handrails, etc.)	3.23	Moderate extent	3.76	Much extent	4.48	Great extent	4.00	Much extent	4.00	Much extent
3. The bus company uses emergency tools in their buses (first aid kits, emergency exits, fire extinguishers, etc.)	2.71	Moderate extent	3.59	Much extent	4.48	Great extent	3.41	Much extent	3.90	Much extent
4. Buses are checked in terminals before departure and upon arrival (brake system, fuel level, tire condition, etc.)	2.94	Moderate extent	3.86	Much extent	4.48	Great extent	3.70	Much extent	3.90	Much extent
5. Drivers and conductors are well-rested and in good health before driving.	3.31	Moderate extent	3.86	Much extent	4.48	Great extent	3.70	Much extent	4.10	Much extent
Weighted Mean	**3.11**	**Moderate extent**	**3.78**	**Much extent**	**4.48**	**Great extent**	**3.70**	**Much extent**	**4.00**	**Much extent**

Note: 4.2 – 5.0 Practice to a great extent, 3.4 – 4.19 Practice to a much extent, 2.6 – 3.39 Practice to a moderate extent, 1.8 – 2.59 Practice to a less extent,1.0 – 1.79 Not Practice at all (NPAA)

Reservation Practices

Table 4 discloses the extent of reservation practices of the bus companies in the studied provincial district. As illustrated, no reservation system practice exists within the studied provincial district. Data from Table 2, specifically the result of the type of commuters that resulted in a 100% walk-in response, may strongly support such claims. In addition, PinoyTravel, the only online website that caters to reserving bus seats in the country, may not be affiliated with the bus companies included in the study (Hynes, 2016).

Table 4. Descriptive statistics of the assessment of reservation practices

Indicators	Commuter		Driver		Conductor		Employee		Operator	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
1. The bus company has an online reservation for bus seating	1.98	Less extent	2.02	Less extent	1.96	Less extent	1.87	Less extent	1.00	Not Practice
2. The bus company has a mobile application for reservation & and availability of seats	1.98	Less extent	2.02	Less extent	2.44	Less extent	1.58	Not Practice	1.00	Not Practice
3. The bus company has a mobile application/online website for schedules of departure and arrival of buses	2.03	Less extent	2.36	Less extent	2.23	Less extent	2.21	Less extent	1.00	Not Practice
4. The bus company uses different ticketing apparatuses for convenience (ticket machine, stubs, card, etc.)	2.63	Moderate extent	3.47	Much extent	3.02	Moderate extent	2.58	Less extent	1.90	Less extent
5. The bus company uses different payment methods for convenience (cash, QR code, load card, debit/credit card, etc.)	2.22	Less extent	3.47	Much extent	2.96	Moderate extent	2.00	Less extent	1.00	Not Practice
Weighted Mean	**2.16**	**Less extent**	**2.66**	**Moderate extent**	**2.52**	**Less extent**	**2.04**	**Less extent**	**1.18**	**Not Practice**

On the contrary, the data may reveal that bus conductors use state-of-the-art apparatuses or at least a variety of ticketing tools (e.g., stubs, cards, etc.) to ease commuter ticketing. It may indicate that the bus industry's ticketing process has evolved and innovated throughout the past decades (Transport for London, 2016).

Facility Management Practices

Table 5 displays the facility management practices of Bus Company A, B, and C. As can be seen, it may be assumed that there are minimal or zero worries about maintenance depot conditions. However, it may still indicate that scheduling repairs and maintenance may be ineffective, given that mechanical defects and poor maintenance are major reasons for vehicular accidents (Corrales, 2014).

However, the gathered information may infer that the settings of bus stops in the studied district (e.g., location, lighting, security measures, etc.) are not in its quality situation, given that bus drivers still illegally load and unload passengers rather than utilizing authorized bus stops, which also causes artificial traffic conditions (Boquet, n.d) that slows down bus turnover (CNN, 2019) which entails the improvement of facilities, efficiency and punctuality, especially in remote areas (Sano, et al., 2007; Li, et al., 2023).

Table 5. Descriptive statistics of the assessment of facility management practices

Indicators	Commuter		Driver		Conductor		Employee		Operator	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
1. Waiting area in terminals is under ideal conditions (seats, lighting, entertainment, clean rest rooms, etc.)	3.22	Moderate extent	3.30	Moderate extent	3.48	Much extent	2.77	Moderate extent	4.10	Much extent
2. The bus company uses security measures in their terminals (CCTV cameras, security guards, K-9 dogs, etc.)	3.17	Moderate extent	2.84	Moderate extent	2.75	Moderate extent	2.77	Moderate extent	3.90	Much extent
3. Bus stops are in ideal condition (location, lighting, seats, rest rooms, security measures, etc.)	2.80	Moderate extent	2.44	Less extent	2.48	Less extent	2.43	Less extent	3.40	Much extent
4. Maintenance and repair depots are in quality condition that is in line with the regulations of LTFRB	3.36	Moderate extent	3.70	Much extent	3.52	Much extent	4.00	Much extent	4.20	Much extent
5. All terminals used by the bus company are open 24/7	2.81	Moderate extent	2.70	Moderate extent	2.72	Moderate extent	3.36	Moderate extent	3.90	Much extent
Weighted Mean	**3.07**	**Moderate extent**	**2.99**	**Moderate extent**	**2.99**	**Moderate extent**	**3.06**	**Moderate extent**	**3.90**	**Much Extent**

Human Resource Management Practices

Table 7 presents the human resource management practices of the included bus companies. As illustrated, the data collected indicate that bus drivers and conductors in the studied provincial district may be treated as regular employees unaffected by the country's contractualization scheme (Generalao, 2019). Unfortunately, passengers may have experienced impoliteness or humiliation from the said bus personnel (PhilNews, 2018) due to the restless workload and payment scheme used by bus companies (Dullana, 2017), which may affect passengers' satisfaction and may lead to less patronship (Munzilla et al., 2013; Islam et al., 2014; Manalo, 2018).

Table 6. Descriptive statistics of the assessment of human resource management practices

Indicators	Commuter		Driver		Conductor		Employee		Operator	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
1. Drivers and conductors have the necessary education level required by LTO and LTFRB	3.53	Much extent	3.59	Much extent	4.27	Great extent	4.00	Much extent	4.50	Great extent
2. Drivers and conductors have necessary training required by LTO and LTFRB	3.57	Much extent	3.72	Much extent	4.27	Great extent	3.70	Much extent	4.50	Great extent
3. Drivers and conductors have the needed licenses and certificates (driver's license, NBI, etc.)	3.64	Much extent	3.59	Much extent	4.48	Great extent	4.00	Much extent	4.50	Great extent
4. Drivers and conductors are well-mannered to their commuters upon riding and leaving the buses	2.51	Moderate extent	3.45	Much extent	4.27	Great extent	3.70	Much extent	4.20	Great extent
5. Drivers follow proper road behavior and regulations (speed limit, correct loading and unloading of passengers, maximum passenger capacity, etc.)	2.61	Moderate extent	4.41	Great extent	4.48	Great extent	4.00	Much extent	4.20	Great extent
6. Drivers and conductors have passed regular medical examinations to see if they are physically fit to drive and travel	3.62	Much extent	4.10	Much extent	4.48	Great extent	3.70	Much extent	4.50	Great extent
7. Drivers and conductors stay in the bus companies as long-term employees	3.69	Much extent	3.70	Much extent	4.48	Great extent	4.0	Much extent	4.40	Great extent
8. Reliever drivers and conductors are available for long travel	2.89	Moderate extent	4.24	Great extent	4.48	Great extent	4.0	Much extent	4.30	Great extent
Weighted Mean	**3.25**	**Moderate extent**	**3.84**	**Much extent**	**4.48**	**Great extent**	**3.88**	**Much extent**	**4.38**	**Great extent**

Conversely, it implies that training is still being rolled out or that minimal or no other additional training and seminars are given to the stated personnel. Information from Table 2, specifically the educational attainment of drivers and conductors, strongly supports the data gathered.

3.3 Effectiveness of Operation Management Practices

Table 7 provides the effectiveness of the operation management practices of the studied bus companies. The highly agreeable responses from the respondents and the results in Tables four (4) to seven (7) may strongly suggest that relevant improvements should be made on such dimensions, especially on practices that are graded lowest (Gallego et al., 2015).

Table 7. Descriptive statistics of the assessment of the effectiveness of operation management practices

Indicators	Commuter		Driver		Conductor		Employee		Operator	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
1. Waiting area in terminals is under ideal conditions (seats, lighting, entertainment, clean restrooms, etc.)	4.23	Very much agree	3.83	Much agree	4.0	Much agree	4.0	Much agree	4.20	Very much agree
2. The bus company uses security measures in their terminals (CCTV cameras, security guards, K-9 dogs, etc.)	4.07	Much agree	3.70	Much agree	4.0	Much agree	4.0	Much agree	4.20	Very much agree
3. Bus stops in ideal condition (location, lighting, seats, restrooms, security measures, etc.)	4.14	Much agree	3.70	Much agree	4.0	Much agree	4.0	Much agree	4.20	Very much agree
5. All terminals used by the bus company are open 24/7	4.16	Much agree	3.70	Much agree	4.0	Much agree	4.0	Much agree	4.20	Very much agree
Weighted Mean	**4.15**	**Much agree**	**3.73**	**Much agree**	**4.0**	**Much agree**	**4.0**	**Much agree**	**4.20**	**Very much agree**

Note: 4.2 – 5.0 Very much agree, 1.0 – 1.79 Do not agree, 3.4 – 4.19 Much agree (MUA), 2.6 – 3.39 Moderate agree, 1.8 – 2.59 Least Agree (LA)

3.4 Difference in Assessment of Operation Management Practices of Bus Companies

Table 8 presents a significant difference in the perceived operation management practiced when respondents are grouped by sex. As can be inferred, bus companies' operation management practices differ in how they perform and deliver their safety, reservation, and human resources functions. In addition, data from previous tables supports such claims because the overall weighted means and their specific practices are usually graded within the average margin (2.6 – 3.39) of the five (5) point Likert Scale, and the difference of age, educational background, and occupation.

Table 8. Differences in assessment of operation management practices of bus companies when grouped by sex

Indicators	Respondents	Mean	P-Value	Decision	Interpretation
Safety	Male	4.84	0.000	Reject Ho	There is a significant difference in the perceived operation management practices between male and female respondents.
	Female	3.61			
Reservation	Male	2.07	0.000	Reject Ho	There is a significant difference in the perceived operation management practices between male and female respondents.
	Female	1.69			
Facility	Male	3.23	0.616	Accept Ho	There is no significant difference in the perceived operation management practices between male and female respondents.
	Female	3.20			
Human Resource	Male	3.87	0.000	Reject Ho	There is a significant difference in the perceived operation management practices between male and female respondents.
	Female	3.61			

Table 9 shows the significant difference in the perceived operation management practiced among bus personnel. As illustrated, it indicates that the operation management practices of bus companies differ from the point of view of bus personnel, primarily drivers, conductors, and employees, regarding safety, facility, and human resource functions, having them apply such practices, the different nature of work within the company, age, sex, educational background, and how they scored the said functions from previous tables.

Table 9. Differences in assessment of operation management practices of bus companies when grouped by bus personnel

Indicators	Sum of Squares	P-Value	Decision	Interpretation
Safety	49.93 128.7	0.000	Reject Ho	There is a significant difference in the perceived operation management practices among bus personnel.
Reservation	10.66 582.7	0.044	Accept Ho	There is no significant difference in the perceived operation management practices among bus personnel.
Facility	46.82 116.4	0.000	Reject Ho	There is a significant difference in the perceived operation management practices among bus personnel.
Human Resource	38.63 192.9	0.000	Reject Ho	There is a significant difference in the perceived operation management practices among bus personnel.

Table 10 illustrates the significant difference between the perceived operation management practiced among bus operators. As can be seen, the data suggest that operators are likely to be satisfied with how their bus companies ply on the studied district. Prior tables conclude such assertions given that operators have usually graded the practices within the highest side (4.20 – 5.00) of the five (5) point Likert Scale. Thus, based on the findings, the first hypothesis (H_{a1}) is accepted.

Table 10. Differences in assessment of operation management practices of bus companies when grouped by bus operators

Indicators	Sum of Squares	P-Value	Decision	Interpretation
Safety	33.93 188.7	0.084	Accept Ho	There is no significant difference in the perceived operation management practices among bus operators.
Reservation	19.66 472.7	0.101	Accept Ho	There is no significant difference in the perceived operation management practices among bus operators.
Facility	86.42 189.4	0.435	Accept Ho	There is no significant difference in the perceived operation management practices among bus operators.
Human Resource	58.63 212.5	0.115	Accept Ho	There is no significant difference in the perceived operation management practices among bus operators.

3.5 Relationship Between Operation Management Practices and Operation Management Effectiveness

Table 11 presents the regression weights of the dimensions of operations management practices on management operations effectiveness. Regression weights measure the impact of a variable on another variable, i.e., the impact of safety, reservation, facility, and human resources on operation management effectiveness.

Table 11. Regression weights of operation management practices on operation management effectiveness

Variables	Standardized β-Coefficient	P-Value	Conclusion
Safety ←-Effectiveness	0.129	.001	There is a significant relationship between operations management practices and operations management effectiveness.
Reservation ← Effectiveness	-0.042	.270	There is no significant relationship between the operations management practices and operations management effectiveness.
Facility ← Effectiveness	0.302	.000	There is a significant relationship between operations management practices and operations management effectiveness.
HR ← Effectiveness	0.630	.000	There is a significant relationship between operations management practices and operations management effectiveness.

The findings indicate that the human resources component of operations management practices has the most significant impact on operational effectiveness. The lack of, or minimal, additional training and how frontline employees—such as drivers and conductors—interact and communicate with passengers (PhilNews, 2018), as discussed in Table 6, are critical factors. It can be argued that these practices directly influence customer satisfaction, company branding, revenue generation, and, ultimately, the overall effectiveness of the bus companies examined. (Munzilla, et.al, 2013; Manalo, 2018) And a standardized driver and conductor hiring process (Corpus et al., 2010).

The second most influential factor in operational effectiveness is the condition of the facilities. As shown in Table 6, poorly maintained bus stops often compel drivers to load and unload passengers in illegal or unsafe locations, contributing to temporary traffic congestion (Boquet, n.d.; Briones et al., 2015; CNN, 2019). This practice likely affects passengers' choices regarding their mode of transportation. It impacts the revenue of the bus companies, thus influencing their overall operational efficiency. It is necessary to have heuristic bus allocation and standardized bus monitoring inspections (Corpus et al., 2010).

The third most significant factor affecting operational effectiveness is safety. As presented in Table 4, the findings reveal a lack of adequate emergency tools on buses, alongside a gradual increase in fatal accidents (Corrales, 2014; Meixler, 2018; Ibay et al., 2019; MDRRM, 2019). This could deter passengers from choosing bus travel and negatively affect revenue, thereby impacting the overall operational effectiveness of the bus companies within the studied provincial district.

Although the regression analysis revealed that the reservation system does not significantly influence operational effectiveness, this is likely due to the absence of such a system in the provincial district studied, where all passengers are walk-ins (as discussed in Table 5 and disclosed in Table 2). While this aspect currently does not appear to affect operational efficiency, it is recommended that bus companies explore innovations and improvements in their reservation processes and, more importantly, create a reservation mobile application (Abad & Fillone, 2014). Given the constant evolution of operations management and the transportation industry, improvements in this area may be beneficial (Clark, 2019). Based on the findings, the second hypothesis (Ha2) is accepted.

Thus, in response to the findings, a strategic operations management plan was developed with industry experts to tackle inefficiencies. The plan enhances safety through emergency tools and a monitoring command center, improves facility management with terminal and CCTV floor plans, upgrades human resources with driver and conductor training programs, and establishes an online reservation system via a website and mobile app. Bus companies A, B, and C are progressively implementing these strategies.

4.0 Conclusion

The research highlights major operational inefficiencies in provincial bus companies, particularly in safety, facility management, and human resources. Issues like inadequate safety tools, poor maintenance, and insufficient staff training lead to accidents and low customer service. While operators are generally satisfied, commuters and staff express dissatisfaction, highlighting a stakeholder disconnect. The study calls for stronger safety protocols, better facility management, ongoing staff training, modern technology, and improved communication, all included in the strategic operations management plan with industry experts to boost effectiveness, customer satisfaction, and overall business performance.

Future researchers should focus on longitudinal studies, stakeholder perspectives, and evaluating technology and training effectiveness. Key areas include regional strategy comparisons, economic impacts, policy influences, sustainability practices, customer feedback, and benchmarking metrics to enhance operational improvements in the Philippines' bus companies.

5.0 Contributions of Authors

The paper is the sole work of the author, who conceptualized, prepared instruments, collected data, performed statistical analysis, tabulated, and interpreted the data.

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The research was self-funded by the researcher.

7.0 Conflict of Interests

No conflict of interest.

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Teachers' Financial Literacy, Concerns, and Well-Being: A Basis for Financial Program Design

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Abstract. This descriptive–correlational study aimed to assess and analyze teachers' financial literacy, concerns, and well-being to develop a targeted financial program. The study involved 241 randomly selected teachers from the Division of Siquijor. Data were collected using validated questionnaires, and analysis was performed using percentage distribution, weighted mean, and Spearman Rank Correlation Coefficient. The findings revealed that: a) the teachers' financial literacy, in terms of financial knowledge and capability, was at a moderate level, while their financial skills were at a high level; b) their financial literacy, about financial awareness, concerns, and decisions, was also at a moderate level, though their financial goals were more advanced (high); and c) their financial well-being, particularly in terms of financial security, was at slightly applicable level. Moreover, the study found that a) there is a moderate relationship between teachers' financial literacy and their financial well-being; b) teachers' financial literacy is significantly related to their financial concerns; and d) although the relationship between teachers' financial awareness and financial well-being is significant, the indicators are too weak to draw a strong conclusion.

Keywords: Financial concerns; Financial literacy; Financial program; Financial well-being; Teachers.

1.0 Introduction

Global findings are alarming as they show a need for more financial literacy, even in industrialized economies with advanced financial markets. Approximately one-third of the world's population is familiar with the fundamental ideas that guide daily financial decisions (Lusardi, 2019). The ongoing global financial crisis highlights the urgent need to measure financial literacy, particularly among those working in educational institutions, such as teachers, as they are responsible for shaping future generations and ensuring they become financially literate (Zulaihati et al., 2019; Priyadharshini, 2017). Similarly, Compen et al. (2019) and Van Campenhout et al. (2017) claimed that the professional development of teachers in financial literacy is not keeping pace with the growing number of financial literacy programs, which is worrying because teachers, along with parents, play a crucial role in shaping young people's understanding of finance.

Understanding an individual's level of financial literacy is crucial for making informed financial decisions (Adil et al., 2021), especially for professionals like teachers, whose financial decisions can have significant implications (Zulaihati et al., 2019). Financial literacy refers to the ability to make appropriate decisions regarding managing personal finances (Tuffour et al., 2020). It involves understanding how money functions worldwide, including how one earns, invests, and donates money to support others (Khan et al., 2022). Nevertheless, financial literacy remains imperfect despite its importance, particularly in developing and underdeveloped countries. This imperfection is attributed to barriers such as the complexity of financial matters, the multitude of options available for financial decisions, and the lack of time and resources to learn about personal finance (Bongomin et al., 2020).

Over the past decade, economic instability, marked by recession, inflation, and unemployment, has significantly reduced community income and threatened the quality of life and work (Sani, 2021). These economic challenges negatively impact psychological and physical health, lowering confidence and productivity, increasing absenteeism and anxiety, and reducing workplace focus (Mustafin et al., 2023). For professionals like teachers, financial literacy is crucial for making informed financial decisions that can alleviate these pressures. While teachers' academic and professional development enhances their teaching effectiveness, financial stress can hinder their ability to perform at their best. Financial concerns remain a significant challenge despite their strong teaching capabilities and influence. To inspire others, teachers must live a balanced life, which includes setting priorities, making informed financial decisions, and maintaining boundaries to live within their means (Swigonski et al., 2021).

Numerous studies have already investigated the importance and impact of financial literacy. For instance, Salas-Velasco et al. (2021), Saputra and Susanti (2021), and Jambunathan (2024), along with several other scholars, focused primarily on teaching financial literacy to children or students. While Zulaihati et al.'s (2019) research did investigate teachers' financial literacy, it only focused on determining the impact of financial literacy on financial behavior. Although these studies have shown that higher financial literacy is strongly linked to increased financial well-being and reduced financial concerns, they did not explicitly shed light on the teachers' financial literacy, well-being, and financial concerns. Therefore, The current study was pursued to examine the levels of financial literacy, financial well-being, and financial concerns among teachers. Its key focus is to explore the relationships between financial literacy, financial concerns, and financial well-being and develop a program to address these issues. The researcher was particularly motivated to assess the current financial conditions of teachers in the Division of Siquijor, given the issue's relevance. This study also aims to respond to a concern raised by Secretary Leonor M. Briones of the Department of Education (DepEd) regarding the PHP 170 billion in loans incurred by teachers from legitimate lending institutions (Sunnexdesk, 2017).

2.0 Methodology

2.1 Research Design

The researcher utilized the descriptive-correlational design to determine the level of financial literacy and financial concerns among teachers in the Division of Siquijor. The study aims to understand the relationship between these factors and their impact on the teachers' financial well-being. This inquiry involved analyzing and describing the data obtained and also looked at the correlation between the variables being studied.

2.2 Research Participants

The study was conducted in the Division of Siquijor, a part of the DepEd in Region VII, Central Visayas. Siquijor, known historically as Isla del Fuego (Island of Fire) during the Spanish colonial period, is the third smallest province in the Philippines regarding population and land area. The Division of Siquijor comprises five districts: Larena, Lazi, Maria, San Juan, and Siquijor. Larena District includes 12 elementary schools and 3 high schools, with a total of 880 teachers. Lazi has 15 elementary schools and 4 high schools; Maria has 12 elementary schools and 1 high school; San Juan has 10 elementary schools and 2 high schools; and Siquijor has 15 elementary schools and 5 high schools. The Division of Siquijor consists of 64 elementary and 15 high schools, amounting to 79 schools. The study included 241 teachers from 64 elementary schools and 15 high schools in the Division of Siquijor employed on or before the 2018–2019 school year. The respondents were randomly selected using a systematic sampling technique, where every fourth teacher on the list was chosen, with a random start.

2.3 Research Instrument

The researcher used a survey questionnaire as the primary instrument for this study. The financial literacy section was based on the questionnaire developed by Sabri (2018), while financial concerns were assessed using the Measuring Financial Literacy questionnaire (2011) and Priyadharshini (2017). The Consumer Financial Protection Bureau (CFPB) (2015) tool measured financial awareness. Three experts in Economics and Commerce, including leaders in cooperatives, finance institutions, and bank accountants, reviewed the questionnaire and made minor edits to enhance clarity. A pilot test was conducted with 30 respondents from the Division of Siquijor who were not part of the final sample. Reliability was assessed using Cronbach's alpha, with values ranging from 0.752 to 0.915 across different indicators, confirming the internal consistency and reliability of the items.

2.4 Data Gathering Procedure

Following the design hearing, the researcher incorporated feedback from the panel members. A request to conduct the study was sent to the Schools Division Superintendent of Siquijor, with approval endorsed by the Dean of the Graduate School at Foundation University. The approved request was then presented to the school principals and teacher respondents. The researcher explained the study's purpose during questionnaire distribution and assured the respondents confidentiality. The questionnaires were collected three days later, and the results were tabulated, analyzed, and interpreted using MS Excel.

2.5 Ethical Considerations

Throughout the investigation, the researcher took several crucial steps to maintain ethical standards. First, before distributing the questionnaire, the researcher ensured that all required consents were acquired, including those from the school principals and the Schools Division Superintendent of Siquijor. The questionnaire had the authorized requests attached. The teacher-respondents were also given a letter of intent explaining the study's goal and requesting their voluntary participation. Furthermore, stringent protocols were implemented to guarantee that each respondent's response remained anonymous and that the data would be treated with the highest discretion and privacy to protect the respondents' anonymity.

3.0 Results and Discussions

3.1 Teachers' Financial Literacy

In terms of Financial Knowledge

Table 1 indicates that teachers in the Division of Siquijor are moderately financially literate, with a composite weighted mean of 3.31. The teachers showed moderate literacy in considering returns on investments ($w\bar{x}$= 3.32), understanding cooperatives as financial institutions ($w\bar{x}$ =3.23), managing financial crises ($w\bar{x}$ =3.22), saving money ($w\bar{x}$ =3.11), and assessing risks in investments ($w\bar{x}$= 3.05). However, they demonstrated the least literacy in investing money, with a mean of 2.71.

Table 1. Level of teachers' financial literacy in terms of financial knowledge

Indicators	Mean	Interpretation
1. I earn money.	3.94	Highly Literate
2. I know that personal financial literacy and planning will improve my family's quality of life.	3.80	Highly Literate
3. I decide on my earned money.	3.57	Highly Literate
4. I can easily find ways and means when my money is insufficient for my needs.	3.39	Moderately Literate
5. I consider returns when investing.	3.32	Moderately Literate
6. I am knowledgeable about cooperatives as a financial institution and its operations.	3.23	Moderately Literate
7. I can manage financial crises easily.	3.22	Moderately Literate
8. I save money.	3.11	Moderately Literate
9. I consider risks when investing.	3.05	Moderately Literate
10. I can deal with banks and other financial services providers.	3.02	Moderately Literate
11. I invest money.	2.71	Moderately Literate
Composite	**3.31**	**Moderately Literate**

The teachers' financial literacy in terms of financial knowledge is moderate, which implies that there is a need for improvement, particularly in investment practices, to reduce reliance on loans. In the study of Cm et al. (2017), it is pointed out that teachers generally perceive themselves as having average financial knowledge, with basic numeracy skills but limited ability to apply this knowledge to real-life financial decisions. Kidwell and Turrisi (2004), Chinen and Endo (2012), and Wise (2013) emphasized the benefits of financial literacy in budgeting, spending regulation, and skill development. Kidwell and Turrisi (2004) reported that those who prepare budgets often manage their finances better, avoiding impulse spending and maintaining a positive attitude toward budgeting.

In terms of Financial Skills

Table 2 reveals that teachers in the Division of Siquijor are highly literate in financial skills, with a composite weighted mean of 3.48, indicating a strong level of financial skillfulness among them. This aligns with Otter's (2010) assertion that teachers generally possess a basic level of financial literacy. However, the data also show that teachers are only moderately literate in specific areas such as closely monitoring their financial affairs ($w\bar{x}$ =3.40), tracking everyday spending ($w\bar{x}$ =3.38), and making ends meet ($w\bar{x}$ =3.33).

Table 2. Level of teachers' financial literacy in terms of financial skills

Indicators	Mean	Interpretation
1. I pay my bills on time.	3.63	Highly Literate
2. I budget my day-to-day finances.	3.58	Highly Literate
3. I have the ability and understanding of how to budget day-to-day finances.	3.52	Highly Literate
4. I spend according to my needs.	3.52	Highly Literate
5. I think about ways to reduce my spending.	3.46	Highly Literate
6. I keep a close personal watch on my financial affairs.	3.40	Moderately Literate
7. I can easily keep track of my everyday spending.	3.38	Moderately Literate
8. I can make both ends meet financially.	3.33	Moderately Literate
Composite	**3.48**	**Highly Literate**

Zarate (2015) supports these findings, noting that while teachers can manage their finances, there is room for improvement. Wachira and Kihiu (2012) also maintained that effective use of financial knowledge aids in meeting financial commitments through careful planning and asset allocation.

In terms of Financial Capability

Table 3 shows that teachers' financial literacy is moderately applicable regarding financial capability, with a composite weighted mean of 3.01. The teachers prioritize paying off debt early, as indicated by a mean of 3.423.

Table 3. Level of teachers' financial literacy in terms of financial capability

Indicators	Mean	Interpretation
1. I prioritize paying off debt early.	3.43	Highly Literate
2. I will not get into debt; if I cannot afford it, I will not buy it.	3.39	Moderately Literate
3. I manage debts squarely.	3.38	Moderately Literate
4. I understand loan agreements that I dealt with banks and other financial services providers.	3.37	Moderately Literate
5. I ensure enough money for my retirement.	3.32	Moderately Literate
6. I plan for my long-term financial future.	3.29	Moderately Literate
7. I usually only pay the minimum amount owed on credit cards.	2.33	Slightly Literate
8. I have investments, such as shares, bonds, managed funds, debentures, and unit trusts.	2.28	Slightly Literate
9. I deal with my financial matters with credit cards.	2.26	Slightly Literate
Composite	**3.01**	**Moderately Literate**

This finding signifies that the teachers actively manage their debts and prioritize paying them off. This is consistent with Cm et al.'s (2017) observation that teachers take full advantage of available financial products and services. However, the teachers needed to improve in credit card use and investments, including shares and bonds. This aligns with Geetha and Ramesh's (2011) findings that many individuals need to be aware of the full range of investment options and gain knowledge about securities.

In terms of Financial Awareness

Table 4 shows that teachers' financial literacy in financial awareness is moderate, with a composite weighted mean of 3.29. Only "having a financial plan" was highly rated among all indicators. Based on this finding, there is a need for greater literacy in reading financial statements, planning for the future, making retirement plans, and staying informed on financial matters. Van Rooij et al. (2012) found that financially knowledgeable individuals are more concerned about retirement planning and often invest in long-term plans. Remund (2010) and Mitchell et al. (2009) also stress the importance of financial education in influencing long-term financial decisions and behaviors.

Table 4. Level of teachers' financial literacy in terms of financial awareness

Indicators	Mean	Interpretation
1. I have a financial plan and know it is important even for those with less money.	3.41	Highly Literate
2. I read financial statements from loans and financial accounts.	3.37	Moderately Literate
3. I have a long-term plan for my financial future.	3.34	Moderately Literate
4. I make a financial plan for my retirement benefits, even if it is too far away for me to think about it.	3.29	Moderately Literate
5. I stay informed on financial planning developments by reading newspapers, magazines/media/the Internet.	3.03	Moderately Literate
Composite	**3.29**	**Moderately Literate**

Overall Level of Teachers' Financial Literacy

Table 5 summarizes the applicability of teachers' financial literacy across four areas: (a) Financial Skills with a weighted mean of 3.48 (Highly Literate); (b) Financial Knowledge with a mean of 3.31 (Moderately Literate); (c) Financial Awareness with a mean of 3.29 (Moderately Literate); and (d) Financial Capability with a mean of 3.01 (Moderately Literate).

Table 5. Summary table of the level of teachers' financial literacy

Areas	Mean	Verbal Description
Financial Knowledge	3.31	Moderately Literate
Financial Skills	3.48	Highly Literate
Financial Capability	3.01	Moderately Literate
Financial Awareness	3.29	Moderately Literate

Overall, the data suggest that while teachers demonstrate strong financial skills, they must enhance their financial knowledge, capability, and awareness. These findings coincide with Zarate's (2015) assertion that assessing financial literacy is crucial for making wise financial decisions, especially for professionals like teachers. Priyadharshini (2017) also conjectured that financial literacy is essential for educators as it shapes future generations' financial literacy. Cm et al. (2017) further claimed that financial illiteracy among educators is often reflected in their students' financial literacy skills and highlights broader economic implications for the Filipino population. Therefore, incorporating financial education into basic and higher education curricula is recommended to improve teachers' and students' financial knowledge, behavior, and attitudes. This could contribute to better economic growth and development. As Collins (2012) found, individuals with higher financial literacy are more likely to seek investment, insurance, and tax advice but less likely to need debt or loan advice. Christelis et al. (2010) concluded that financially literate individuals understand the importance of risk diversification and are likelier to include stocks in their portfolios, highlighting the significance of comprehensive financial literacy.

3.2 Teachers' Financial Concerns

In terms of Financial Goals

Table 6. Level of teachers' financial concerns in terms of financial goals

Indicators	Mean	Interpretation
1. I am interested in being a member of a cooperative.	3.95	Highly Applicable
2. A cooperative would answer my financial needs.	3.90	Highly Applicable
3. As a cooperative member, my financial management will be enhanced and developed.	3.90	Highly Applicable
4. I believe that more resources and information are needed concerning money management and investing.	3.87	Highly Applicable
5. I am interested in attending informational money management and investing workshops.	3.87	Highly Applicable
6. I know that training opportunities concerning money management and investing must be available for everybody.	3.80	Highly Applicable
7. I set long-term financial goals and strive to achieve them.	3.55	Highly Applicable
8. I choose appropriate insurance.	3.54	Highly Applicable
9. I have concrete financial goals toward which I am working.	3.46	Highly Applicable
10. I always check the balance on financial statements.	3.42	Highly Applicable
11. I take out insurance to be prepared for the unexpected.	3.32	Moderately Applicable
12. I recognize a scam or investment scheme that seems too good to be true.	3.13	Moderately Applicable
Composite	**3.64**	**Highly Applicable**

Table 6 shows teachers' financial concerns regarding financial goals, with a composite weighted mean of 3.64, indicating high financial concerns among the teachers. Teachers express a strong interest in joining cooperatives, with a mean of 3.95, believing that cooperatives meet their financial needs ($w\bar{x} = 3.90$) and improve financial management ($w\bar{x} = 3.90$). The teachers in this study demonstrate a strong grasp of financial goals. Nevertheless, Zarate (2015) argued that it is important to deepen this understanding among public school teachers. The findings suggest that enhancing cooperative services could help teachers achieve their financial goals. Vieta and Lionais (2015) stress the effectiveness of cooperatives in addressing socioeconomic needs, while Co-operative News (2016) notes the importance of strengthening cooperatives' connection to their communities. De Bassa Scheresberg (2013) added that lower financial literacy correlates with less effective financial planning and stock market participation.

In terms of Financial Needs

Table 7 highlights teachers' financial concerns regarding financial needs, with a composite weighted mean of 2.57. The data indicate that several financial strategies are moderately applicable to teachers when they require money. These include spending less on necessities to save ($w\bar{x}$ = 3.20), withdrawing or transferring savings to a current account ($w\bar{x}$ = 2.97), taking loans from savings and loan clubs ($w\bar{x}$ = 2.91), borrowing from family or friends ($w\bar{x}$ = 2.90), taking out personal loans from financial institutions ($w\bar{x}$ = 2.70), pawning personal items ($w\bar{x}$ = 2.66), and borrowing from employers or requesting salary advances ($w\bar{x}$ = 2.63).

Table 7. Level of teachers' financial concerns in terms of financial needs

Indicators	Mean	Interpretation
1. I spend less on things I need to save money.	3.20	Moderately Applicable
2. I draw money out of savings or transfer savings into the current account.	2.97	Moderately Applicable
3. I take a loan from my savings and loans clubs.	2.91	Moderately Applicable
4. I borrow money from family or friends.	2.90	Moderately Applicable
5. I take out a personal loan from a financial service provider, including a bank, credit union, or microfinance.	2.70	Moderately Applicable
6. I pawn something that I own.	2.66	Moderately Applicable
7. I borrow from employer/salary advance.	2.63	Moderately Applicable
8. I work overtime to earn extra money.	2.54	Slightly Applicable
9. I take money out of a flexible mortgage account.	2.42	Slightly Applicable
10. I sell something that I own.	2.40	Slightly Applicable
11. I use a credit card/ATM card for a cash advance or to pay bills/buy food.	2.35	Slightly Applicable
12. I apply for a loan/withdrawal on my pension fund.	2.28	Slightly Applicable
13. I take out a loan from an informal finance provider/moneylender.	2.24	Slightly Applicable
14. I use authorized, arranged overdrafts or lines of credit.	2.20	Slightly Applicable
15. I take out a payday loan.	2.17	Slightly Applicable
Composite	**2.57**	**Slightly Applicable**

Cole, Sampson, and Zia (2009) have shown that people with low financial literacy often fail to plan for retirement, always borrow at high interest rates, and are less likely to participate in the financial system. Schuchardt, Hanna, Hira, Lyons, Palmer, and Xiao (2009) reviewed the literature of the last decade on financial literacy and found that several efforts have been made to document the impact of financial education on consumers' financial well-being. The study found consistent evidence that financial education leads to increased financial knowledge and positive changes in financial attitudes, motivation, and planned behavior. According to Zarate (2015), teachers' financial concerns compel them to travel to other places to transact loans, even at a higher rate of percentage, because they are groaning with financial woes. Thus, Mateo (2017) stressed that something has to be done about the loans teachers have incurred from legitimate lending institutions amounting to PHP 170 billion.

In terms of Financial Decisions

Table 8 presents the moderate level of teachers' financial concerns regarding financial decisions, with a composite weighted mean of 3.32. The data indicating that teachers have moderate financial concerns, particularly regarding financial decisions, reflect their moderate financial literacy. Research by Ibrahim and Alqaydi (2013) and Kapoor et al. (2018) shows that financial literacy positively influences personal financial management. This is crucial for teachers, who play a key role in societal development. Cm et al. (2017) pointed out that a lack of basic financial information and the inability to use resources effectively can lead to poor financial decision-making. Mitchell et al. (2009) asserted that financial education is vital in shaping long-term financial behaviors.

Table 8. Level of teachers' financial concerns in terms of financial decisions

Indicators	Mean	Interpretation
1. I carefully consider whether I can afford it before I buy something.	3.66	Highly Applicable
2. I can discern needs from wants.	3.56	Highly Applicable
3. I spend much time thinking about financial information before I make financial decisions.	3.44	Highly Applicable
4. I understand the information I receive concerning financial products.	3.36	Moderately Applicable
5. I regularly seek out financial information and advice.	3.35	Moderately Applicable
6. I am confident in making financial and investment decisions.	3.19	Moderately Applicable
7. I consider several (products/loan policies/accounts) from different companies before making my decisions	3.10	Moderately Applicable
8. I always find ways to buy what I want.	2.92	Moderately Applicable
Composite	**3.32**	**Moderately Applicable**

The current findings, however, contrast with those of Owusu (2015), who discovered that teachers needed more personal finance knowledge, primarily due to poor financial planning and budget preparation. This lack of planning negatively affected their spending and saving habits. Meanwhile, Priyadharshini (2017) emphasized the importance of effective financial goal planning, which involves identifying needs and dreams, prioritizing them, and determining the best time to achieve each. Financial literacy enables this process. Cm et al. (2017) further posited that financial illiteracy critically affects teachers' ability to manage income, use credit effectively, secure financial well-being, and make sound financial decisions.

Overall Level of Teachers' Financial Concerns

Table 9 summarizes teachers' financial concerns. The data reveal that setting financial goals, with a weighted mean of 3.64, is highly applicable to teachers. Making financial decisions, with a mean of 3.32, is moderately applicable, while addressing financial needs, with a mean of 2.57, is only slightly applicable. These findings suggest that setting financial goals is the primary financial concern for teachers.

Table 9. Summary table of the level of teachers' financial concerns

Areas	Mean	Verbal Description
Financial Goals	3.64	Highly Applicable
Financial Needs	2.57	Slightly Applicable
Financial Decisions	3.32	Moderately Applicable

The results negate the findings of Owusu (2015). His study revealed that teachers in the Sekyere East District needed more knowledge of personal finances. The low level of knowledge was attributed mainly to the need for more sound personal finance planning (44.35%) and budgetary preparation (42.92%). Most teachers needed to plan their finances adequately, which negatively affected their expenses and savings habits. Priyadharshini (2017) cited effective financial goal planning as identifying one's needs and dreams, putting them on paper, prioritizing them, and determining when one can best accomplish each. This effective goal planning is achieved through financial literacy. Montalbo and Pogoy (2017) further stressed financial illiteracy as having critical implications on how teachers manage their income to attain their financial goals, use credit effectively, secure their financial well-being, and make good financial decisions.

3.3 Teachers' Financial Well-Being

In terms of Financial Security

Table 10 shows teachers' financial well-being level in terms of financial security, with a composite weighted mean of 2.43.

Table 10. Level of teachers' financial well-being in terms of financial security

Indicators	Mean	Interpretation
1. An ATM <current> account	3.33	Moderately Applicable
2. A savings account	2.95	Moderately Applicable
3. An Insurance	2.93	Moderately Applicable
4. A pension fund	2.68	Moderately Applicable
5. An investment account, such as unit trust	2.22	Slightly Applicable
6. A mortgage	2.15	Slightly Applicable
7. Stocks and shares	2.12	Slightly Applicable
8. A bank loan secured on property	2.06	Slightly Applicable
9. An unsecured bank loan	1.94	Slightly Applicable
10. Prepaid payment card	1.88	Slightly Applicable
Composite	**2.43**	**Slightly Applicable**

The data on teachers' slight financial security suggest a need for greater financial literacy in this area. This finding parallels Owusu's (2015) study, which revealed that teachers generally have low financial literacy, particularly in areas like insurance. Cm et al. (2017) also noted that teachers often resort to borrowing money when their income falls short. However, they cannot effectively evaluate financial information, which is crucial for making informed financial decisions.

Overall Teachers' Financial Well-Being

Table 11 reveals that the teachers' overall financial well-being has a composite weighted mean of 2.93, described as "Moderately Applicable."

Table 11. Level of teachers' financial well-being

Indicators	Mean	Interpretation
1. I am securing my financial future.	3.31	Moderately Applicable
2. I could handle major unexpected expenses.	3.12	Moderately Applicable
3. I am concerned that the money I have/will save will not last.	3.10	Moderately Applicable
4. I can enjoy life because of how I manage my money.	3.07	Moderately Applicable
5. I can give a gift for a wedding, birthday, or other occasion without putting a strain on my finances for the month.	2.95	Moderately Applicable
6. I am controlled by my finances.	2.95	Moderately Applicable
7. I am behind with my finances.	2.94	Moderately Applicable
8. I am just financially enough.	2.89	Moderately Applicable
9. I have money left over at the end of the month.	2.76	Moderately Applicable
10. I can have the things I want in life because of my money situation.	2.73	Moderately Applicable
11. I have no financial obligations (loans and payables)	2.37	Slightly Applicable
Composite	**2.93**	**Moderately Applicable**

Overall, the teachers' financial well-being is moderate, suggesting a need for improvement in their financial literacy. The study revealed that having no financial obligations, such as loans and payables, is the least applicable factor, indicating that many of the teachers in the division of Siquijor are burdened with financial obligations. Similarly, Sunnexdesk (2017) and Zarate (2015) observed significant financial challenges among teachers, often resulting in multiple loans. According to Brown and Gray (2016), financial well-being is the adequacy and security that protect individuals or families from economic risks. Although teachers are taking steps to secure their financial future, the need to rely on loans remains a significant concern.

3.4 Relationship Between Financial Literacy and Financial Concerns

The data in Table 12 indicate that all p-values (0.000) for each pair of variables are below the significance level of 0.05. This leads to rejecting the null hypothesis, thereby confirming a significant relationship between the respondents' financial literacy and their financial concerns. Specifically, the data reveal a strong relationship between the respondents' financial knowledge and financial goals (rs = 0.616) and financial decisions (rs = 0.549). A moderate relationship is also observed between financial knowledge and financial needs (rs = 0.305). The data also show a strong relationship between the respondents' financial skills, financial goals (rs = 0.573), and financial decisions (rs = 0.538).

Table 12. Correlation between the teachers' financial literacy and financial concerns

Financial Literacy	Financial Concerns		
	Financial Goals	Financial Needs	Financial Decisions
Financial Knowledge	$r_s = 0.616$ p = 0.000 Decision: Reject H_o Significant	$r_s = 0.305$ p = 0.000 Decision: Reject H_o Significant	$r_s = 0.549$ p = 0.000 Decision: Reject H_o Significant
Financial Skills	$r_s = 0.573$ p = 0.000 Decision: Reject H_o Significant	$r_s = 0.190$ p = 0.000 Decision: Reject H_o Significant	$r_s = 0.538$ p = 0.000 Decision: Reject H_o Significant
Financial Capability	$r_s = 0.557$ p = 0.000 Decision: Reject H_o Significant	$r_s = 0.369$ p = 0.000 Decision: Reject H_o Significant	$r_s = 0.541$ p = 0.000 Decision: Reject H_o Significant
Financial Awareness	$r_s = 0.629$ p = 0.000 Decision: Reject H_o Significant	$r_s = 0.381$ p = 0.000 Decision: Reject H_o Significant	$r_s = 0.579$ p = 0.000 Decision: Reject H_o Significant

The findings indicate that respondents with higher financial knowledge exhibit greater financial concerns. As Lusardi (2019) highlights, financial literacy significantly impacts financial behavior. Individuals with low financial literacy are more likely to face debt issues, refrain from participating in the stock market, choose high-fee mutual funds, and struggle with wealth accumulation, effective management, and retirement planning. A structured spending, saving, and investing plan is crucial for meeting financial needs and goals. Kapoor et al. (2018) stress that achieving these goals requires comprehensive financial planning, including budgeting, tax and liability management, purchasing decisions, insurance, investments, retirement, and estate planning.

Additionally, data reveals that higher financial skills are linked to stronger financial goals and informed decision-making. This aligns with Hastings, Madrian, and Skimmyhorn (2013), who found that individuals with greater financial literacy are more likely to recognize financial benefits and participate in employer-sponsored savings plans. However, there is only a weak correlation between financial skills and financial needs, suggesting that financial needs remain consistent regardless of skill level. Taft et al. (2013) support this, indicating that financial well-being relies heavily on personal financial management amid daily economic challenges. Priyadharshini (2017) also notes that strong financial skills enable sound decision-making and reduce the risk of misinformation.

Furthermore, individuals with greater financial capability tend to have heightened financial concerns. Priyadharshini (2017) explains that financial capability includes both the knowledge and skills necessary to understand one's financial position and the motivation to act. Those who are financially capable often prioritize early debt repayment and feel more confident in managing financial institution interactions, leading to increased consideration of financial issues. Lastly, the data suggests that heightened financial awareness is associated with a greater recognition of financial concerns. Remund (2010) notes that financial awareness helps individuals grasp the broader implications of their financial decisions in an evolving social landscape. Similarly, Byrne (2007) found that higher financial literacy promotes financial well-being, ultimately reducing overall financial concerns.

3.5 Relationship Between Financial Literacy and Financial Well-Being

Table 13 shows that all p-values (0.000) for each variable pair are below the significance level of 0.05, leading to the rejection of the null hypothesis. This indicates a significant relationship between the respondents' financial literacy and their level of financial well-being. Specifically, the data reveal a moderate relationship between the respondents' financial knowledge and two aspects of financial well-being: financial security (rs = 0.324) and their overall description of financial well-being (rs = 0.459). The table also indicates a moderate relationship between the respondents' financial skills and financial security (rs = 0.296), and a stronger relationship with their overall financial well-being (rs = 0.475). Furthermore, there is a moderate relationship between the respondents' financial capability and financial security (rs = 0.437), and a strong relationship with their overall financial well-being (rs = 0.530). Finally, the table reveals a moderate relationship between the respondents' financial awareness and financial security (rs = 0.473), and a strong relationship with their overall financial well-being (rs = 0.538).

Table 13. Correlation between the teachers' financial literacy and their level of financial well-being

Financial Literacy	Financial Well-Being	
	Financial Security	**Description of Their Financial Well-Being**
Financial Knowledge	$r_s = 0.324$ $p = 0.000$ Decision: Reject H_o Significant	$r_s = 0.459$ $p = 0.000$ Decision: Reject H_o Significant
Financial Skills	$r_s = 0.296$ $p = 0.000$ Decision: Reject H_o Significant	$r_s = 0.475$ $p = 0.000$ Decision: Reject H_o Significant
Financial Capability	$r_s = 0.437$ $p = 0.000$ Decision: Reject H_o Significant	$r_s = 0.530$ $p = 0.000$ Decision: Reject H_o Significant
Financial Awareness	$r_s = 0.473$ $p = 0.000$ Decision: Reject H_o Significant	$r_s = 0.538$ $p = 0.000$ Decision: Reject H_o Significant

The findings of this study reveal that increased financial knowledge among respondents is associated with improved financial well-being. This observation aligns with the research by Taft et al. (2013), which identified a correlation between higher financial well-being and greater financial literacy. Financial literacy encompasses a solid understanding of essential principles and terminology for effective personal financial management.

Additionally, the results suggest that enhanced financial skills significantly contribute to overall financial well-being. Taft et al. (2013) noted that improved financial skills stem from high financial literacy, which empowers individuals to participate more successfully in economic activities. This includes making better savings, purchasing choices, investment strategies, asset management, insurance utilization, and effective debt and credit management.

Moreover, individuals with greater financial capability tend to report higher levels of financial well-being. According to Taft et al. (2013), elevated financial well-being can mitigate financial concerns, particularly for those who feel they are struggling to meet their financial needs. Sabri (2018) describes financial well-being as being shaped by material conditions, personal satisfaction, and attitudes toward one's financial status. This well-being can be enhanced through financial capability—the ability to act in one's best financial interest within specific socioeconomic contexts.

Finally, the findings suggest that respondents with higher financial awareness experience better financial well-being. Supporting this, Priyadharshini (2017) found that increased awareness through education and guidance helps individuals identify financial risks and opportunities, resulting in more informed decision-making and actions that bolster financial well-being. This research is further corroborated by Hassan Al-Tamimi and Anood Bin Kalli (2009), who demonstrated a positive relationship between financial literacy and financial well-being.

3.6 Relationship Between Financial Concerns and Financial Well-Being

Table 14 shows that all p-values (0.000) for each pair of variables are below the significance level of 0.05, leading to the rejection of the null hypothesis. This indicates a significant relationship between the respondents' financial concerns and the level of their financial well-being. The data specifically reveal a moderate relationship between respondents' financial goals and two aspects of financial well-being: financial security (rs = 0.347) and overall financial well-being (rs = 0.450). Additionally, the table shows a moderate relationship between the respondents' financial needs and the following: a) their financial security (rs = 0.471) and b) overall financial well-being (rs = 0.366). Lastly, the data reflect a moderate relationship between respondents' financial decisions and financial security (rs = 0.351) and a strong relationship with their overall financial well-being (rs = 0.500).

Table 14. Correlation between the teachers' level of financial concerns and the level of their financial well- being

Financial Concerns	Financial Well-Being	
	Financial Security	**Description of Their Financial Well-Being**
Financial Goals	$r_s = 0.347$ $p = 0.000$ Decision: Reject H_o Significant	$r_s = 0.450$ $p = 0.000$ Decision: Reject H_o Significant
Financial Needs	$r_s = 0.471$ $p = 0.000$ Decision: Reject H_o Significant	$r_s = 0.366$ $p = 0.000$ Decision: Reject H_o Significant
Financial Decisions	$r_s = 0.351$ $p = 0.000$ Decision: Reject H_o Significant	$r_s = 0.500$ $p = 0.000$ Decision: Reject H_o Significant

Neill et al. (2005), as cited in Taft et al. (2013), examined the relationship between financial activities, concerns, and overall financial well-being. Their research found that individuals with higher incomes and greater financial well-being experience lower stress levels, exhibit increased motivation in financial matters, maintain healthier family relationships, and enjoy better physical and mental health. The findings also suggest that as individuals set more ambitious financial goals, their financial well-being tends to improve. Taft et al. (2013) pointed out that increased financial needs can negatively affect well-being and self-esteem. They concluded that enhanced financial literacy can lead to reduced financial needs and improved financial well-being.

Moreover, the data imply that making sound financial decisions is linked to better financial well-being. Taft et al. (2013) highlighted the connection between high financial well-being and financial literacy, which enhances individuals' ability to manage their finances effectively and lower stress levels. Supporting this, Sabri (2018) found that greater financial knowledge correlates with increased satisfaction regarding financial well-being. Similarly, Hassan Al-Tamimi and Anood Bin Kalli (2009) noted that higher financial well-being is associated with improved financial literacy and fewer financial concerns.

4.0 Conclusion

The study reveals important insights into teachers' financial literacy, concerns, and well-being, highlighting areas that have significant implications for their professional and personal lives. Teachers' financial literacy is only moderate, particularly regarding financial knowledge, capability, and awareness. In contrast, their financial skills are rated high, suggesting a disconnect between knowledge and practical application. While teachers may be adept at managing immediate financial tasks, they might need a deeper understanding of long-term financial planning, such as investments or retirement planning. This gap has significant implications for their future financial security, particularly in the context of their modest salaries.

The findings also suggest that teachers' financial concerns are most acute about their financial goals, rated at a high literacy level. However, their decision-making processes are only moderately informed, and their financial security could be improved. This imbalance implies that while teachers may have clear financial goals, they may need more decision-making skills and security to achieve them effectively. Such situations may lead to increased financial stress and reduced overall well-being.

The significant relationships identified between financial literacy and various financial concerns and well-being highlight the crucial role that financial education plays in enhancing teachers' financial stability. The strong correlation between financial literacy (knowledge, skills, capability, and awareness) and financial goals indicates that improving teachers' understanding of financial concepts could directly enhance their ability to set and achieve financial goals. However, the weaker correlation with financial needs suggests that simply improving literacy may not address the deeper issues related to financial insecurity and stress.

Overall, the study emphasized the critical need for enhanced financial literacy programs that improve basic financial knowledge and skills and address the broader financial well-being of teachers. Doing so could reduce financial stress, improve decision-making, and ultimately improve teachers' financial outcomes, positively impacting their professional performance and personal lives. The findings suggest that stakeholders, including educational institutions and policymakers, must prioritize financial education as a key component of professional development for teachers to ensure their long-term financial security and well-being.

5.0 Contributions of Authors

This academic endeavor is solely authored by Enrico D. Zerna.

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This study does not have any conflict of interest.

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Social Media Engagement and Students' Critical Thinking Disposition Influenced by Their Information Skills

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Abstract. This study explored the relationship between social media engagement and critical thinking disposition among three hundred thirty-nine master's students at the Professional School of the University of Mindanao, Matina Campus, focusing on the mediating role of information skills. Using a quantitative, non-experimental design and stratified random sampling, data were collected through supervised face-to-face surveys and Google Forms to ensure accuracy. Data analysis included mean scores to assess the levels of social media engagement, critical thinking disposition, and information skills of the respondents; Pearson Product Moment Correlation was also used to examine relationships among these variables, and path analysis was further used to evaluate the mediating effect of information skills. The findings highlighted three primary dimensions of social media engagement: habitual use, obligation, and knowledge sharing. The results indicated that students exhibited a very high level of habitual use, integrating social media into their routines, a sense of obligation to engage in online interactions and a strong commitment to community participation. They also demonstrated very high knowledge-sharing behaviors, actively exchanging information, skills, and expertise. The analysis showed that students possessed a very high critical thinking disposition, marked by active engagement, cognitive maturity, and a robust capacity for problem-solving and synthesizing information. Moreover, the participants demonstrated strong information skills, including effective abilities in information retrieval, evaluation, and the application of prior knowledge to construct new concepts. Mediation analysis indicated that information skills partially mediated the relationship between social media engagement and critical thinking disposition, underscoring the value of fostering information literacy to enhance critical thinking alongside social media engagement. These findings suggest that information skills play a critical role in linking social media engagement to critical thinking, advocating for educational strategies that develop information literacy as a way to support students' critical thinking development further.

Keywords: Social media engagement; Critical thinking disposition; Information skills; mediation.

1.0 Introduction

Teachers are central to developing students' critical thinking skills, guiding them as they learn to evaluate and interpret the information they encounter, especially from social media. By incorporating critical thinking exercises, educators help students assess the credibility of online content. This skill is crucial in today's digital age, where sources of information are abundant yet often contradictory (Escola-Gascon et al., 2021). However, the vast quantity of information on social media presents significant challenges. Most students lack adequate guidance on using social media effectively, often struggling to discern credible information from misleading content, resulting in confusion and misinformation. To address these challenges, researchers emphasize the importance of integrating critical media literacy into educational practices to equip students with the skills to navigate complex online environments (Akpoghiran & Erubami, 2019).

In recent years, studies have examined how critical thinking instruction enhances students' ability to recognize fake news and evaluate information reliability. For instance, Álvarez-Huerta et al. (2022) found that focused critical thinking instruction empowers students to become more discerning media consumers, strengthening their higher-order thinking skills and contributing to overall academic growth. Despite evidence supporting the positive impact of targeted critical thinking instruction, research exploring the role of information skills in mediating the relationship between social media engagement and critical thinking disposition remains limited. While some studies suggest that strong information skills enable students to evaluate online content more effectively, few have directly examined how these skills influence students' ability to critically analyze social media information (Pudyaningsih et al., 2020).

This study seeks to fill this gap by examining the relationship between social media engagement and critical thinking disposition among students, focusing specifically on the mediating role of information skills. By understanding how students' abilities to manage and evaluate information impact their critical thinking development, this research aims to provide insights that could enhance educational strategies in the digital era. The findings could offer valuable guidance to educators on integrating information literacy and critical thinking instruction, ultimately supporting students' ability to assess and effectively engage with social media content critically.

2.0 Methodology

2.1 Research Design

The study utilized a non-experimental quantitative design and a descriptive-correlational research approach to gather data and insights. Calderon et al. (2012) define descriptive research as a fact-finding investigation aimed at understanding the main causes of situations, which was key in exploring the relationships in this study. The descriptive aspect provided an overview of the current situation, while the correlational component focused on identifying relationships between variables, enabling predictions based on existing data (Stangor & Walinga, 2019). Khan (2019) notes that descriptive-correlational research uses quantitative methods to analyze and interpret existing conditions, often comparing variables to uncover relationships among non-manipulated factors. This study specifically examined the relationships among three key variables: social media engagement, critical thinking disposition, and information skills of professional school students. It aimed to determine if higher levels of social media engagement influenced students' critical thinking, with information skills as a potential mediator. Quantitative methods were employed to collect data, and statistical analyses were conducted to identify significant relationships and mediation effects.

2.2 Research Locale

The study was carried out at the University of Mindanao, one of the universities in Davao City, during the school year 2024-2025. The research setting provided a conducive environment for exploring the relationship between social media engagement, information skills, and critical thinking disposition among students. The university was chosen for its diverse student population and active academic programs, making it an ideal location for this study.

2.3 Research Participants

The population of interest in this study consisted of students enrolled in the master's Program for the School Year 2024-2025. Participants were selected using a simple random sampling method to ensure everyone had an equal chance of being included. This method was chosen for its simplicity and effectiveness in generating a representative sample of the total population, which comprised approximately 1,500 students (Reeger & Aloe, 2019). To determine the appropriate sample size, Raosoft's formula was used, with a margin of error set at 5% and a confidence level of 95%. Based on this, the required sample size was calculated to be 316 respondents. However, the final number of respondents involved in the study was three hundred thirty-nine (339), exceeding the minimum sample size required. This ensured a sufficient sample size for the analysis, improving the study's reliability and accuracy (Raosoft, 2013).

2.4 Research Instrument

This study used an adapted, modified questionnaire based on various researchers' works, consisting of three sections: Social Media Engagement (adapted from Shava, 2017), Critical Thinking Disposition (Demircioğlu & Kilmen, 2014), and Information Skills (Clark & Catts, 2007). The Social Media Engagement section covered habit, obligation, and knowledge sharing; the Critical Thinking Disposition section included engagement, innovativeness, and cognitive maturity, while the Information Skills section focused on finding, evaluating, and managing information. The survey received a rating of 4.53 (excellent) from specialists and was pilot-tested for reliability. Cronbach's alpha values confirmed the reliability of the sections, with scores of .902 for Social Media Engagement, .92 for Critical Thinking Disposition, and .934 for Information Skills. A five-point Likert scale was employed throughout the questionnaire.

2.5 Data Gathering Procedure

This study utilized specific steps to gather data systematically. First, three distinct questionnaires were developed and subjected to internal validation. Subsequently, external validation was conducted by experts in the field, resulting in revisions based on their feedback. Following these revisions, approval was obtained from the researcher's advisor and the graduate school dean at the University of Mindanao. Once approval was secured, permission was requested from the relevant offices of the respondents to proceed with data collection. The survey questionnaires were distributed to respondents face-to-face and via Google Forms. Before sharing the link, the researcher explained the study's purpose and the objectives of the questionnaire. After one week, the completed survey forms were collected, and the responses were tabulated and submitted to an authorized statistician for data analysis.

2.6 Ethical Considerations

This research study adhered to ethical guidelines to protect human participants. The researcher obtained permission from the vice president of academics to distribute the survey, and a cover letter was included outlining the researcher's background, study objectives, and potential benefits. The cover letter also ensured respondents' anonymity and confidentiality. Data were securely stored, with identifying information separated from responses and safeguarded on password-protected devices or locked filing cabinets. Respondents were informed of their rights to decline participation or seek clarification, reinforcing ethical transparency. Furthermore, strict measures were implemented to prevent plagiarism, utilizing tools like Grammarly and Quillbot while avoiding data fabrication or falsification, with expert consultations to review the findings.

In addition to these measures, the study protocol number was obtained from the relevant ethics committee, which reviewed and approved the study to ensure adherence to ethical standards. Ethical considerations also included disclosing any conflicts of interest and ensuring the study posed no physical, psychological, or socio-economic risks to participants. Informed consent was secured from all respondents, ensuring transparency and agreement to participate in the study.

3.0 Results and Discussion

3.1 Social Media Engagement

Table 1 presents the results indicating a high overall mean score for social media engagement among students, reflecting consistent usage patterns. The highest score was observed in the habit dimension, suggesting that social media has become a fundamental aspect of students' daily routines. This consistent engagement aligns with previous studies emphasizing the significance of social media for interaction and information sharing (Mhlongo et al., 2023; Navales & Dequito, 2022). The obligation dimension highlighted students' commitment to engaging with their communities, reinforcing that social media facilitates meaningful connections.

Table 1. Descriptive statistics of the level of social media engagement

Indicator	Mean	SD	Descriptive Level
Habit	4.48	0.61	Very High
Obligation	4.35	0.63	Very High
Knowledge Sharing	4.37	0.57	Very High
Overall	**4.40**	**0.56**	**Very High**

This finding is supported by research suggesting that social media can enhance student community involvement and civic engagement (Yaqub & Alsabban, 2023). Moreover, students' willingness to share knowledge through these platforms underscores social media's role in collaboration and information exchange. This aspect is crucial, as educators can leverage social media to foster collaborative learning environments. Integrating social media into classroom discussions and group projects could enhance learning outcomes by promoting active participation and peer interaction. Overall, these findings highlight the need for educational institutions to recognize the influence of social media on students. By incorporating these platforms into educational practices, institutions can support academic growth and community engagement, further enhancing the learning experience.

3.2 Critical Thinking Disposition

Table 2 indicates students demonstrated a high overall critical thinking disposition, reflecting minimal response variability. This consistent level of critical thinking suggests that students regularly engage in collaborative learning, which enhances their critical thinking skills. Such findings align with previous studies by Boikou (2019) and Trout (2020), emphasizing the importance of collaborative activities in developing critical thinking. Further, the engagement dimension specifically reflects students' active participation in problem-solving, resonating with the work of Bedenlier et al. (2020). This active involvement supports Oddone's (2023) Connectivism Learning Theory, which emphasizes the role of engagement in knowledge acquisition.

Table 2. Descriptive statistics of the level of critical thinking disposition

Indicator	Mean	SD	Descriptive Level
Engagement	4.43	0.57	Very High
Innovativeness	4.29	0.59	Very High
Cognitive Maturity	4.27	0.64	Very High
Overall	**4.33**	**0.57**	**Very High**

The innovativeness dimension highlights students' eagerness to explore new ideas, consistent with findings by Wertzet et al. (2020). This eagerness is crucial as it fosters creativity and adaptability, skills that are essential in today's rapidly changing world. The cognitive maturity dimension also implies that students can evaluate multiple perspectives, reflecting their engagement with complex cognitive tasks. This finding aligns with Oddone's (2023) theory and corroborates Bedenlier et al. (2020), suggesting that exposure to diverse opinions significantly enhances critical thinking skills.

3.3 Information Skills

Table 3 indicates that students demonstrated a very high level of information skills, reflecting consistent responses across various dimensions. This proficiency suggests a positive contribution to their academic success and lifelong learning, as noted by Ozor and Toner (2022). Students' ability to effectively find, evaluate, manage, and utilize information fosters their development as critical thinkers, supporting findings by François (2022). The dimension focused on finding needed information effectively and efficiently suggests that students are adept at using search tools and adapting their information-seeking strategies. This aligns with research indicating that proficient users can navigate online and library resources effectively (Akpoghiran & Erubami, 2019).

Table 3. Descriptive statistics of the level of information skills

Indicator	Mean	SD	Descriptive Level
Finds needed information effectively and efficiently	4.48	0.53	Very High
Critically evaluates information and the information-seeking process	4.44	0.63	Very High
Manages information collected or generated	4.54	0.54	Very High
Applies prior and new information to construct new concepts or create new understandings	4.46	0.57	Very High
Uses information with understanding	4.48	0.58	Very High
Overall	**4.48**	**0.53**	**Very High**

Students' ability to critically evaluate information and the information-seeking process demonstrates their capacity to assess sources for accuracy and relevance, a vital aspect of critical thinking emphasized by Tully et al. (2021). Their strong proficiency in information management indicates that they excel at organizing and tracking sources, corroborating findings from Darling-Hammond et al. (2019). Moreover, students showed a remarkable ability to synthesize new ideas by combining existing and new information, which reflects higher-order thinking skills. This finding aligns with Kujur and Singh (2020), who noted that creating new concepts indicates advanced cognitive abilities. Finally, students were strongly aware of information use's ethical, legal, and social implications.

This commitment to ethical standards in academic work is crucial, as highlighted by Mhlongo et al. (2023), ensuring that students excel academically and uphold integrity in their information practices.

3.4 Relationship Between Variables

Table 4 presents the correlation analysis results that examined the relationship between social media engagement and students' critical thinking disposition, mediated by their information skills. The analysis reveals significant positive relationships among all variables, highlighting important implications for educational practices. The strong correlation between social media engagement and critical thinking disposition indicates that increased engagement on social media platforms is associated with a heightened disposition toward critical thinking among students.

Table 4. Correlation between variables

Pair	Variables Coefficient	Correlation	p-value	Decision
IV and DV	Social Media Engagement and Critical Thinking Disposition	0.960	0.000	Reject the null hypothesis
IV and MV	Social Media Engagement and Information Skills	0.895	0.000	Reject the null hypothesis
DV and MV	Critical Thinking Disposition and Information Skills	0.886	0.000	Reject the null hypothesis

This finding supports the notion that social media can enhance critical thinking skills through ongoing interaction with digital content, evaluation of online resources, and peer collaboration. Bedenlier et al. (2020) noted that social media activities can foster critical thinking more effectively than traditional face-to-face learning by promoting digital literacy and critical engagement. The significant relationship between social media engagement and critical thinking disposition can be explained through Social Learning Theory (Bandura, 1977), which emphasizes learning through observation and interaction within social contexts. Engaging on platforms like Facebook allows students to observe, question, and critically assess information. This is echoed by Rhyne et al. (2019), who concluded that social media engagement significantly contributes to cognitive maturity, including critical thinking among South African rural youth.

Another significant relationship the analysis identifies is between social media engagement and information skills. This strong positive correlation suggests that increased engagement with social media correlates with improved information skills. This implies that social media enables students to evaluate information, verify sources, and assess content reliability, consistent with findings from the Stanford Graduate School of Education, as cited by Ozor and Toner (2022). Their study revealed that many students struggle to distinguish between real and fake information. Consequently, social media platforms serve as valuable tools for developing these skills by exposing students to content requiring critical evaluation. This aligns with Kaarakainen et al. (2019), who argued that social media use is intertwined with developing sophisticated information skills. As students share knowledge, engage in discussions, and navigate online resources, they inherently assess the credibility of information, enhancing their information literacy. Johnson et al. (2021) further emphasize that information skills are essential for lifelong learning and academic success, especially as institutions strive to improve students' independent access to reliable information.

The correlation between critical thinking disposition and information skills confirms another significant positive relationship. Students with a strong disposition toward critical thinking tend to demonstrate higher information skills, highlighting the interdependence between critical thinking and the ability to process and evaluate information. This suggests that better critical thinkers are more adept at discerning information quality and utilizing it effectively in academic settings. These findings are consistent with Boikou (2019), who asserted that students with heightened critical thinking can gather, evaluate, and apply information independently. Wertzet et al. (2020) also argued that individuals with strong information skills leverage critical thinking to navigate the overwhelming amount of available information, both online and offline.

3.5 Social Media Engagement's Influence on Critical Thinking Disposition as Mediated by Information Skills

Table 5 shows the mediation analysis conducted in this study, which explored the relationship between social media engagement, information skills, and critical thinking disposition through a structured path analysis. A key component in interpreting these results is the Standard Error (SE), which provides insight into the precision of the estimates. The analysis reveals significant relationships across different paths, emphasizing social media engagement's role in enhancing information skills and critical thinking disposition.

Table 5. Regression analysis shows social media engagement's influence on critical thinking disposition as mediated by information skills

Step	Path	B	S.E.	β
1	c	0.966	0.015	.960
2	a	0.850	0.023	.895
3	b	0.146	0.036	.138
4	c′	0.842	0.034	.836

* p<0.05

The first step in the analysis examined the direct relationship between social media engagement and critical thinking disposition. The findings indicated a positive influence of social media engagement on critical thinking disposition, suggesting that students who engage more with social media demonstrate higher critical thinking skills. This aligns with Rhyne et al. (2019), who demonstrated that social media can enhance cognitive abilities, including critical thinking.

In the second step, the analysis assessed the impact of social media engagement on information skills, revealing a strong positive relationship. This implies that increased engagement correlates with better information skills, confirming the notion presented by Kaarakainen et al. (2019) that social media aids in developing skills necessary for evaluating and verifying information.

The third step tested the relationship between information skills and critical thinking disposition. The significant positive correlation indicates that students with better information skills tend to exhibit a stronger disposition toward critical thinking. This finding complements Boikou's (2019) assertion that students with higher critical thinking dispositions possess better information skills, reinforcing the interconnectedness of these abilities.

Finally, the analysis considered the mediating role of information skills in the relationship between social media engagement and critical thinking disposition. The results suggested that while social media engagement significantly influenced critical thinking disposition, the effect size decreased, indicating partial mediation. This finding implies that although information skills are key, other contributing factors likely exist. Bedenlier et al. (2020) emphasized that social media learning environments foster various skills, including critical thinking, beyond just information skills.

The variability noted in the estimates, particularly in the paths that included information skills, suggests that other external factors may influence the mediation. Nonetheless, the overall analysis underscores that social media engagement and enhanced information skills significantly contribute to developing students' critical thinking dispositions. Johnson et al. (2021) further highlight the importance of developing information skills for lifelong learning, reflecting the current study's implications that fostering social media engagement and information skills can significantly enhance students' critical thinking abilities.

4.0 Conclusion

The students demonstrate a profound engagement with social media, characterized by habitual use, a sense of obligation to participate in their online communities, and a commitment to knowledge sharing. They exhibit a very high level of critical thinking disposition, actively engaging in problem-solving and showcasing cognitive maturity as they navigate complex issues. Their information skills are equally impressive, as they efficiently locate, evaluate, and manage information while being aware of the ethical implications of their use. The strong positive correlations among social media engagement, critical thinking disposition, and information skills highlight the interconnectedness of these competencies, suggesting that social media serves as a vital platform for enhancing cognitive skills. Furthermore, the mediation analysis confirms that improved information skills partially mediate the relationship between social media engagement and critical thinking disposition, emphasizing the need to foster information literacy and social media engagement to effectively cultivate students' critical thinking abilities.

Future research directions could include conducting longitudinal studies to assess the long-term impacts of social media use on critical thinking and information literacy across various educational contexts (Villalobos, 2023). Additionally, investigating which types of social media interactions—such as collaborative projects or peer feedback, are most effective in enhancing these skills would provide valuable insights for educators (Swinkels, 2023).

These future directions are significant for educators and students beyond the immediate sample studied. Educators can create more engaging and interactive learning environments that encourage critical thinking and collaboration among students by understanding how social media can be strategically utilized in educational settings. This prepares students for the complexities of a digital world and equips them with essential skills for their academic and professional futures. As social media plays a pivotal role in education, fostering an informed and responsible approach to its use will be crucial for developing students' cognitive abilities in an increasingly interconnected landscape.

5.0 Contributions of Authors

The realization of this study involved significant contributions from the author, ensuring a comprehensive approach to the research process. The author was crucial in supervising the overall project, guiding its direction, and ensuring adherence to research standards. She was responsible for data encoding and analysis, meticulously handling the data to extract meaningful insights. The author further contributed to the writing and interpretation of the findings, synthesizing the results and ensuring clarity in the presentation.

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7.0 Conflict of Interests

The authors declare no conflicts of interest about the publication of this paper.

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Environmental Literacy among Pre-Service Teachers Towards Integrating Green Technology into the Classroom

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Abstract. Alarming environmental degradation urges educators to be well-trained with the essential knowledge and skills to integrate green technology into school curricula. This study investigated the level of awareness and extent of practices of pre-service teachers regarding green technology. The study also determined the relationship between awareness and practices. The respondents of this study were undergraduate education students of Bulacan Agricultural State College. Data were analyzed using mean and standard deviation, Spearman's rank correlation, and thematic analysis. The study explored how the respondents perceive and potentially integrate green technology into their future classrooms by employing sequential explanatory mixed-methods design. Findings revealed that most respondents are moderately aware of green technology and its benefits in addressing environmental issues. Results also indicate a high overall extent of practices of pre-service teachers regarding green technology. Furthermore, the correlation ($r_s = 0.465$) shows that the level of awareness and extent of practice in green technology positively correlated to a moderate degree. The relationship was statistically significant with a p-value lesser than 0.05 significance level, t (8.832), $p = 0.000$. The insights and conceptualizations of the pre-service teachers regarding green technology strengthened the quantitative data. Their practices reflect green and sustainable living, and they hold exciting insights into the benefits of green technology in mitigating climate change. The findings proposed a strategic environmental management plan to enhance pre-service teachers' capacity to leverage green technology. Thus, it is essential to implement a carefully developed strategic ecological management plan to raise students' dedication, passion, and commitment toward environmental sustainability.

Keywords: Climate change; Environmental education; Green technology; Pre-Service teachers; Sustainable practices.

1.0 Introduction

The Philippines, being highly vulnerable to climate change impacts, frequently experiences severe natural disasters, exacerbating environmental degradation and emphasizing the urgent need for sustainable practices (Peñalba, 2021). In line with the global environmental goals, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) advocates for integrating education for sustainable development (SDG4), aiming to raise awareness of environmental issues through education (Gonzaga, 2016). As essential information agents, teachers are pivotal in fostering environmental awareness and action among future generations. However, pre-service teachers need more training in ecological literacy and green technology (Bahar et al., 2008; Özsoy, 2012). This gap limits their ability to effectively educate students on critical environmental issues like climate change and sustainable living.

Integrating green technology into educational curricula can equip students with the tools to mitigate environmental damage and adapt to sustainable practices. However, studies show that while teachers recognize the importance of environmental education, many still need to be equipped with the requisite knowledge and training to implement concepts effectively (Li et al., 2023). Furthermore, pre-service teacher training programs often inadequately address this practical and conceptual integration of green technologies into teaching practices (Álvarez-García et al., 2015). This gap is significant because educational institutions promote environmental consciousness and sustainable practices.

Recent studies reveal several barriers to green technology integration in education, including financial constraints, limited environmental knowledge, and skepticism toward sustainable practices (Lay et al., 2013). While universities are gradually adopting sustainable technologies, integration remains inconsistent, and efforts are often fragmented, as mentioned (Ateeu et al., 2024). Despite progress in implementing green technologies in higher education, a comprehensive, systematic approach to environmental literacy within teacher education is still insufficient (Sadh, 2019). This study addresses these gaps by assessing pre-service teachers' current awareness and practices regarding green technology to enhance their capacity to lead sustainable education initiatives.

This research explores the environmental literacy of pre-service teachers, focusing on their awareness and practices related to green technology. By identifying future educators' current knowledge levels and practices, this study sought to bridge gaps in environmental education and support the integration of green practices within classroom settings. Ultimately, the findings aim to inform a strategic environmental management plan designed to empower pre-service teachers with the skills and motivation to promote ecological sustainability effectively.

2.0 Methodology

2.1 Research Design

The study employed a sequential explanatory mixed-methods design, a two-phase research approach. In the first phase, quantitative data were collected and analyzed to explore the pre-service teachers' level of awareness and extent of practices regarding green technology. In the second phase, qualitative data were gathered through open-ended questions to further explain and elaborate on the quantitative findings. A two-part process of data collection and analysis is included in a sequential explanatory mixed-methods design, as described by Wipulanusat et al. (2020), with the qualitative phase building on the quantitative findings. Qualitative data provided a more comprehensive understanding of the research problem using the initial quantitative results. The quantitative phase allowed for the measurement and analysis of the pre-service teachers' awareness and practices, while the qualitative phase offered an in-depth exploration of their conceptualizations, insights, and perspectives regarding green technology. The sequential explanatory design was deemed appropriate for this study as it enabled the researcher to establish the baseline quantitative data and then use the qualitative findings to explain the numerical results in greater depth. This design also allowed for the development of a more comprehensive strategic environmental plan based on the integrative findings from both phases of the research.

2.2 Research Locale

The study occurred in Bulacan Agricultural State College, San Ildefonso, Province of Bulacan, Central Luzon, Philippines. This college is a lone agricultural higher education institution and a home for the province's financially challenged but deserving students. It was founded in 1952 as Plaridel Community Agricultural High School and later renamed Bulacan National Agricultural High School (BNAHS) in 1953. The school was renamed Bulacan National Agricultural School (BuNAS) in 1959 and became a state college in 1998 under Republic Act No. 8548, solidifying its significant role in agricultural education.

2.3 Research Participants

The researcher collected the data from 80 pre-service teachers. Purposive sampling is the sampling technique utilized in the study where the target respondents were not forced to participate and considered their right to withdraw. According to Oliver (2013), purposive sampling is a form of non-probability sampling in which decisions concerning the individuals to be included in the sample could be treated by the researcher based on a variety of criteria, which may include specialist knowledge of the research issue, or capacity and willingness to participate in the research. Pre-service teachers were chosen as the study's respondents because they would be the next generation of teachers and must be well-trained in environmental ed that they can use to teach environmental education to their future learners regardless of the subject they will handle.

2.4 Research Instrument
A structured questionnaire from the study "Level of Knowledge, Comprehension, and Attitude of Rural Communities on Green Technology" by Chik et al. (2017) was adopted to gather data from respondents. The researcher sent an email to ask permission from the authors to adopt their instrument. The researcher made certain modifications to make it suitable in the study context, such as some statements or questions were transferred to which category they were most appropriate. The survey instrument consisted of three parts. Part I inquired about the socio-demographic profile of the respondents in terms of sex, age, and year level. Likert scale response options such as level of awareness and frequency, adopted from Vagias (2006), were the appropriate measures for the statements that respondents may choose from to rate their responses to the indicated evaluative questions. Part II consisted of statements on the level of awareness regarding green technology. Five-point Likert scale techniques of '5 – Extremely aware', '4 – Moderately aware', '3 - Somewhat aware, '2 – Slightly aware', and '1 – Not at all aware' were used to score the items. Part III consisted of items on pre-service teachers' extent of practice of green technology. Five-point Likert scale of '5 – Always', '4 – Often', '3 – Sometimes', '2 = Rarely' and '1 = Never' were used. The last part included five open-ended questions to obtain the students' insights about green technology's importance, examples, misconceptions, and how it can help mitigate climate change and integrate it into the curriculum. The researcher organized the questionnaires using Google Forms and created a link the respondents could access. Pre-service teachers were required to open their email accounts for the online survey form. Instruction that explains that all the information the respondents provide is treated with utmost confidentiality as indicated. Responses were automatically recorded by the Google form when the students had completed the survey form completely and submitted their responses correctly.

2.5 Data Gathering Procedure
A research consent form indicating the crucial conditions and considerations to the respondents has been provided for ethical purposes. A survey questionnaire was disseminated through Google Forms to gather the data. They were required to open their email accounts to access the Google form through a link. They were also required to answer all the questions with red asterisk (*) marks from the Google Form. Clear instructions for each part of the online survey form were included regarding how the Data Privacy Act protected the respondents and how they would complete the questionnaire. During the data gathering, pre-service teachers submitted their responses, and for transparency purposes, the researcher could view each respondent's responses. The online survey form was open for two weeks, allowing the respondents ample time to complete the questionnaire. On average, it took the respondents around 15-20 minutes to answer the entire survey, which included both the Likert-scale items and the open-ended questions.

2.6 Data Analysis
Since the study used a sequential explanatory quantitative and qualitative research method, descriptive statistics such as mean and standard deviation were used to analyze data for the respondent's level of awareness and extent of practice in green technology. Spearman's rank correlation was employed to determine the relationship between the respondents' awareness and practice of green technology. Subsequently, the open-ended responses were analyzed through a Thematic Analysis to explain the implications and conceptualizations made by the pre-service teachers regarding Green Technology. The data gathering and analysis were conducted sequentially, with the quantitative phase preceding the qualitative phase. This convergent approach allowed the researcher to better understand the research problem by integrating the quantitative and qualitative findings to generate more comprehensive insights and recommendations. The method of Braun and Clarke (2006) involving six phases of thematic analysis was applied to generate findings. These phases are the following: 1. Familiarizing oneself with the data where the researcher read and re-read the open-ended responses to become thoroughly familiar with the content; 2. Generating initial codes in which the significant statements and phrases were identified and coded to capture key ideas and concepts; 3. Searching for themes where the coded data was collated, the researcher began searching for broader themes that could encompass the various codes; 4. Reviewing themes where the identified themes were reviewed and refined to ensure they accurately represented the data; 5. The themes were clearly defined and named to reflect their essence and distinguish them from one another, and 6. Producing the report was the last step, and the final themes were used to generate a detailed analysis and interpretation of the

qualitative findings. Furthermore, the recommendations for the strategic environmental management plan were presented in a tabular form based on the findings.

2.7 Ethical Considerations

This research study followed ethical guidelines. The researcher kept the data gathered confidential and raw data were stored on a USB device to protect the privacy of each respondent. After the data gathering, the summarized data from the collected data were preserved for the results and discussion.

3.0 Results and Discussion

3.1 Awareness of Green Technology

Table 1 shows the respondents' awareness of green technology, including their perspective on its importance, utilization and implementation, and impact on reducing environmental problems.

Table 1. Pre-service teachers' level of awareness in green technology

Parameters	Mean	SD	Description
1. I am aware of the importance of green technology to the environment.	4.19	0.90	Moderately aware
2. I am aware that green technology can guarantee a healthy and pleasing environment	4.08	0.92	Moderately aware
3. I am aware of the technology of green consumption to society, the country, and the environment.	3.86	0.88	Moderately aware
4. I know that green technology can reduce Greenhouse Gas emissions (GRH).	4.04	0.91	Moderately aware
5. I know that using green technology can save energy and non-renewable natural resources.	4.25	0.82	Extremely aware
6. I know that using green technology can reduce the negative impact of human activity.	4.10	0.84	Moderately aware
7. I am aware of the types of green technology products or equipment.	3.50	0.84	Moderately aware
8. I am aware of the government's implementation of the green technology campaign.	3.60	0.87	Moderately aware
9. I am aware that human activities have a lot of adverse effects on the environment.	4.43	0.94	Extremely aware
10. I know that 'Green Building' and 'Go Green' are linked to green technology.	3.90	0.98	Moderately aware
11. I am aware that green technology will have a positive impact on future generations.	4.26	0.91	Extremely aware
12. I know the meaning of the energy-saving sticker attached to electrical appliances.	3.91	0.96	Moderately aware
13. I am aware that green technology can promote renewable energy use.	4.05	0.87	Moderately aware
Overall Mean	**4.01**	**0.89**	**Moderately aware**

The overall computed mean for the respondents' awareness level of green technology was 4.01 with a standard deviation of 0.89 and can be interpreted as "Moderately aware." This result implies that most pre-service teachers are moderately aware of the positive impacts of green technology as a strategy to control the emergence of different environmental concerns and issues. This most likely conformed to the study of Mustapha and Nashir (2019) on the Awareness of Green Technology among Engineering Technology Students. They found that the students have a positive attitude toward green technology and strongly agreed that it is crucial because it could enhance their quality of life.

The highest computed mean for the level of awareness of green technology was item number 9, with a mean of 4.43 and a standard deviation of 0.94, and can be verbally described as "Strongly Agree." This suggests that the pre-service teachers know that human activities have a lot of adverse effects or consequences on the environment. Human activities such as burning fossil fuels, mining, deforestation, illegal fishing, industrialization, and using different technologies are known causes of global warming and the greenhouse effect that eventually leads to climate change. Even though educating people on strategies like green technology will not be enough, pre-service teachers must still be able to address environmental issues efficiently so that students can have empathy and love for their surroundings. This is followed by item 11 (M=4.26, SD=0.91), in which pre-service teachers strongly agreed with the statement, "I am aware that green technology will have a positive impact on future generations." This means that being aware of green technology would probably orient the community to a more sustainable way of utilizing natural resources from the environment.

Pre-service teachers believed that green technology may be one of the best approaches to promote education for sustainable development. Preserving the future life of the coming generation is a simple description to understand sustainability. Chik *et al.* (2017) also claimed that development, industry, agriculture, forestry, and other human activities have contributed significantly to global warming, climate change, and other natural calamities. Furthermore, with a lack of concern and a less responsible attitude toward environmental maintenance and preservation, it is complex that situations with a more significant negative influence on the environment, including the quality of human life, are also affected (Ahmad, 2013).

The lowest mean for the awareness level construct about green technology was item 7 (M=3.50, SD=0.84), which can be described as "Agree." The respondents agreed, "I am aware of the types of green technology products or equipment." This implies that pre-service teachers agreed that they had encountered the types of green technology products or equipment. With this, they can put it into day-to-day practice and even conduct research studies about green technology, further promoting this environmental strategy for the benefit of the people and especially for the recovery of nature. The second lowest recorded mean was item 8 (M=3.60, SD=0.87), which can be interpreted as "Agree." It can be indicated that the respondents agreed with the statement, "I know the government has implemented the green technology campaign."

Although it is just on the awareness level, it is advantageous for the pre-service teachers to have already encountered the Philippine environmental laws and policies implemented for many years. However, the problem is that there is a lack of evidence that Filipinos strictly and widely obey these laws. It can still be shared that the lack of discipline and disobedience results in different environmental destructions because statutes are said to be followed only at the beginning by setting politics and corruption aside as major problems of the country. Ali et al. (2019) suggested that one of the things that motivates individuals to become more aware of green technology is government policy and regulation. To achieve the strategic aim of green technology, the government also focuses on all the growth and principles of moving toward a nation that prioritizes environmental health. Furthermore, Butt et al. (2018) claimed that political challenges impact the outcome for the Green since political power comes from government rules.

3.2 Practice of Green Technology

Table 2 presents the respondents' green technology practices in terms of the control of the use of paper and plastics, minimizing the activities that cause carbon dioxide emissions, and the practice of reducing, reusing, and recycling.

Table 2. Pre-service teachers' extent of practice of green technology

Parameters	Mean	SD	Description
1. I reuse the unprinted part of the paper for other uses.	3.96	0.91	Often
2. I bring my container when buying food.	3.34	1.09	Sometimes
3. I use organic materials to reduce chemicals in my daily life.	3.60	0.85	Often
4. I bring a reusable water bottle.	4.19	1.07	Often
5. I buy items that are recyclable or made from recycled materials.	3.75	0.89	Often
6. I stopped buying CFC spray because it destroys the ozone layer.	3.76	1.06	Often
7. I separate the waste into paper, plastic, bottles, and cans for recycling purposes.	3.80	0.99	Often
8. I practice recycling at home and hostel.	3.73	1.02	Often
9. I always use green technology products both at home and outdoors.	3.58	0.88	Often
10. I reduce the use of air conditioning at home.	3.78	1.26	Often
Overall Mean	**3.81**	**0.89**	**Often**

The overall mean for this construct was 3.81 with a standard deviation of 0.89, which can be interpreted as "Often" for the respondents. The result suggests that the pre-service teachers often engage in activities regarding the use of green technology. This is an indication that they have already experienced simple practices for engaging in the use of green technology. Therefore, green technology is not new to many because it is just a modified approach to maintaining a well-sustained environment. In the survey conducted by Anusuya and Hashima (2022), it was found that practices related to green technology among Vocational college students are high. Equally, Da Silva (2015) observed favorable attitudes, or high scores, for green technology practices, such as high involvement in environmental activities and using green technology in day-to-day tasks.

Moreover, an additional plausible interpretation of the results may be that they stem from the collective influence of numerous individuals or a population achieving little improvements in their environmental impact, resulting in a marginal development in the environmental impact as a whole (Perrault & Clark, 2018). Different studies also indicated that practices relating to green technology are high (Mustapha & Nashir, 2019; Perrault & Clark, 2018; Salas-Zapata et al., 2018; Musa et al., 2015). On the other hand, some studies negate the findings, reiterating negative or below-satisfactory level practices on green technology (Anusuya & Hashima, 2022; Ahmad et al., 2020;

Hussin & Hafit, 2018). Students' inconvenience is said to be the cause for the low level of green technology practices. The idea that educational organizations like schools should be able to help modify students' environment to influence their behavior is increasingly encouraged. (Perrault & Clark, 2018).

The highest mean computed was item number 4 (M=4.19, SD=1.07), which can be described as "Often." This means that the pre-service teachers often bring a reusable water bottle. Many people can relate to it as getting a tumbler somewhere has become a trend to reduce waste. Essentially, it is becoming a good practice in the classroom setting or even outdoors the "bring your own tumbler" policy that limits the students and others to use bottled water and plastic cups that are just additional to the waste pollution. The aim of green technology may be to promote more sustainable practices and develop good habits that lead to zero-plastic usage. The second highest mean was item number 1 (M=3.96, SD=0.91), and verbally describes "Often." This implies that the pre-service teachers often reuse the unprinted part of the paper for other uses, which is an example of being resourceful or economical.

Indeed, the sources of paper used in schools and many offices are the trees from the forest. One cannot imagine how costly it is when a tree is cut just to make papers to be used in the office to print stuff. Another sustainable practice is reusing the back of printed papers to save trees from the forest because they are essential for the ecological balance and for us to breathe. In the same fashion, the findings of Goulgouti et al. (2019) revealed that three out of every four pre-service teachers use paper as a draft, and more than half use plastic and paper bags more often or regularly. Furthermore, more than half of prospective teachers are willing to recycle batteries (56%), plastic, glass, and paper (52%), but only about 46% recycle electric and electronic gadgets.

The lowest mean obtained was item number 2 (M=3.34, SD=1.09), which can be verbally described as "Sometimes." This explains that the respondents can sometimes bring their containers when buying food. This may be because some students have their own packed lunch while some prefer to eat lunch at the school canteen or take out foods covered by styrofoam with plastic spoon and fork. As role models, teachers may encourage their students to start (even in a gradual phase) shifting into a more sustainable way of living. The second highest mean computed was item number 9 (M=3.58, SD=0.88), which verbally describes "Often." This suggests that respondents often say, "I always use green technology products both at home and outdoors." With this, the pre-service teachers may be devoted to green technology products if they can regularly use eco-friendly products. However, this is quite challenging as it depends on the availability of the resources and the quality outcomes it provides. Climate change has progressively become more serious, and teaching people about applicable practices or hacks to reduce the consequences is never too late. It is about time for educators, scientists, and leaders to extensively use green technology for the public and let environmental laws and policies take effect for a more extended period. Gonzaga (2016) emphasizes that college students practice green energy, green building, and green chemistry to a low extent. However, it was also mentioned that consumers are growing increasingly mindful of the significance of environmental destruction, which makes them want to buy eco-friendly goods and services and support companies that prioritize ecological practices.

More recently, Yusof et al. (2023) expounded that environmental pollution persists even after several responsible parties have launched ecological education and awareness efforts through social media, books, and other forms of information. Therefore, to contribute to environmental conservation, a persistent effort to raise public awareness of green technology and efficient energy resource management has to be launched, especially among students. For students to practice environmental sustainability and understand its significance, it is also necessary to highlight the necessity of behaviors like conserving water and energy and adhering to the 3R principle.

3.3 Relationship between Awareness about and Practice of Green Technology

Table 3. Correlation between pre-service teachers' level of awareness and extent of practice in green technology

r_s-value	t-value	p-value	Relationship
0.465	8.832	<0.000	Significant

*Correlation, r_s, is significant at $p < 0.05$ level.

The result of Spearman's rank correlation (rs = 0.465) shows that the pre-service teachers' level of awareness and extent of practice in green technology have a positive correlation to a moderate degree. The relationship was reported to be statistically significant (Table 4) with a p-value lesser than 0.05 alpha level of significance, t (8.832), p =0.000. This means that as the awareness of the pre-service teachers increases, their practices in green technology are, to a reasonable extent, indicating. Environmental consciousness is linked to a desire for sustainability, which further leads to participation in movements or initiatives on climate action or environmental protection, as stated in Sustainable Development Goal (SDG) 13.

This finding is similar to the report made by Gonzaga (2016), in which she found a moderate level of awareness but low practice in green technology among college education students. Meanwhile, other studies indicate high attitudes and actions toward sustainability (Sunthonkanokpong & Murphy, 2019). In addition, Lualhati et al. (2024) discussed that environmental law awareness positively correlates with green household practices. Relatively, Ridwan et al. (2021) added that sustainability awareness is generally high among pre-service teachers, but practice may lag. Recommendations for addressing the gap between awareness and practice include creating holistic programs integrating green technology concepts in tertiary education (Gonzaga, 2016) and holding seminars on sustainability and green practices (Lualhati et al., 2024). These initiatives aim to enhance environmental consciousness and promote sustainable living among future educators.

3.4 Qualitative Analysis

Table 4 presents the qualitative analysis of students' responses to the open-ended question, "*In your opinion, how important is Green Technology to solve environmental problems?*" that elaborates on the importance of green technology in terms of climate change mitigation through *minimizing the carbon footprint* that causes global warming and *promoting sustainable solutions* to conserve environment allowing everyone to contribute to global carbon emissions from continuous industrial activities and urbanization. Green technology can be a sustainable solution that aims to provide alternative options for people to become part of the solution rather than part of the problem.

Table 4. Qualitative analysis of students' responses in interview guide question 1

Central Theme (s)	Themes Clusters	Formulated Meanings
Climate Change Mitigation	Minimizing human's carbon footprint Promoting sustainable solutions	Findings suggest that the emergence of green technology can help solve environmental problems, including carbon emissions in the atmosphere that cause global warming due to human anthropogenic impacts. This implies that individual carbon footprints increase as the human population continuously grows, leading to more challenging climate conditions. Green technology can be an alternative solution to prevent the release of harmful chemicals from industrial destructive activities by shifting to the use of renewable sources of energy that promote conservation over harm.
Promote Environmental Sustainability	Conservation of Natural Resources	This means that green technology paves the way for conserving natural resources to provide life for future generations. Specific environmental imbalances are inevitable due to human's ever-changing needs and demands, especially from natural resources. Still, this green technology initiative can teach the community to practice conservation efforts for ecological sustainability. Green technology allows one to appreciate the importance of active participation in climate actions.

Meanwhile, the findings also revealed that green technology promotes environmental sustainability by initiating the conservation of natural resources efforts and ensuring abundant life for the next and future generations. It takes much encouragement to convince people to participate in environmentalism, but instilling self-discipline in younger generations is still possible, even though it is very challenging nowadays. Several studies underscored the importance of green technology in mitigating climate change and promoting environmental sustainability among students. According to Suryawanshi (2018), higher education institutions (HEIs) must embrace green ICT practices, whereas Kadiyono *et al.* (2019) suggest that introducing green technology can increase students' knowledge of environmental issues. With this, some authors address how education shapes students' attitudes and behaviors toward the environment. Bashirun (2023) suggests that green concepts can be incorporated into learning outcomes. On the other hand, Cernicova-Bucă (2023) proposed that students must be prepared to act as sustainability promoters. Collectively, these studies emphasize the potential impact of green technology to engage and empower students in addressing the pressing issues of climate change and the need for sustainable development.

Table 5 presents the qualitative analysis of students' responses to the question, *"How does GreenTech help fight climate change?"* highlighting that patronizing green consumerism, lessening the carbon footprint, and starting sustainable practices at home are among how one can use green technology to fight climate change. Green consumerism allows one to discover the benefits of being *open to buying eco-friendly products*. It is much like buying products more likely to come from raw materials to improve environmental conditions. Green technology can also *lessen the carbon footprint* by making alternative and sustainable choices when using natural resources for food supply and commercial and industrial purposes, among others. When one consumes a tree, it must be replaced with ten more trees. In a more practical sense, a simple conservation activity at home can lessen the impact of climate change. People need to control their *household activities that harm nature's conditions* by considering basic sustainable practices, no matter how small these are.

Table 5. Qualitative analysis of students' responses in interview guide question 2

Central Theme (s)	Themes Clusters	Formulated Meanings
Renewable sources of energy as a counter to climate change	Solar panels, Windmills, and geothermal sources of energy	Results suggest that renewable sources of energy such as solar panels, windmills, and geothermal forms of energy are part of GreenTech initiatives that allow for energy conservation practices by not compromising or relying too much on coals, fuel, and natural gases, which are non-renewable sources and contribute mainly on the emission of baron in the atmosphere. This may also prevent people from experiencing insufficient reserves or low power supply, leading to power outages.
Zero non-biodegradable wastes	Discouraging the use of plastics	GreenTech is about the product and its meaningful environmental principle, which encourages everyone to participate in climate actions. Influencing others to use eco-bags instead of plastic is a challenge to reducing waste pollution.
Climate-smart methods in agriculture and different industries	Sustainable farming and industrial techniques can help to prevent harmful gas emissions that cause climate change.	This implies that more ongoing innovations in agriculture, industry, and other fields ensure profits while promoting sustainability. It is good that these advanced green technologies are mainly invented to monitor our climatic conditions and minimize the huge impact of environmental problems, such as the greenhouse effect and global warming, which have further caused climate change.

This conforms to the studies of Kumar (2022) and Fatemi *et al.* (2022), who both emphasize the potential of renewable energy sources such as solar, wind, and biomass to lower fossil fuel consumption and environmental pollution in agriculture. Faucher (2006) specified that incorporating renewable systems on farms is advantageous, mainly when manure is used to produce biogas. It was further elaborated that solar-powered technology, which includes photovoltaic modules and energy-efficient pumping systems, plays a crucial role in sustainable agriculture (Dhonde, 2022). These studies highlighted how crucial green technology is to combat climate change and advancing sustainable development.

Table 6 presents the qualitative analysis of students' responses to the question, *"How does GreenTech help fight climate change?"* highlighting that patronizing green consumerism, lessening the carbon footprint, and starting sustainable practices at home are among how one can use green technology to fight climate change. Green consumerism allows one to discover the benefits of being *open to buying eco-friendly products*. It is much like buying products more likely to come from raw materials to improve environmental conditions. Using green technology can also *lessen the carbon footprint* by making alternative and sustainable choices when using natural resources for food supply and commercial and industrial purposes, among others. When one consumes a tree, it must be replaced with ten more trees. In a more practical sense, a simple conservation activity at home can lessen the impact of climate change. People need to control *household activities that harm nature's conditions* by considering basic sustainable practices, no matter how small they are.

Table 6. Qualitative analysis of students' responses in interview guide question 3

Central Theme (s)	Themes Clusters	Formulated Meanings
Green consumerism	Openness to using eco-friendly products.	One practical way to practice green technology is to buy eco-friendly products rather than patronizing those that are destructive to the environment. GreenTech may influence others to shift to sustainable ways and show discipline over the growing human abuse of natural resources.
Lessening carbon footprint	It reduces carbon emissions, greenhouse gases, and other harmful chemicals.	Green technology can lessen the harmful emissions of CO2 and other greenhouse gases caused by various human activities. As this occurs, extreme weather conditions can improve, resulting in a healthy environment.
Starting sustainable activities at home	Lessen household activities that contribute to climate change	It indicates that green practices may always begin at home by simply avoiding dumping plastics and harmful chemicals associated with the minimal use of air conditioners, refrigerators, and other home appliances that emit CO2.

Research reveals that there is now an increase in green consumerism that is driven by a desire to combat climate (Roser-Renouf *et al.*, 2016). The positive impact of environmental knowledge, education, and social norms on green purchasing behavior supports this trend (Lin & Niu, 2018). It is further emphasized that through mitigation and adaptation strategies, green technology may be considered a significant component in countering climate change (Olaleru *et al.*, 2021). In addition, communication plays a pivotal role in strengthening attitudes regarding the ability of consumer action to promote green consumption (Roser-Renouf *et al.*, 2016). These results address the role that green technology and consumerism may help mitigate environmental challenges leading to climate change.

Furthermore, studies on sustainable living and green consumerism suggest examining the highly consumed natural resources (Barr, 2011). Experts must look at the complex environment because although small initiatives in households may help to boost the more significant initiatives from people, global environmental issues must automatically be addressed (Holden, 2004). Utilities that promote the automated use of renewable energy to drive sustainable consumption can be encouraged by default regulations (Hale, 2018). These collective efforts start with the behavioral changes and self-discipline of the individuals in the household and outside, which can lessen the carbon footprints regarding energy use, transportation, and waste management (Marchi *et al.*, 2021).

Table 7. Qualitative analysis of students' responses in interview guide question 4

Central Theme (s)	Themes Clusters	Formulated Meanings
Green technology is not economical	It is not affordable to everyone and is less efficient.	Findings elaborate that one of the misconceptions of the respondents is that green technology is not so practical and not cost-efficient. To cite a few applications, using solar panels can help many households save money on their electric bills while preserving the availability of non-renewable resources.
It promotes convenience over sustainability.	GreenTech is no different from the material things we use.	Green technology does not emphasize whether the product is sustainable, but it is mainly done for business purposes or to earn money. In simple words, GreenTech is just a marketing strategy. However, it cannot be denied that it is a green act, much like maximizing the utilization of materials while constructively benefitting the environment rather than destroying it.
Everything is renewable	The ignorance, lack of knowledge, and interest of the people lead them to believe that everything is renewable.	One of the root causes of a misconception of Green technology is people's lack of knowledge and interest in the environment. Discipline and empathy must be imparted to people to prevent environmental abuse, leading them to think that everything can be replenished. However, non-renewable resources are becoming more limited due to destructive human activities.

Table 7 presents the qualitative analysis of students' responses to the question, *"What are the misconceptions you have personally encountered about GreenTech among your fellow students and in your community?"* emphasizing that some misconceptions that emerge about GreenTech include its cost inefficiency, its function in the market, and the overconsumption of the food, water, and other natural resources. While some advanced climate-smart technology *costs too much to be afforded by someone*, Green Technology promotes eco-friendly products and services.

It significantly offers some positive economic impacts to the public. Some green products are expensive, and some are affordable, but if one could imagine how much they help save energy and conserve resources, it would become a worthy investment to save the Earth. Although green technology may seem to advocate environmentalism too much, it is *not raised for business purposes*. It is more than just a product being sold in the market. As a counter, it is more than just a technology aiming to provide a more significant space for sustainable development. Another misconception raised was the *lack of people's empathy* towards the environment. The sense of sustainability can be lost when an individual exerts no effort or shows no respect for the environment. Destructive human abuse must be stopped right before all the natural resources and life fade.

In support of the above findings, Leckie (2000) has identified certain common misconceptions regarding green technology, one of which is the ignorance of the practicality of renewable energy sources. The misconception of "green technology" itself worsens this, as noted by Allenby (2000), who advocates concentrating on high-quality technology that considers environmental problems. Lesser (2010) clarifies that green technology can save the economy by delving deeper into the financial side. Matatiele and Gulumian (2016) added a word of warning, highlighting the necessity to consider the risks and hazards that could be present with green technologies, especially in developing nations. All of these studies emphasize the need for a deeper understanding of the implications of green technology.

Table 8 presents the qualitative analysis of pre-service teachers' responses to the question, *"How do you think Green Technology can be integrated into different science disciplines apart from just environmental science?"* indicating that GreenTech can be integrated into the school and the local community of the students. Teachers can use *Green Integration* through an interdisciplinary approach to other areas involving environmentally sustainable development. Schools can urge students to initiate eco-literacy activities that allow them to learn the basic concepts of green technology aside from including it in the lessons in environmental science, Araling Panlipunan, and ESP, among others. On the other hand, Green Technology could be integrated across the science discipline through intradisciplinary methods that enrich the students' community and cultural values and holistic environmental development. However, sometimes, it is a matter of the teacher's creativity when one can integrate green concepts into their subject matter.

Table 8. Qualitative analysis of students' responses in interview guide question 5

Central Theme (s)	Themes Clusters	Formulated Meanings
Green Integration	A holistic approach towards promoting eco-friendly initiatives. GreenTech can be applied to TLE, ESP, and Values or any subject through teachers' creative mindset. Student-led environmental stewardship initiatives Studying renewable sources of energy.	Green technology can be integrated across different subject areas. The result suggests that students can learn GreenTech by relating to various environmental issues locally and globally in Social Sciences, acquiring the practical skill in creating eco-friendly handicrafts in Arts or TLE, and its principles of sustainability and efficiency that can be studied in applied disciplines like Agriculture, Fisheries, Medicine, among others. Hence, it develops students' capability to initiate environmentalism and advocate for climate resiliency.
Sustainable Spectrum	Types of Energy Sources, Green Chemistry, and Genetics are some topics that GreenTech can apply to various science disciplines.	In an intradisciplinary sense, GreenTech can be easily applied across different branches of Science like Physics, Chemistry, and Biology, especially when talking about the Law of Thermodynamics, the Law of Conservation of Mass, energetics, developing Genetically Modified Organisms (GMOs) for developing climate-resilient crops for better yield as well Artificial Intelligences (AIs) that monitor weather changes and assist scientists in analyzing data for accurate interpretation of calamities such as extreme weather conditions, earthquakes, tsunamis, and other natural disasters.

Timmer *et al.* (2018) provided evidence in the field of chemistry regarding the successful integration of green technology into various subjects and disciplines by taking a holistic approach. This strategy gradually introduces green chemistry ideas into already-existing courses to encourage sustainable reasoning and thinking. Cai (2010) lends even more support to this, stressing the role computers play in building a sustainable future and arguing for the inclusion of sustainability in undergraduate computing education. Kivimaa and Mickwitz (2006) stress the importance of incorporating environmental policy and green chemistry concepts into the curriculum to prepare future scientists and advance ecological preservation. These examples highlight how green technology integration may be applied to various topics and specialties.

3.5 Proposed Strategic Environmental Management Plan

The proposed environmental management plan was crafted based on the Likert scale and open-ended questions interview results. The activities included were based on the least weighted means obtained from the survey.

Table 9. List of proposed activities

Specific Objective/s	Title of the Activity	Person/s Involved	Duration	Expected Output
To apply arts and develop students' creativity by appreciating the beauty and dominance of biodiversity inside the campus.	Project Eco-CAPTURE: A Photography and Video-Making Contest	Students Teaching staffs Non-teaching staffs	Monthly (every 2nd semester)	Photographs and videos featuring the biodiversity inside the campus Feedback from viewers via Facebook
To lessen the use of plastics on campus,	➢ Project "BRING YOUR C-U-P ➢ Conserve biodiversity ➢ Uphold environmentalism ➢ Protect the Earth A seminar on the disadvantages of using plastics that cause pollution	Teachers Students Resource Persons Parents	November	Attendance sheet of participants, evaluation report, student and parents' manifesto
To produce eco-friendly products and items that can help students make an additional source of income while promoting ecological sustainability. To encourage students to love their local products.	Project "Eco-PROdukto GAD-vocacy" This training will be initiated by the Gender and Development Office (GAD) and other student organizations to teach students sustainable practices by creating or innovating inclusive and sustainable products/items that can be a source of additional income for the students and will support their financial needs. This will also include the participation of men and women in producing Eco-materials.	GAD Director GAD Focal Person Training Specialist Student Organizations Teachers Student General Public	October-December and May-June	Innovative eco-friendly products include bamboo pens, reusable straws, and coffee cups.
To encourage everyone, especially the young, to be the agent of change for the environment in their local communities.	Project "Go Green BASCians": A series of environmental activities that will engage students in community and campus clean-up drives, tree planting activities, gardening, and other environmental advocacy campaigns.	Teachers Students College Community	August-December and January to June	Attendance sheet of participants, evaluation report, pamphlets

4.0 Conclusion

The study found that the overall level of awareness of the pre-service teachers on green technology is Moderately Aware. This suggests that most respondents are reasonably aware of green technology's benefits and positive impacts in addressing various environmental concerns and issues. However, pre-service teachers still need to have a deeper understanding of the detrimental effects that human activities such as burning fossil fuels, industrialization, and using different technologies could have on the environment. It is crucial to equip pre-service teachers with a more comprehensive knowledge of environmental problems and the practical ways to mitigate them, as they will serve as role models and educators for future generations.

In terms of the overall extent of green technology practices, the pre-service teachers Often engage in activities related to the use of green technology. This indicates that they have already incorporated some sustainable practices into their daily lives, such as reusing paper, bringing reusable water bottles, and separating wastes for recycling. These findings suggest that the pre-service teachers have a reasonably firm foundation in applying green technology principles, which can be further leveraged and expanded upon in their future classrooms.

The study also revealed a significant positive correlation between the pre-service teachers' level of awareness and the extent of their practices regarding green technology. This emphasizes the importance of increasing environmental awareness and knowledge, as it can lead to more sustainable behaviors and integrating green technology into various aspects of life, including educational settings. By equipping pre-service teachers with the necessary knowledge, skills, and mindset, they can better incorporate green technology into their teaching practices and foster environmentally conscious attitudes among their students. The study also proposes a strategic environmental management plan that could guide educational institutions in developing and implementing initiatives to enhance pre-service teachers' capacity to leverage green technology for sustainable development.

However, it is vital to acknowledge the limitations of this study. The research was conducted within a single institution, and the findings may not be generalizable to a broader population of pre-service teachers. Additionally, the study relied on self-reported data, which can be subject to potential biases or inaccuracies. Future studies could explore the perspectives and practices of pre-service teachers across multiple educational institutions, both public and private, to address limitations and further expand the scope of the research, Comparative analyses between different regions or socioeconomic backgrounds may also provide valuable insights into the factors that influence environmental awareness and green technology integration. Furthermore, longitudinal studies tracking the long-term impact of green technology integration on pre-service teachers' practices and their students' environmental behaviors would be a valuable avenue for future research.

This study stresses the pivotal role of pre-service teachers in promoting environmental sustainability and integrating green technology into the classroom. By enhancing their awareness, fostering positive attitudes, and facilitating sustainable practices, pre-service teachers can become catalysts for change, inspiring future generations to embrace a more eco-friendly and sustainable future. The proposed strategic environmental management plan serves as a roadmap for educational institutions to empower pre-service teachers and equip them with the necessary tools and resources to address pressing environmental challenges.

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Instructional Role-Playing Video Game: Its Application to Physics' Equations of State Learning

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Abstract. The potential of video games for learning is now widely accepted among the community of Educational Technology. Multiple types of research have been conducted to see the proficiency of video games as an educational tool, and the effect on students' learning and performance of instructional video game approaches, which have elevated considerable interest in the thematic field of education research. The study assessed the effectiveness of instructional role-playing video games in learning physics equations of state concepts and problem-solving for junior high school students. Specifically, the study determined the performance level in Equations of State Problem Solving of junior high school students when concepts were taught through the conventional approach and through the Role Playing Video Game approach. The result indicated that the performance level in Equations of State problem solving of students taught using the role-playing video game approach was significantly higher than those taught using the conventional approach. Also, the Equations of State problem-solving performance level of students taught using the role-playing video game were satisfactory or better regardless of sex. Problem-solving through role-playing video games is an effective learning approach to learning the Equation of State concept. It is recommended that further research on the application of instructional Role-playing video games be considered in the teaching and learning of Physics concepts.

Keywords: Role-playing video game; Equations of state; Problem-solving, Teaching-learning approach.

1.0 Introduction

The integration of technology into education has significantly influenced how students learn and interact with content. With the prevalence of digital devices, students increasingly rely on technology for both educational and entertainment purposes. This shift highlights the potential of innovative teaching tools, such as video games, to support learning. Video games, a staple of modern entertainment, have evolved into mainstream media with applications beyond leisure, including education. Recent studies, such as those by Rashty (2003) and Whitton (2018), emphasize how digital games can create engaging and dynamic learning experiences, foster problem-solving, and motivate students through challenges and rewards. These qualities align closely with the goals of the

K to 12 Science Curriculum, which aims to develop innovative, critical thinkers equipped for complex scientific and societal challenges (DepEd, 2016).

In physics education, concepts such as the Equations of State are integral to understanding thermodynamics. However, these topics can be abstract and challenging for students, necessitating instructional approaches that enhance engagement and comprehension. Prior research highlights the potential of interactive and blended learning strategies. For instance, studies by Lubrica et al. (2016) and Dolipas et al. (2017) demonstrate that interactive science tools can spark curiosity and improve performance. Similarly, Teofilo et al. (2012) found that blended learning approaches lead to higher academic achievement. However, the specific impact of role-playing games (RPGs) on physics education remains underexplored.

This study aims to address this gap by investigating the effect of an RPG-based instructional approach on students' academic performance in Physics, focusing on the Equations of State. By bridging educational technology and physics pedagogy, this research contributes to understanding how innovative tools can enhance learning outcomes in science education.

2.0 Methodology

2.1 Research Design

The study applied an experimental quantitative approach that used a non-randomized control group pretest-posttest research design to determine the efficiency of an educational role-playing game in teaching and learning the Physics Equations of State: Boyle's Law, Charles' Law, and Ideal Gas Law. The purpose of a pretest-posttest design is to take measurements prior to and after employing a treatment on participants. Given this, the differences in the performance between groups may be assessed.

The role-playing video game "Adventures of You" was programmed using Role Playing Game (RPG) Maker 2015. The programmed role-playing video game integrated the Physics Equations of State concepts and problem-solving applications. The Equations of State concepts included in the study are the Ideal Gas Law, Boyle's Law, and Charles' Law. The game was installed in the computer lab so that students could access it. The student then logs in and plays the character named "You" in the installed game. The game is a journey of "You", exploring a virtual place called "Prontera." Along the character's journey in Prontera, you encountered different people who instructed him to do various activities that involved learning the equation of state concepts. On the way, the character faced problems and challenges related to activities where the Equations of State were integrated. In order to surpass the challenges and continue the journey, the user was required to solve the problems and overcome challenges by applying the Equations of State: Boyle's Law, Charles'Law, and Ideal Gas Law. As an example of the problem you encountered, you went into scuba diving with one of the persons you encountered, and while on scuba diving, there was a problem with the oxygen tank of the other character. In such a scenario, two variables of states (pressure, temperature, or volume) were given, and the missing third variable would be computed to solve the encountered problem.

2.2 Research Respondents

The population investigated consisted of students from six sections of Grade 10 classes of a University - Laboratory High School. Out of the possible number of students, six sections were sampled through a combination of purposive and convenience sampling, and participants were chosen based on their availability and whether they had already taken the topic at hand in their science class. There were two hundred fifty-five (255) respondents, of which 129 belonged to the control group, while 126 were included in the class using the role-playing video game method of instruction. The researchers only considered the sections that had not yet learned the chosen topic to ensure the students had little to no prior knowledge regarding the topic. Thus, researchers focused on 6 sections of Grade 10 students from the university.

2.3 Research Instrument

The study mainly compared academic performance in Physics' Equations of States concept among Grade 10 students taught through conventional and role-playing video game-based teaching-learning methods. It attempted to understand the potential of the role-playing video game teaching-learning method as an effective alternative way of teaching-learning.

2.4 Data Gathering Procedure and Analysis

The participants were asked to answer a questionnaire to preliminary test the student's prior knowledge of the topic. The questionnaire comprised several questions modified from the lessons integrated into the role-playing game (RPG) and included individual questions formed by the researchers. The pretest was conducted to select only respondents with homogenous initial knowledge of the Equation of State concept. After assigning the experimental group and control group, the intervention commenced. Both groups utilized the same lesson content and topics about Boyle's Law, Charles' Law, and Ideal Gas Law, but the groups were instructed with two different teaching-learning approaches. The control group was instructed using the conventional teaching approach where the topics considered were taught through direct instruction that relies mainly on the teacher serving as the resource, and the students had a more passive-receiver role. Conversely, the experimental group was instructed to use a role-playing video game approach. The Equations of State were introduced to the experimental group by playing the educational role-playing video game in the Grade 7 & 8 university Computer Laboratory. The study was conducted two days a week in a 50-minute class meeting per day for each class. Subsequently, the same participants took the questionnaire again. A control group was established to determine the possible effects of the game. Said group underwent the same pretest and posttest. The scores on the post-test were analyzed using a repeated-measures analysis (independent samples t-test) to see if the performance of the control and experimental respondents significantly differed from each other. The study used a 0.05 level of significance.

2.5 Ethical Considerations

The researchers followed ethical guidelines, where informed consent was obtained from all research participants, and permission was solicited from the university heads before the study was conducted.

3.0 Results and Discussion

Table 1 presents the performance level and compares the students' performance level in Physics Equations of State problem solving under the conventional approach of teaching-learning and the role-playing video game learning approach. Based on the data presented, 0.80% of the students under the conventional approach method of learning performed outstandingly, 30.95% satisfactorily performed, and 78.05% did not meet expectations. For students who underwent the Role Playing Video Game learning approach, 7.14 % of the students from the experimental group performed outstandingly, 23.81% very satisfactorily, and the rest (69.05%) did not meet expectations.

Table 1. Comparison of performance of the conventional approach and role-playing video game approach

Performance Rating	Descriptive Equivalent	Teaching-Learning Approach Used	
		Conventional	Role Playing Video Game
90 and above	Outstanding	0.800	7.140
75-89	Satisfactory	30.95	23.81
74 and below	Does not meet the expectation	68.25	69.05

Table 2 compares the students' performance level in Physics Equations of State Problem Solving under the conventional teaching approach and students under the role-playing video game learning approach. Accumulatively, about 31% of the experimental group performed satisfactorily or better than the control group, with about 32%. The computed t-value of 5.986 is significant at a 0.05 level of significance, indicating a significant difference between the performance of the control group compared to the experimental group. The performance level in Physics' Equations of State concept of students under the instructional Role Playing Video game type of learning approach is significantly higher than that of students under the conventional learning approach.

Table 2. Analysis of the difference in performance of the conventional approach and role-playing video game approach

Performance Rating	Descriptive Equivalent	Teaching-Learning Approach Used		t	p
		Conventional	Role Playing Video Game		
75 and above	FS-O	31.75	30.95	5.986	0.015
74 and below	NME	68.25	69.05		

The table shows that the experimental group that has undergone the RPG had a significantly higher level of performance in Physics' Equations of State problem solving compared to the control group that had gone through conventional teaching methods. There has been overwhelming evidence that educational computer games outperformed the control group (nongames) in attaining factual knowledge (Almeida, 2012). This is further proved by Angelo et al. (2014) and Yubuno et al. (2019), who suggest improved cognitive competencies of students in math, science, human anatomy, engineering, and technology when they use digital games. This finding indicates the favor of digital games in students' cognitive learning, as supported by Bai (2020).

Table 3 shows the performance level in Physics' Equations of State problem solving of students when grouped according to sex and comparison of the performance in Physics' Equations of State problem solving of male and female students who undergone the role-playing video game method of learning. As presented in the table, about 25.37% of the female students performed satisfactorily or better than the 22.04% of male students. About 6% of the females performed outstandingly, while about 8% of the male students likewise performed outstandingly. The rest of the female students (about 67%) and male students (about 70%) did not meet expectations. The t value of 0.263 is not significant at a 0.05 significance level. This implies that even though there are differences in the performance levels of both males and females, both still have the same level of performance in Physics' Equations of State problem-solving.

Table 3. Comparison of performance of male and female participants

Performance Rating	Descriptive Equivalent	Male	Female	t	P
90 and above	Outstanding	8.47	5.97		
85-89	Satisfactory	22.04	25.37	0.263	0.609
74 and below	Does not meet the expectation	69.49	68.66		

The table above indicates that role-playing video games have an equal influence on both male and female students' academic performance in Physics' Equations of State problem-solving. This finding is also congruent with the results of Dorji, Panjaburee, and Srisawasdi (2015), which have exhibited that there is no significant difference in the level of knowledge between male and female students when they go through a role-playing video game learning approach. This, however, does not support the study of Nadeem (2023), where the result of the study showed female students having a higher level of enjoyment towards the games compared to male students.

4.0 Conclusion

Based on the study's results, the problem-solving performance level of students in the Physics Equations of State under the conventional teaching-learning approach ranged from not meeting expectations to outstanding. This is likewise observed with students under the educational role-playing video game learning approach but with a significantly higher number of students with outstanding performance levels. The study shows a significant difference in students' performances in Physics Equations of State problem solving when taught with an educational Role Playing Video Game and the use of a conventional approach. In addition, role-playing video games is an effective approach in the teaching-learning process of the topic of physics equations of state concept. There was no significant difference in the level of performance of males and females, suggesting a near-equal performance level in Physics' Equations of State problem-solving. This signifies the identical perception of information of both males and females regarding role-playing video games. As a result, it can be said that educational Role-Playing Video Games are effective in schooling for educational goals.

Based on the conclusions, it is recommended that the academe consider Role-Playing Games as one of the effective teaching-learning methods. It could be used as a method of instruction, regardless of sex, in the teaching-learning process, especially in the Gas Laws concept. It is likewise recommended that more research be done on applying role-playing games to other concepts or other instruction fields.

5.0 Author contributions

Bretel B. Dolipas: formal analysis, investigation, writing—review and editing; Thrysha B. Dolipas: writing—original draft preparation, investigation, methodology; Christian Fabriga: writing—original draft preparation, conceptualization, investigation, supervision; Marius Garcia: visualization, conceptualization, investigation; Sebastien Duke Romero: visualization, writing—original draft preparation, writing—review and editing; Aeron Mactal: data curation, investigation, writing—review and editing, revision; Junel Silvio: data curation, writing—review and editing, revision.

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7.0 Conflicts of Interest

The authors declare no conflicts of interest.

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Power of GeoGebra in Igniting the Interest in Learning Quadratic Functions

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Abstract. This study investigated the perceived relationship between students' interest in learning quadratic functions after utilizing GeoGebra and their perceived usefulness. The study used a quasi-experimental design, specifically the one-group pretest-posttest design using a single-stage cluster sampling technique, to identify Grade 9 students' interest levels before and after using GeoGebra software in the school year 2023-2024 at Demetrio L. Alviola National (Memorial) High School. It also used the weighted mean, Wilcoxon test, and Spearman rank correlation coefficient to compare pre- and post-evaluation interest in learning quadratic functions. The results showed that GeoGebra effectively increased students' interest in quadratic functions, igniting a greater passion for the subject matter. Furthermore, using GeoGebra tools increased students' interest in learning, leading to greater confidence, participation, and motivation to understand quadratic functions. This encompassed tasks such as graphing, solving equations, and applying their knowledge to real-world scenarios, representing a significant shift before and after incorporating geometry into the learning process. Certainly, GeoGebra's engaging and vibrant components help students to relax and stay engaged, enhancing the enjoyment and collaboration aspects of education. The findings also showed that students' substantial progress in three areas—understanding concepts, engaging with teachers, and assessment results—is closely associated with their interest in learning more about quadratic functions. Students more enthusiastic about quadratic functions are more likely to comprehend these topics using GeoGebra.

Keywords: Education; ICT; GeoGebra; Mathematics; Quadratic functions.

1.0 Introduction

On a global scale, one of the major issues or concerns in learning mathematics is the lack of interest among students. Mathematics is often seen as difficult not due to students' lack of capability but because it is perceived as uninteresting or irrelevant, leading to a lack of focus and engagement (Fletcher, 2018). According to the PISA-D (PISA for Development 2018) data, two countries, Panama and the Dominican Republic, scored extremely low in mathematics, resulting in the introduction of a new proficiency level termed "below level 1" to represent the lowest level of math proficiency. When using technology to enhance interest in learning math, students may face challenges if their teachers lack the skills to create effective learning opportunities. Additionally, the lack of resources can make it difficult to implement GeoGebra on a large scale (Birgin & Topuz, 2021).

The latest results from the Programme for International Student Assessment (PISA) highlight significant challenges faced by Filipino students in numeracy (Descartin et al., 2023; Trinidad, 2020), indicating that their performance is below that of their international peers (Bernardo et al., 2023). The 2019 Trends in International Mathematics and Science Study (TIMSS) also revealed that the Philippines scored 297 in mathematics and 249 in science, placing last among the 58 countries surveyed. Romantico (2019) also emphasized that the struggles with mathematics are evident not only in international assessments but also at national, regional, and school levels. To address these issues, improvements should be implemented at the school level by integrating new technologies, as technology-based methods have proven successful in addressing various educational challenges.

Although existing literature points out how GeoGebra improves mathematical understanding, problem-solving, and student participation, its adoption and influence on math education passion require additional research (Uwurukundo et al., 2022). No study has yet delved into GeoGebra's effect on students' interest in mathematics, specifically quadratic functions. Most studies primarily concentrated on the advantages and effects of using technology on mathematical disciplines and educational contexts (Wijaya et al., 2020), while other scholars examined GeoGebra mathematics instruction's benefits to students based on their academic aptitude, cultural heritage, preferred learning approach, and special education needs (Yatim et al., 2022; Zulnaidi et al., 2020). However, the current inquiry is different because it focuses on the student's interest level before and after using GeoGebra in learning quadratic functions. This study concentrates on quadratic functions, as students often lack interest in this topic, particularly in grasping and graphing concepts. The research investigates using GeoGebra software in teaching quadratic functions, which is important for teachers and students. The goal is to improve teaching methods by equipping educators with innovative strategies to make lessons more engaging and interactive. Specifically, the study aims to enhance personalized instruction and student participation by examining the factors influencing students' selection of GeoGebra and its effects on their learning experience.

2.0 Methodology

2.1 Research Design

The study utilized the quasi-experimental design, specifically the one-group pretest-posttest design. In this type of research, there was no control group, and the subjects in the experimental group were assessed before and after the treatment. Additionally, the level of students' interest was identified before and after using the GeoGebra software.

2.2 Research Locale

This study was done at Demetrio L. Alviola National High School-Junior High School Campus located in Barangay Tinaogan, Municipality of Bindoy, Negros Oriental. The school is the second-largest secondary school in the Division of Negros Oriental, with a total number of 1,842 students and 105 teaching and non-teaching personnel in the school year 2023-2024. In this institution, flat-screen TVs are used to aid learning in classrooms. Science, library, and ICT labs are also available at the school. Moreover, the campus is equipped with Wi-Fi for teachers and students. The typical Junior High School average class size is 35 students per class, with 13 sections per year level.

2.3 Research Participants

The study participants were 238 Grade 9 students enrolled in Demetrio L. Alviola National (Memorial) High School for the school year 2023-2024. They were chosen using the single-stage cluster sampling technique, wherein seven sections were randomly selected out of 13.

2.4 Research Instrument

The self-made questionnaire used in this study consists of four parts. Part I displays the disclosure statement and the consent form. It also contains the purpose of the study. Part II assesses the student's interest in learning quadratic functions before utilizing the GeoGebra software. In contrast, Part III gauges the student's interest in learning quadratic functions after utilizing the GeoGebra software. Part IV assesses the perceived usefulness of the GeoGebra software. A dry run of the questionnaire was done with students from the randomly selected 13 sections as the respondents to ensure item reliability. The Cronbach's alpha test assessed the items' reliability, revealing how closely the items were related as a group. The questionnaire underwent a rigorous assessment to ensure the reliability and validity of its contents. It was initially validated by four experts in the field, followed by a dry run to verify its effectiveness. All coefficients obtained from the dry run exceeded 0.70, confirming the reliability of the questionnaire. Consequently, the researcher proceeded with the final data collection phase.

2.5 Data Gathering Procedure

After the design hearing, the researcher incorporated the corrections and suggestions of the panel members. A letter asking permission to conduct the study was sent first to the office of the Schools Division Superintendent of Negros Oriental requesting permission to allow the researcher to conduct the study on the targeted Grade 9 Students of Demetrio L. Alviola National High School. The signed and approved request was presented to the school principal and the randomly selected advisers of the grade 9 students. Before conducting the experiment and distributing the test questionnaires, the researcher explained to the students the purpose and importance of the research. A specific schedule was followed during the two-day pre-test and post-test experiment: two hours on the first day and another two hours on the second day. On the first day, the researcher thoroughly discussed the concepts of quadratic functions and administered a pretest using a questionnaire. On the second day, the researcher used GeoGebra Software to explore the lesson on quadratic functions further. Following the discussion, students completed a post-test questionnaire. Subsequently, questionnaires aimed at measuring the usefulness of GeoGebra were distributed. Both sets of results were analyzed and interpreted.

2.6 Data Analysis Procedure

Appropriate statistical tools were used to answer the research questions. Appropriate descriptive research rating interpretation was also applied. Weighed Mean was used to identify the level of students' interest in using GeoGebra software and the extent of usefulness of GeoGebra in terms of understanding the concepts, visual presentation, student-teacher interaction, and evaluation/assessment. Wilcoxon test was used to identify the significant difference between the pre-evaluation and post-evaluation of the student's interest in learning quadratic functions. The Spearman rank correlation coefficient was utilized to determine the degree of relationship between the level of students' interest in learning quadratic functions after utilizing GeoGebra software and the extent of GeoGebra's usefulness.

2.7 Ethical Considerations

Research ethics were primarily observed and maintained throughout the study. Ethical approval was obtained from the Foundation University Research Office's ethical committee. Informed consent was obtained through the disclosure statement from all individual respondents in the study before its implementation. The rights to self-determination, confidentiality and anonymity, benefits, and risks of the study were also highlighted.

3.0 Results and Discussion

3.1 Students' Interest in Learning the Graphs of Quadratic Functions before and after using GeoGebra

Tables 1, 2, and 3 present the levels of students' interest in learning the graphs of quadratic functions before and after using GeoGebra Software.

Table 1. Level of students' interest in learning the graphs of quadratic functions before and after using GeoGebra

Indicators	Before			After		
	wx̄	**VD**	**LoI**	**wx̄**	**VD**	**LoI**
1. I look forward to learning about quadratic functions with my classmates	3.67	A	H	4.48	SA	VH
2. I look forward to using graphing software to practice drawing the points of quadratic functions.	3.59	A	H	4.50	SA	VH
3. I prefer graphing software over manual graphing to learn more about how to graph a quadratic function.	3.58	A	H	4.56	SA	VH
4. I am eager to practice drawing the points of quadratic functions	3.57	A	H	4.47	SA	VH
5. I am looking forward to learning quadratic functions	3.55	A	H	4.53	SA	VH
6. I study for my math class and pay close attention whenever my teacher discusses the graph of quadratic functions.	3.54	A	H	4.48	SA	VH
7. I get more excited and curious about graphing quadratic functions	3.44	A	H	4.78	SA	VH
8. I find joy in learning quadratic functions	3.43	A	H	4.60	SA	VH
9. I am motivated to complete my math work about graphs of quadratic functions	3.34	MA	M	4.55	SA	VH
10. I am confident in my ability to excel in tests, assignments, and projects related to learning the graph of quadratic functions.	3.31	MA	M	4.51	SA	VH
Composite	**3.50**	**A**	**H**	**4.55**	**SA**	**VH**

Legend: 4.21 – 5.00 Strongly Agree (SA) Very High (VH), 3.41 – 4.20 Agree (A) High (H), 2.61 – 3.40 Moderately Agree (MA) Moderate (M), 1.81 – 2.60 Disagree (D) Low (L), 1.00 – 2.60 Strongly Disagree (SD) Very Low (VL)

Table 1 shows the students' interest in learning the graphs of quadratic functions before and after using GeoGebra. It is shown that before using GeoGebra, students have a "high" level of interest in (a) learning about quadratic functions with their classmates ($w\bar{x}$ = 3.67), (b) using graphing software to practice drawing points of quadratic functions ($w\bar{x}$ = 3.59), and (c) graphing software over manual graphing to learn more about how to plot a quadratic function ($w\bar{x}$ = 3.58). These findings suggest that students have a high regard for collaborative learning, show readiness for the use of graphing software, and recognize the efficiency and utility of digital tools in mastering the graphs of quadratic functions. The table further shows that before the utilization of GeoGebra, the students had "moderate" interest in (a) completing their math work about the graph of quadratic functions ($w\bar{x}$ = 3.34) and (b) having themselves excelled in tests, assignments, and projects related to learning the graph of quadratic functions ($w\bar{x}$ = 3.31). This moderate level of interest entails a shift in classroom instruction to ignite their interest in learning graphs of quadratic functions.

On the other hand, after the utilization of GeoGebra software, the data exposed that students have a "very high" interest in (a) learning about quadratic functions with their classmates ($w\bar{x}$ = 4.84), (b) using graphing software to practice drawing points of quadratic functions ($w\bar{x}$ = 4.50), and (c) graphing software over manual graphing to learn more about how to plot a quadratic function ($w\bar{x}$ = 4.56). These results indicate that the students managed to raise a more positive collaborative work with their classmates, value the interactive features of GeoGebra for a deeper understanding of graphical representations, and emphasize GeoGebra's role in optimizing learning efficiency and effectiveness. Furthermore, the data show that after the utilization of GeoGebra, the students exhibit a "very high" interest in (a) completing their math work about the graph of quadratic functions ($w\bar{x}$ = 4.55) and (b) having themselves excelled in tests, assignments, and projects related to learning the graph of quadratic functions ($w\bar{x}$ = 4.51). These findings connote that the students enjoy the utilization of GeoGebra and acknowledge its usability to a very high level in learning graphs of quadratic functions. Generally, the level of students' interest in learning graphs of quadratic functions was "high" before GeoGebra was utilized ($w\bar{x}$ = 3.50) and "very high" after GeoGebra was introduced ($w\bar{x}$ = 4.55). A difference in their level of interest exists considering the samples.

The above findings align with the study by Rojo et al. (2023), which explored how a pedagogical innovation called the 'King and Queen of Mathematics Initiative' (KQMI) impacts students' interest in learning mathematics and improves their achievement. It was also found that students developed a newfound interest in mathematics through the real-world context of the mathematical modeling unit. Similarly, the study by Jalandoni and Futalan (2024) found that after the intervention using game-based instructions (Integer Math Maze and Intego Card Game), students improved their understanding of addition and subtraction of integers. This improvement suggests that game-based instruction can effectively scaffold students' difficulties in learning the addition and subtraction of integers, leading to enhanced learning outcomes and increased interest in the subject.

Table 2. Level of students' interest in finding the equations of quadratic functions before and after using GeoGebra

Indicators	Before			After		
	$w\bar{x}$	**VD**	**LoI**	**$w\bar{x}$**	**VD**	**LoI**
1. I look forward to learning about how to find the equation of quadratic functions with my classmates	3.59	A	H	4.60	SA	VH
2. I study for my math class and pay close attention whenever my teacher uses graphing software to discuss how to find the equation of quadratic functions.	3.57	A	H	4.53	SA	VH
3. I prefer graphing software over manual graphing to learn more about finding the equations of quadratic functions.	3.57	A	H	4.55	SA	VH
4. I look forward to practicing finding the equation of quadratic functions.	3.56	A	H	4.55	SA	VH
5. I find joy in learning how to find the equation of quadratic functions	3.52	A	H	4.59	SA	VH
6. I am looking forward to solving equations of quadratic functions	3.51	A	H	4.56	SA	VH
7. I am eager to practice identifying the zeroes and vertex points of the quadratic functions	3.50	A	H	4.53	SA	VH
8. I get more excited and curious about finding the zeroes of the quadratic functions	3.36	MA	M	4.52	SA	VH
9. I am confident in my ability to excel in tests, assignments, and projects related to finding quadratic function equations.	3.36	MA	M	4.46	SA	VH
10. I am motivated to complete my math work because I understand how to find the equation of a quadratic function	3.31	MA	M	4.55	SA	VH
Composite	**3.49**	**A**	**H**	**4.54**	**SA**	**VH**

Table 2 presents the data on students' interest in finding the equations of quadratic functions before and after using GeoGebra software. Before using GeoGebra, the students showed a "high" level of interest in several areas, such as (a) learning with classmates ($w\bar{x}$ = 3.59), (b) paying attention during lessons involving graphing software ($w\bar{x}$ = 3.57), and (c) preferring graphing software over manual graphing ($w\bar{x}$ = 3.57). These findings suggest that students appreciate collaborative learning and acknowledge the benefits of digital tools in understanding quadratic equations. However, students only had a "moderate" level of interest in aspects like (a) finding the zeroes of quadratic functions ($w\bar{x}$ = 3.36), (b) excelling in tests and assignments related to quadratic equations ($w\bar{x}$ = 3.36), and (c) completing their math work ($w\bar{x}$ = 3.31). This moderate interest indicates areas where additional instructional support could be beneficial to engage students further. After using GeoGebra, the data show a "very high" level of interest in all indicators. Students displayed a "very high" interest in (a) learning collaboratively ($w\bar{x}$ = 4.60), (b) paying close attention during lessons ($w\bar{x}$ = 4.53), (c) preferring graphing software ($w\bar{x}$ = 4.55), and (d) practicing finding equations ($w\bar{x}$ = 4.55). The increased scores imply that GeoGebra enhanced students' engagement and understanding, making learning more interactive and enjoyable.

Overall, the level of students' interest in finding the equation of quadratic functions was "high" before GeoGebra was used ($w\bar{x}$ = 3.49) and "very high" after GeoGebra was explored ($w\bar{x}$ = 4.54). This finding indicates a noticeable difference in their interest levels based on samples. One key finding is that students appreciated the collaborative learning approach and recognized the benefits of digital tools in enhancing their understanding of quadratic equations. Hoyles (2018), likewise, believes that using technology-based tools, such as videos and PowerPoint presentations, can make learning complex and abstract mathematical concepts more achievable for learners. Furthermore, incorporating digital tools like graphing software can create a more interactive and enjoyable learning process, strengthening students' engagement and understanding when working with quadratic functions (Hoyles, 2018). However, the result also suggests that additional instructional support could be beneficial to further engage students in learning mathematics. The transformation of mathematics classrooms through the use of the internet and digital technologies has occurred in distinct phases, and there is a need to provide appropriate guidance and support to help students effectively utilize these tools (Engelbrecht et al., 2020; Naidoo & Hajaree, 2021).

Table 3 illustrates students' interest in learning the applications of quadratic functions before and after using GeoGebra software. Initially, students exhibited a "high" level of interest in (a) using graphing software to practice solving problems ($w\bar{x}$ = 3.58), (b) preferring graphing software for learning ($w\bar{x}$ = 3.51), and (c) learning applications with classmates ($w\bar{x}$ = 3.50). These responses indicate a positive attitude toward using technology and collaborative learning in understanding quadratic function applications. The study of Scherer et al. (2019), corroborates these findings, claiming that students who find educational tools easy to use are more likely to have a positive attitude toward learning.

Table 3. Level of students' interest in learning the real word problems on quadratic functions before using GeoGebra

Indicators		Before			After		
		$w\bar{x}$	VD	LoI	$w\bar{x}$	VD	LoI
1.	I look forward to graphing software to practice solving more problems related to quadratic functions.	3.58	A	H	4.53	SA	VH
2.	I prefer graphing software to learn more about solving problems involving quadratic functions.	3.51	A	H	4.57	SA	VH
3.	I look forward to learning the application of quadratic functions with my classmates	3.50	A	H	4.58	SA	VH
4.	I study for my math class and pay close attention to what my teacher says. I want to do well on tests, assignments, and projects related to the application of quadratic functions.	3.49	A	H	4.55	SA	VH
5.	I look forward to learning quadratic functions by applying them to real-life situations.	3.45	A	H	4.58	SA	VH
6.	I find joy in solving problems of quadratic function.	3.44	A	H	4.63	SA	VH
7.	I am motivated to complete my math work related to the application of quadratic functions because I understand it better using graphing software.	3.41	A	H	4.56	SA	VH
8.	I get more excited and curious about applying the concepts of quadratic functions in problem-solving.	3.35	MA	M	4.53	SA	VH
9.	I am confident in my ability to excel in tests, assignments, and projects related to the application of quadratic functions.	3.33	MA	M	4.55	SA	VH
10.	I regularly apply the principles of quadratic functions learned through graphing software to solve real-world problems independently.	3.30	MA	M	4.51	SA	VH
Composite		**3.43**	**A**	**H**	**4.56**	**SA**	**VH**

As reflected in the table, students have a "moderate" level of excitement about applying quadratic functions in problem-solving ($w\bar{x}$ = 3.35) and being confident in their ability to excel in related tests and assignments ($w\bar{x}$ =

3.33). This moderate interest suggests areas for further engagement and instructional support. Zimmerman (2002) suggested that students with moderate interest may lack self-regulation skills, which can be developed through targeted instructional support. Instructional support to develop self-regulation can help moderately interested students become more proactive and engaged learners. After implementing GeoGebra, the data reveal a "very high" level of interest in all indicators. Students expressed a “very high” interest in (a) using graphing software to practice solving problems ($w\bar{x} = 4.53$), (b) preferring graphing software for learning ($w\bar{x} = 4.57$), and (c) learning with classmates ($w\bar{x} = 4.58$). Collectively, the level of students’ interest in learning the applications of quadratic functions is “high” before GeoGebra was employed ($w\bar{x} = 3.43$) and “very high” after GeoGebra was presented ($w\bar{x} = 4.56$). A difference in their level of interest exists considering the samples.

The overall findings support the study by Karma et al. (2019), which discusses the positive impact of software on students' interest and motivation in learning applied mathematics subjects. Using multimedia technology and online resources can provide students with various learning modalities, catering to diverse learning styles and preferences, further enhancing their interest and motivation in the subject. According to Conceição (2021), using dynamic and interactive software tools, such as Mathematica, can greatly enhance students' understanding and engagement with mathematical concepts like quadratic functions, positively impacting their interest and motivation in learning these concepts.

3.2 Difference in the Level of Students’ Interest in Learning Quadratic Functions before and after Utilizing GeoGebra

Table 4 reveals the data signifying the difference in students’ interest in learning the three topics in quadratic functions before and after utilizing GeoGebra software.

Table 4. Analysis table on the difference in the level of students’ interest in learning quadratic functions before and after utilizing GeoGebra

Topics	Median		Comp.	p-	Decision	Remark
	Before	After	W	value		
Graph of Quadratic Functions	3.50	4.60	188.50	<.001	Reject H_{o1}	Significant
Finding the Equation of Quadratic Functions	3.50	4.60	183.50	<.001	Reject H_{o1}	Significant
Application of Quadratic Functions	3.45	4.60	277.50	<.001	Reject H_{o1}	Significant
Overall	**3.50**	**4.60**	**28284**	**<.001**	**Reject H_{o1}**	**Significant**

Wilcoxon Test (W) at 0.05 Level of Significance

Using the Wilcoxon Test to identify the difference, the data show that all p-values of the three topics are less than the significance level (0.05). This finding allows the rejection of the null hypothesis. This means that there is a significant difference in the level of students’ interest in (a) learning the graph of quadratic functions, (b) finding the equation of quadratic functions, and (c) learning the application of quadratic functions before and after the utilization of GeoGebra software. Considering the values of the medians before and after the utilization of the intervention, one can conclude that using GeoGebra impacts students, enabling them to boost their interest. The above findings support the conclusions drawn by Sheikh Qasem (2020), Birgin and Topuz (2021), and Zulu et al. (2022), who collectively demonstrated how GeoGebra software effectively enhances mathematics education. Generally, these studies emphasize the significance of integrating technology such as GeoGebra into mathematics teaching to enrich students' learning experiences and improve their comprehension of mathematical concepts. Handayani et al. (2022) also noted that the software enhances problem-solving skills and sustains student interest by offering creative and interactive models. Rabi et al. (2021) stressed GeoGebra’s positive influence on students' attitudes and ability to depict mathematical ideas visually. Moreover, Bekene Bedada and Machaba (2022) demonstrated GeoGebra's advantages across various mathematical domains, affirming its role in enhancing overall mathematical literacy and engagement. Collectively, these studies affirm GeoGebra as a transformative educational tool that enhances the interactivity, engagement, and effectiveness of mathematics instruction.

3.3 The Extent to Which Students Perceive the Usefulness of GeoGebra in Learning Quadratic Functions

Tables 5, 6, and 7 show the extent to which students perceive GeoGebra as a useful tool for understanding quadratic functions, visual presentation, student-teacher interaction, and assessment results. The data in Table 5 further shows that students perceive GeoGebra as “very highly” useful for understanding quadratic functions, with a composite weighted mean of 4.71. Specifically, students claim that GeoGebra is “very useful” in plotting points of quadratic functions (w$\bar{x}$ = 4.78), drawing graphs (w$\bar{x}$ = 4.78), and identifying key features such as the opening of the graph intercepts, center, and line of symmetry (w$\bar{x}$ = 4.69). Moreover, the students divulge that GeoGebra is "very useful" in discussing concepts with peers (w$\bar{x}$ = 4.71) and demonstrating an understanding of solving quadratic functions (w$\bar{x}$ = 4.66). These ratings accentuate GeoGebra's effectiveness in aiding comprehension and communication related to quadratic functions. The consistently high composite score suggests widespread recognition of GeoGebra's usefulness in this context.

Table 5. The extent to which students perceive the usefulness of GeoGebra in learning quadratic functions in terms of conceptual understanding

Indicators	w$\bar{x}$	VD	EoU
1. Plot the points of quadratic functions.	4.78	A	VH
2. Draw the graphs of quadratic functions.	4.71	A	VH
3. Identify the opening of the graph, the intercepts, the center, and the line of symmetry.	4.69	A	VH
4. Discuss the concepts of quadratic functions with my fellow students.	4.71	A	VH
5. Demonstrate my understanding of solving quadratic functions.	4.66	A	VH
Composite	**4.71**	**A**	**VH**

These findings are consistent with Birgin and Yazıcı's (2021) research, which demonstrated that GeoGebra's interactive and visual tools significantly improve students' understanding and retention of mathematical concepts, especially in complex areas such as Algebra and Calculus. Santia and Sutawidjadja (2019) also emphasized how GeoGebra's dynamic approach helps tackle common mathematical challenges by presenting well-structured and manageable problems. Furthermore, GeoGebra has been found to increase students' self-assurance and academic performance in mathematics. Studies by Kado and Dukpa (2020) and Mosese and Ogbonnaya (2021) revealed that GeoGebra remarkably improves conceptual understanding, especially in differential calculus. Uwurukundo et al. (2020) also reported that GeoGebra generally enhances students' knowledge and engagement, although its effectiveness may vary based on the specific implementation methods.

The data in Table 6 displays that the students perceive GeoGebra as "very highly" useful for visual presentation of learning quadratic functions, achieving a composite weighted mean of 4.68. Explicitly, the data indicate that students perceive GeoGebra as "very highly" useful in the sense that it enables them to show their skills in learning quadratic functions (w$\bar{x}$ = 4.71). The visual aids provided by GeoGebra also make abstract mathematical concepts more tangible and comprehensible for students. The software significantly enhances students' understanding by providing real-life visual experiences. Students further reported that GeoGebra helps create an (a) engaging learning atmosphere (w$\bar{x}$ = 4.62), (b) easy understanding of quadratic functions (w$\bar{x}$ = 4.68), (c) improved students' analytical skills (w$\bar{x}$ = 4.66) and (d) attentive learner (w$\bar{x}$ = 4.74).

Table 6. The extent to which students perceive the usefulness of Geogebra in learning quadratic functions in terms of visual presentation

Indicators	w$\bar{x}$	VD	EoU
1. Show skills in learning about quadratic functions when my teacher uses GeoGebra software to show me how they look on a graph.	4.71	A	VH
2. Create an atmosphere of interest in learning quadratic functions through GeoGebra presentation.	4.62	A	VH
3. Understand quadratic functions quickly and easily. This is because they give me a real-life visual experience through graphics and virtual screen	4.68	A	VH
4. By using GeoGebra for visual presentations and demonstrations, I can analyze things better, and my level of understanding is now excellent.	4.66	A	VH
5. Develop my attention in learning quadratic functions using GeoGebra creative templates, tools, tables, and algebra.	4.74	A	VH
Composite	**4.68**	**A**	**VH**

These findings imply that GeoGebra is a highly effective tool for enhancing understanding, engagement, and analytical skills through visual presentations. Its use in the classroom can improve learning outcomes, particularly for visual learners, and support teachers in delivering more effective and engaging instruction. These findings are consistent with research that supports the effectiveness of visual learning tools in enhancing understanding and engagement in mathematics. According to Azizah et al. (2021) and Vágová and Kmetová (2019), learning mathematics involves the application of visualization skills. GeoGebra plays a crucial role in developing these skills by allowing students to accurately perceive geometric structures in 2D and 3D formats. Furthermore, Tamam and Dasari (2021) found in their study that students who used GeoGebra achieved higher assessment scores, improving their ability to visualize mathematical concepts. Integrating tools like GeoGebra into educational environments has become indispensable due to rapid technological advancements and the economy.

The data displayed in Table 7 demonstrate how GeoGebra enhances student-teacher interaction regarding quadratic functions. The results with a composite score of 4.71 suggest "Always" useful and "Very High" effectiveness. Active participation, lesson understanding, open communication, exploring ideas, and clarifying confusion all received high scores, from 4.61 to 4.76, reflecting the role of GeoGebra in fostering collaborative and interactive learning environments. This implies that GeoGebra enhances student-teacher interactions, leading to a more collaborative and interactive learning environment. According to Dahal et al. (2019), GeoGebra promotes active knowledge construction through collaboration and engagement, transferring the instructional emphasis from the teacher to the learners.

Table 7. The extent to which students perceive the usefulness of GeoGebra in learning quadratic functions in terms of student-teacher interaction

Indicators	$w\bar{x}$	VD	EoU
1. Actively took part in joint learning tasks with my peers.	4.74	A	VH
2. Understand the lessons on quadratic functions. When I had questions, my teacher clarified things using GeoGebra Software.	4.74	A	VH
3. Talked to my teacher and asked questions openly.	4.61	A	VH
4. Explore ideas and skills in graphing and solving quadratic functions when my teacher gave me input on my answer, which was suitable and useful.	4.67	A	VH
5. Understand when my teacher explained very well using GeoGebra Software when some students showed confusion.	4.76	A	VH
Composite	**4.71**	**A**	**VH**

The versatility of the software in addressing design issues, geometry, algebra, and other mathematical fields expands its utility in numerous areas (Saputra & Fahrizal, 2019). Research consistently demonstrates that integrating GeoGebra into the classroom yields favorable results. Wijaya et al. (2020) observed improvements in problem-solving capabilities and visual cognition, while Birgin and Topuz (2021) reported enhancements in performance, retention, and attitudes of seventh-grade students in geometry when utilizing GeoGebra within a computer-supported collaborative learning (CSCL) setting. This shows that GeoGebra enhances scholastic achievement and cultivates favorable attitudes toward mathematics. GeoGebra's ability to connect mathematical concepts with practical applications augments student engagement and comprehension (Lopes et al., 2019).

Table 8 assesses GeoGebra's impact on evaluation and assessment in learning quadratic functions. The composite score of 4.72 depicts GeoGebra as "Always" useful and "Very Highly" effective. This implies that students felt at ease solving problems, taking exams, participating in activities, and improving grades, with scores ranging from 4.68 to 4.76.

Table 8. The extent to which students perceive the usefulness of GeoGebra in learning quadratic functions in terms of results of assessmen t

Indicators	$w\bar{x}$	VD	EoU
1. Solve problems in quadratic functions and make me feel at ease.	4.76	A	VH
2. I took the exam easily and felt comfortable doing a task because my teacher used GeoGebra to make the graphs on the test easy to see.	4.68	A	VH
3. Participate in performance-based activity in solving quadratic functions.	4.71	A	VH
4. Participate actively in the tasks my teacher gave us.	4.70	A	VH
5. Do better in school by improving my grades and academic performance in mathematics.	4.74	A	VH
Composite	**4.72**	**A**	**VH**

These results underscore the tool's ability to enhance students' confidence and performance in quadratic function assessments. Research consistently supports the efficacy of GeoGebra in enhancing students' mathematical representation capabilities, regardless of their prerequisite skill levels (Acharya, 2020; Alabdulaziz et al., 2021). Students instructed using GeoGebra consistently perform better post-tests than those taught with conventional methods (Uwurukundo et al., 2022). This finding is reinforced by Harahap et al. (2021), Kholid et al. (2022), and Nurzannah et al. (2021), who demonstrated significant improvements in students' abilities when using GeoGebra. Pari-Condori et al. (2020) also found that GeoGebra enhances students' engagement and comprehension by enabling a dynamic understanding of geometry. Similarly, Ridha and Pramiarsih (2020) showed substantial enhancements in geometry transformation proficiency among college students using GeoGebra.

GeoGebra is highly regarded in mathematics education for its time-saving, representational, and participatory benefits (Awaji, 2021). It is particularly effective in calculus, geometry, and algebra. For instance, a study by Tong et al. (2021) revealed that eleventh-graders taught continuous functions via GeoGebra exhibited higher motivation and achieved superior results than those taught using traditional methods. Eid and Abdulla (2021) also observed that GeoGebra helped learners better comprehend triangular similarities. GeoGebra's impact on higher-order thinking and problem-solving abilities is well-documented, with studies showing that it also reduces learning anxiety and cognitive burden (Juandi et al., 2021; Yohannes & Chen, 2021). Arnawa and Fitriani (2022) emphasized that GeoGebra helps students visualize and understand intricate calculus principles, enhancing their logical thinking and overall comprehension.

3.4 Relationship between the Level of Student's Interest in Learning Quadratic Functions after Utilizing GeoGebra and the Perceived Usefulness of GeoGebra

Table 9 shows the relationship between students' interest in learning quadratic functions after using GeoGebra and the perceived usefulness of the tool across various dimensions.

Table 9. Relationship between the level of student's interest in learning quadratic functions after utilizing GeoGebra and the perceived usefulness of GeoGebra

Level of Interest in…	r_s	**p-value**	**Decision**	**Remark**
Learning Quadratic Functions vs. Perceived Usefulness in Terms of Understanding the Concepts	0.191	0.003	Reject H_{o2}	Significant
Learning Quadratic Functions vs. Perceived Usefulness in Terms of Visual Presentation	0.115	0.078	Fail to reject H_{o2}	Not significant
Learning Quadratic Functions vs. Perceived Usefulness in Terms of Student-Teacher Interaction	0.153	0.018	Reject H_{o2}	Significant
Learning Quadratic Functions vs. Perceived Usefulness in Terms of Evaluation/Assessment	0.149	0.022	Reject H_{o2}	Significant
Learning Quadratic Functions vs. Overall Perceived Usefulness	0.174	0.007	Reject H_{o2}	Significant

Spearman Rank-Order Correlation at 0.05 Level of Significance

As shown, there is a significant positive relationship between students' interest and the perceived usefulness of GeoGebra in understanding concepts (r_s =0.191, p = 0.003). Similarly, a significant positive correlation exists for student-teacher interaction (r_s = 0.153, p = 0.018) and evaluation/assessment (r_s = 0.149, p = 0.022). These results suggest that increased interest in learning quadratic functions is associated with higher perceived usefulness of GeoGebra in these areas. The study finds a significant positive relationship between students' interest in learning quadratic functions and their overall perception of GeoGebra's usefulness (r_s = 0.174, p = 0.007). These results imply that GeoGebra effectively enhances students' interest in learning quadratic functions, particularly conceptual understanding, student-teacher interaction, and evaluation/assessment. Educators can leverage GeoGebra to boost student engagement and comprehension in these key areas, leading to better learning outcomes.

Extensive research supports these findings, showing that GeoGebra facilitates the acquisition of mathematical principles, especially in geometry and algebra (Acharya, 2020; Alabdulaziz et al., 2021). Studies have consistently demonstrated that GeoGebra's interactive functionalities lead to higher levels of mathematical interest and improved performance (Uwurukundo et al., 2022; Harahap et al., 2021; Kholid et al., 2022; Nurzannah et al., 2021). GeoGebra's dynamic user interface and ability to integrate arithmetic, algebra, and geometry make it a powerful tool in mathematics education (Dahal et al., 2019; Hayati & Ulya, 2022). The software's efficacy in helping students comprehend complex concepts through graphical and line representations is well-documented (Zulnaidi et al., 2020). However, there is no significant relationship between students' interest and their perception of the usefulness of GeoGebra in terms of visual presentation (r_s = 0.115, p = 0.078). This might be due to the necessity of adequate teacher preparation to optimize the software's capabilities. Successful integration of GeoGebra into classroom instruction depends heavily on teachers' proficiency with the tool, underscoring the need for professional development (Sheikh Qasem, 2020).

4.0 Conclusion

Utilizing the GeoGebra software greatly amplifies the students' enthusiasm for comprehending quadratic functions. There is a significant difference before and after using GeoGebra in the students' involvement, assurance, and drive in comprehending quadratic functions, such as plotting, determining equations, and utilizing these functions in practical scenarios. Using real-time visualization and interactive graphical representations of quadratic functions seems to enhance students' comprehension of intricate topics and cultivate a heightened enthusiasm for the subject matter. The interactive and visual tools offered by GeoGebra enhance engagement and reduce intimidation, thus promoting a cooperative and pleasurable learning atmosphere among the students. The students' motivation in studying quadratic functions is strongly associated with their perceived benefit in three areas: comprehending the concepts, student-teacher interaction, and evaluation or assessment. Those more interested in quadratic functions after using GeoGebra are more inclined to value these areas. GeoGebra is, indeed, an invaluable instructional instrument that significantly improves students' motivation, confidence, and capacity to solve real-world problems while engaging in the study of quadratic functions. However, there is no significant relationship in visual presentation, as all students find GeoGebra's visual presentation components highly valuable.

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The author attests to his involvement in all aspects of this research. The author reviewed and approved the final version of this paper.

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The AI, Blockchain, Cloud and Data (ABCD) Technology Integration in the Philippines: A Literature Review

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Abstract. This literature review examines the integration of ABCD (Artificial Intelligence, Blockchain, Cloud Computing, and Data Analytics) technologies in the Philippines, including adoption, worldwide developments, as well as particular applications. Despite the significant potential for ABCD technologies, the integration in healthcare, agriculture, financial, and educational sectors to increase efficiency, security, and ability to make decisions, challenges that are experienced include infrastructure constraints, skill gaps, and regulatory requirements. It manifests the enormous potential of ABCD if applied to engineering models such as Industry 4.0 and digital innovation in health care, e-commerce, and supply chains, predictive maintenance, transparent transactions, and automation. Early adopters can already be discerned in the Philippines, such as AI applications in agriculture and mental health, blockchain for secure records, cloud applications in education, and data analytics in health care- but still, lack of infrastructure and inability to find the people with proper skills slow the movement. Sectors like health and manufacturing, which have high growth potential, these technologies can become competitive engines for the Philippines. Recommendations on digital infrastructure, data privacy, public-private partnerships, and investment in workforce development would facilitate an enabling environment for supporting the culture of ABCD technologies.

Keywords: ABCD technologies; Artificial Intelligence; Digital transformation; Digital infrastructure; Innovation.

1.0 Introduction

Over a year, ABCD technologies, an abbreviation for Artificial Intelligence, Blockchain, Cloud Computing, and Data Analytics, have seen much developmental progress at breakneck speed, spreading to the widest canvas of industries. These technologies have focused on aspects such as automation, security, scalability, and the use of data for decision-making and stand at the forefront of innovation across various sectors. AI allows machines to mimic human intelligence, in which systems learn from data and adapt toward specific tasks (Morandín-Ahuerma, 2022; Haenlein & Kaplan, 2019). With the digital ledger being decentralized, blockchain assures safe transactions; thereby, the process is quite transparent. The processes become tamper-proof and cost-effective (Monrat et al., 2019; Gaikwad, 2020). Cloud computing is on-demand access to scalable computing resources over the internet, reducing reliance on physical infrastructure (Sikka & Ojha, 2021; Lamba et al., 2022).

Data analytics or big data allows for processing large datasets to extract actionable insights, contributing significantly to fraud detection, risk management, and decision-making endeavors (Arena & Pau, 2020; Schneider & Weiller, 2022). These technologies can significantly change business operations in the Philippines, especially in the manufacturing and finance sectors. However, this is still handicapped by infrastructure-related limitations and a lack of skilled workers. Therefore, tapping the power of ABCD technologies can enable organizations to navigate the digital landscape better, position themselves for future growth, and, most importantly, increase market leverage through their products and services.

The research gap of this study lies in the fact that there has been a lack of exploration of the actual applications of ABCD technologies in particular sectors such as healthcare, agriculture, finance, or education in the Philippines. This study is also very significant in synthesizing present knowledge, pointing out opportunities by sectors, and offering strategic recommendations to support digital transformation in fostering sustainable growth and innovation. This would surely help policymakers and industry leaders.

2.0 Methodology

This literature review involves the following processes: identification, selection, and analysis of relevant, peer-reviewed articles, reports, and studies related to technologies and their integrations within various sectors of the Philippines. The terminologies used to search in databases such as IEEE Xplore, ScienceDirect, and Google Scholar include ABCD technology integration in the Philippines, AI in the Philippines, blockchain applications in the Philippines, cloud computing in the Philippines, and data analytics in the Philippines. Articles must be from 2019 onwards. These articles must focus more on real-world applications, sector-specific impacts, and adoption challenges. Articles without empirical evidence or those that do not relate to the context of the Philippines are excluded. The thematic synthesis analysis was used to categorize the findings into core themes such as infrastructure limitations, skills gaps, and sectoral opportunities for a holistic overview of the current state and potential of ABCD technology integration.

3.0 Literature Review

The Global Integration of ABCD Technologies

The Integration of ABCD technologies around the world has transformed multiple industries. Most notable are the implementation models of Industry 4.0. Characterizing this fourth industrial revolution is the integration of cyber and physical elements, amplifying the use of ABCD technologies for better prediction, control, and maintenance (Bajic et al., 2021). In the engineering field, these technologies have transformed production processes through the improvement of the quality of products, safety, and productivity that favors mass customization (Sony & Aithal, 2020). For instance, Siemens uses Industrial AI to integrate predictive analytics required in a complex environment with decision-making capacity to tackle some of the challenges of Industry 4.0 (Peres et al., 2020). Similarly, GE could absorb AI and data analytics to predict machinery breakdowns, thus saving tremendous amounts of money and operational efficiency.

While AI, IoT, and blockchain are part of the Industry 4.0 technologies, they have also found their way into construction, e-commerce, and supply chains. These technologies enable automation, robotics, and digital twins in construction, advancing sustainability and resource optimization (Turner et al., 2021). E-commerce platforms, including Amazon, utilize AI and blockchain technologies to enhance the quality of services and customer experience in terms of designing personal, secure, and flawless shopping experiences (Sardjono et al., 2023). ABCD technology also enables Resilient Supply Chain 4.0 to develop crucial indicators such as lead times and chain transparency (Marinagi et al., 2023). Here are some success stories demonstrating efficiency, savings, cost-cutting, and smart decisions by using data at the business level, thus pointing out how the ABCD technologies will transform the industry in the coming years.

The Current Status of AI, Blockchain, Cloud, and Data (ABCD) Integration Technology in the Philippines

The Philippines is gradually embracing ABCD technologies that include Artificial Intelligence, Blockchain, Cloud Computing, and Data Analytics in different disciplines, including the application in healthcare, agriculture, and services in employment generation by human resource development (Rosales et al., 2020). In mental health practices, AI is explored to make care more accessible and cost-effective; in higher education institutions (Kee et al., 2021), AI is used to help research academics and administration processes (Asirit & Hua, 2023). Blockchain technology is also taking center stage, especially in higher education, considering the founding element of secure record-keeping for beneficial utilization being salient (Salandanan, 2020). Cloud computing is also applied to make operations better. For this reason, cloud-based HRIS for employees improves the management of people in governmental departments, including the Department of Health (Manahan et al., 2022). With a boost from cloud computing, data analytics have been applied in fields such as judicial case management to improve real-time decision-making (Ge & Yanli, 2022).

This Philippine government is engaged in initiatives that help establish an encouraging climate of using ABCD technology. For example, the Technology Environment Organization framework supports virtual learning through cloud computing in higher education and streamlines organizational operations and infrastructure (Menta, 2022). What people see through the actual integration of AI in traffic systems, such as contactless violation detection, gives a picture of the government's attempt to include AI in public systems (Jose et al., 2021). Additionally, blockchain is one of the technologies that can ensure the country stays competitive in the global scheme, particularly in its records and financial systems (Bongo & Culaba, 2019).

However, some issues hinder the adoption of these ABCD technologies. Capacity building, specifically in healthcare, has to be stepped up since AI models need to generalize for underrepresented regions such as the Philippines (Gutierrez & Viacrusis, 2023). Infrastructure, lack of experts, and technological gaps remain prevalent in almost all sectors. Policy alignments and changes in business models are also required to help integrate such technologies into one coherent system. Take Broadcasting, for instance; digitalization from analog systems required a paradigm shift toward an alternative business model and aligned policies (Licup, 2023). Overcoming such barriers would be fundamental in helping the Philippines fully realize the benefits of these ABCD technologies and keep ahead of the world.

AI, Blockchain, Cloud, and Data in Different Fields in the Philippines

Integrating the four technologies and the ABCDs—artificial intelligence, blockchain, cloud computing, and data analytics—has started changing multiple sectors in the Philippines. This has resulted in efficiency, security, and accessibility to agriculture, health care, finance, and education, among other sectors, from which every field will have something different to benefit.

AI in Agriculture, Industry, and Public Safety

In agriculture, AI applications make farming more proactive by applying predictive analytics to maximize crop yields, champion sustainable food production, and donate to the entire spectrum of food-related habits (Rosales et al., 2020). Technology-driven solutions, such as AI and big data analytics, are applied in initiatives such as Smart Farming Innovations to boost organic food production, alleviate poverty, and enhance timely decision-making (Matero & Jumawan-Matero, 2020). In the industrial sector, AI would automate redundant tasks, thus making amends for labor shortages and productivity boosts (Concepcion et al., 2019). All these applications are sufficient proof that AI is indeed transforming public safety and would not benefit from integrating AI in bioengineering as a new path toward crime prevention and, at the same time, an ethical and regulatory consideration (Arroyo, 2023).

Blockchain in Education, Healthcare, and Finance

Blockchain provides safety for storing and sharing data; hence, it is crucial for sensitive industries such as healthcare and finance in terms of data security and confidentiality (Singhal et al., 2021). In education, this manifests itself in building on record-keeping involving secure frameworks for a student's record, thereby creating new employment opportunities in the employment market with blockchain-related jobs (Salandanan, 2020). AI and blockchain convergence in these sectors will be aided by advanced analytics to help in decision-making and will help enable data-driven insights.

Cloud Computing in Education and Government Services

Cloud computing revolutionizes the education industry by allowing elastic learning solutions and increasing data-driven student performance insights (Estrellado & Miranda, 2023). The technology allows organizations to create virtual learning environments using models, such as the Technology Environment Organization, that make their work easier and strengthen their foundational infrastructure in higher education institutions (Menta, 2022). More than that, cloud-based systems are improving government services with applications like the HRIS of the

Department of Health, which supports the efficient management of employees and the improvement of program implementation (Manahan et al., 2022).

Data Analytics in Healthcare and Urban Management
Data analytics plays an essential role in healthcare settings. It improves decision-making while enhancing the quality of patient care. To enhance the capability, AI health models must be implemented to influence underrepresented regions in the Philippines, such as regional variances influencing access to care (Gutierrez & Viacrusis, 2023). In urban governance, data analytics and AI are used in contactless traffic violation apprehension systems to improve traffic management and urban planning in congested areas (Jose et al., 2021).

Challenges and Opportunities in the Integration of AI, Blockchain, Cloud, and Data in the Philippines
In the Philippines, integrating ABCD technologies could lead to full-scale transformation but also involves great challenges. ABCD presents many security, scalability, efficiency, and data management opportunities in different sectors, yet their adoption involves significant infrastructure, interoperability, and talent readiness issues.

Infrastructure Limitations
The country has its digital divide, as the technology infrastructure in the Philippines is few and far between, particularly in rural areas. This limitation is causing fewer acceptances of advanced technologies (Estrellado & Miranda, 2023). The absence of adequate computational resources limits the full optimization of cloud computing and AI, mostly in the healthcare and education sectors, where real-time data processing must be executed.

Data Privacy and Security Concerns
The integration of these technologies poses several crucial concerns over data privacy and security. However, blockchain technology provides decentralized, secure, and tamper-proof solutions to many issues. However, this capability is realized only by robust architectures and consensus mechanisms (Nguyen et al., 2019; Murthy et al., 2020). There must be strength in data privacy policy to protect sensitive information because AI relies upon large datasets for training and analytics.

Skills Gap
To utilize ABCD technologies, a proficient workforce must be optimally exploited. More importantly, there is an urgent call for developing skills and building capacity in the Philippines (Rosales et al., 2020). Therefore, bridging this gap will require education and capacity building across industries, as both the technical and ethical underpinnings are involved with AI and blockchain.

Interoperability and Data Management
Integrating AI, blockchain, and IoT in the logistics and manufacturing sectors will pose interoperability and data management issues. In reality, blockchain connected with IoT (BCoT) can provide a singular framework for data exchange. This will benefit data handling and reliability, but practical ways for its real-world application are still under development (Dai et al., 2019).

Opportunities
Enhanced Application Across Sectors
AI, blockchain, and cloud technologies constitute a source of innovative applications for different industries, including healthcare, logistics, and education. Blockchain record-keeping in education is believed to increase transparency and job opportunities among students studying in blockchain fields (Salandanan, 2020). AI combined with blockchain has supported data-driven decision-making, safe records, and efficiency in healthcare (Singhal et al., 2021).

Economic Growth and Job Creation
Proper harnessing of ABCD technologies can be a means of economic growth through the generation of employment due to the progressive transformation of various industries into digital models. In agriculture, AI will predict farming analytics, and in e-commerce transactions, blockchain takes care of security support for productivity and access to new markets (Matero & Jumawan-Matero, 2020; Rosales et al., 2020).

Collaborative Efforts for Technological Advancement

Collaboration opportunities among the public, private, and academic sectors can advance the adoption of ABCD technologies. Partnerships foster an environment where technology innovation can be promoted and resourceful application-based solutions supported through research (Rosales et al., 2020). Policies in the technology environment, including the structure of the Technology Environment Organization, also form the basis upon which such technologies can scale up because efforts are directed toward improving the educational infrastructure as well as efficiencies in the operational virtual learning system (Menta, 2022).

Therefore, these ABCD technologies have enormous transformation opportunities in sectors in the Philippines, realising such benefits, however require overcoming infrastructure challenges, concerns on data privacy, and skill gaps. Through these means, Philippines can seriously implement the benefits from Artificial Intelligence, Blockchain, Cloud Computing, and Data Analytics for enhanced operational efficiency, economic growth, and sustainable technological advancement across industries.

Synthesis

The review shows how these sectors, such as health, agriculture, finance, and education, are slowly changed by the application of these ABCD technologies, (Rosales et al., 2020). These infrastructures should take more effort, particularly in the areas where experts are in low supply such as the country-developed Blockchain-secured educational records and AI-driven mental health solutions (Gutierrez & Viacrusis, 2023). The government has provided cloud-based learning systems through the Technology Environment Organization framework (Menta, 2022), but the result is not uniformed because of a lack of connectivity in rural settings (Estrellado & Miranda, 2023).

Cloud computing has supported virtual learning and effective government services like those of cloud-based HRIS by the Department of Health (Manahan et al., 2022). Infrastructure shortcomings and deficiencies only recently permit such near real-time processing of the information along with its extensive integration into other industrial sectors. Blockchain has promised to potentially strengthen data integrity and openness, promising data security, while notable examples were given in education and finance (Salandanan, 2020). Regulation as well as technical shortcomings work against wider dissemination (Bongo & Culaba, 2019). High demonstrated potential for AI in driving innovation in farming through predictive analytics and smart farming techniques, but badly hampered by a lack of skills in technology management (Matero & Jumawan-Matero, 2020).

Public-private partnerships and investment in the training of the workforce will further open these technologies into the pathways of economic growth and job generation (Rosales et al., 2020). Coordinated effort from the academic, public, and private sectors will bring about acceleration in scalable frameworks for broadening the applications of ABCD technologies (Sardjono et al., 2023). These are some of the key ingredients required to strengthen the digital economy in the Philippines for aggressive competition.

4.0 Conclusion

The review of the literature confirms the fact that while integration of the ABCD technologies starts to transform sectors in the Philippines, be it in the country's healthcare, agriculture, finance, and education sectors, there are considerable barriers to adoption. Findings include the fact that infrastructural inadequacies, skills gaps, and regulatory constraints remain significant barriers to across-the-board adoption. Already, there are successful cases, such as AI-driven healthcare solutions and blockchain-secured educational records, that prove the transformational potential of the technologies. Overcoming these hurdles through investment in digital infrastructure, policy enhancements, and training the workforce is key to fully realizing the benefits of ABCD integration.

For future research, it is important to develop practical case studies that will explore the real applications of ABCD technologies in specific sectors of the Philippine economy, that will focus on developing scalable, interoperable frameworks and strong data privacy protocols aligned with local regulations. Also, there should be further research on how the educational programs would address the gap in skills so that the workforce is better equipped to take advantage of these new technologies. Closing these gaps will set the way forward for future efforts toward a digitally driven, innovative economy that will bring sustainable growth and a more competitive Philippines in the world.

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Joel Mark P. Rodriguez: He was the overall in charge of writing this literature review.

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7.0 Conflict of Interests

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Perspectives of Teachers on the Integration of Assistive Technology in Higher Education Inclusive Classrooms in the Philippines: Importance, Benefits, Social Support, and Challenges

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Abstract. This study explored the perspectives of teachers on using assistive technology (AT) in inclusive higher education classrooms. Although previous research showed AT benefits students with disabilities, there is limited understanding of the challenges, social support, and strategies from teachers' viewpoints in this context. The study also looked at how teachers' demographics—such as age, education, and experience—affect their views on AT. Using a quantitative descriptive correlational design, surveys were given to teachers in various higher education institutions in the 2nd District of Misamis Oriental. The findings revealed that teachers strongly agree on the importance of AT in the classroom and its positive impact on student learning. Despite recognizing challenges, especially a lack of training, they still viewed AT as valuable for independent living, job skills, and community involvement. A strong negative correlation was found between teachers' views on AT and their age, meaning older teachers were less positive about AT integration. In contrast, a strong positive correlation was found between teachers' attitudes and their highest educational qualifications, indicating that teachers with higher qualifications have more favorable views on AT, likely due to better understanding and exposure. The very weak negative correlation between attitudes and years of teaching experience suggested that teaching experience does not significantly affect views on AT. Therefore, professional development in AT should be provided regardless of experience. A strong positive correlation was found between teachers' attitudes and the use of specific AT devices, meaning teachers who use these devices are more positive about AT. The results suggest that while teachers value AT, their views were influenced by age, education, and experience with AT devices. Improving AT training and providing hands-on experience will enhance attitudes toward AT, benefiting students in inclusive classrooms. Tailored professional development programs may also support effective AT use in education.

Keywords: Assistive technology; Higher education; Inclusive classroom; Social support; Teachers.

1.0 Introduction

Inclusive education aims to offer equal learning opportunities for all students, including those with and without disabilities. It ensures that students can participate fully in the educational process regardless of their physical or cognitive abilities. Assistive technology (AT) plays an important role in achieving this goal by providing tools and devices that help remove barriers to learning, enabling students to engage more effectively in academic tasks. AT includes various resources, such as screen readers, hearing aids, and adaptive software, facilitating communication, materials access, and independent learning (McNaughton & Light, 2013). By addressing the specific needs of students, AT supports the creation of more inclusive learning environments.

Despite its potential, the effective integration of AT depends significantly on teachers' attitudes and practices. Research shows that teachers' beliefs about the usefulness and impact of assistive technology are key factors in its adoption (Roose et al., 2019). Studies indicate that AT can enhance student outcomes, including improved access to materials, increased class participation, and greater independence (Kisanga & Kisanga, 2022). It can also positively affect students' academic performance and engagement (McNicholl et al., 2021). However, adopting AT is not without challenges; barriers such as lack of training, insufficient resources, and technical difficulties often hinder the successful use of AT in classrooms (Bouck & Long, 2021). Influenced by these challenges, teachers' attitudes play an essential role in whether AT is effectively used to support inclusive education.

Previous studies have explored the benefits of AT in educational settings. Still, there needs to be more understanding of how teachers perceive and implement this technology, particularly in higher education institutions in the Philippines. The Philippine education system presents unique challenges, including varying levels of technological infrastructure, access to resources, and diverse student populations (Dela Fuente, 2021). While research has highlighted the benefits of AT in improving learning outcomes, there is a noticeable gap in understanding how teachers in the Philippines approach AT integration in higher education-inclusive classrooms.

The integration of assistive technology (AT) in inclusive classrooms is widely recognized for its potential to support students with diverse needs and enhance their learning experiences. These technologies, designed to provide tailored support and facilitate equal access to education, are important for creating effective learning environments. However, the successful implementation of AT is influenced by various factors, including teachers' perspectives on its use and their professional profiles. Research has demonstrated that teachers' attitudes towards assistive technology and their perceived competence in using these tools can significantly affect how AT is integrated into their teaching practices. For instance, teachers with specialized training or extensive experience with assistive technology tend to exhibit more positive attitudes and higher confidence in its application (McNicholl et al., 2021). Despite these findings, there is a need for more detailed investigations into how specific aspects of teachers' profiles, such as their educational background, years of experience, and training in AT, influence their perspectives on technology integration.

Thus, this research addressed this gap by examining teachers' perspectives on using assistive technology in Philippine higher education, particularly in inclusive settings. Moreover, this study aims to explore teachers' views on assistive technology within inclusive classrooms, focusing on the benefits, challenges, and social support available for integrating AT in teaching practices. By examining these perspectives, the study aims to provide insights into how AT is currently utilized and how it can be better implemented to support student learning and inclusion. The findings will be valuable for educational institutions and policymakers in developing more effective strategies for AT integration, ultimately fostering more inclusive and supportive learning environments in Philippine higher education. This research also seeks to contribute to the broader understanding of how teachers' attitudes and practices influence the success of AT in diverse educational contexts. Understanding these relationships is important for identifying potential barriers or facilitators in adopting assistive technology. Therefore, examining whether teachers' profiles are associated with their perspectives on AT in inclusive classrooms is important.

2.0 Methodology

2.1 Research Design

This research employed a quantitative descriptive-correlational design to investigate teachers' perspectives on the integration of Assistive Technology (AT) in inclusive classrooms. A quantitative methodology was chosen to analyze and quantify teachers' perceptions, allowing for exploring patterns, trends, and relationships within the data. The descriptive-correlational design facilitates the examination of teachers' attitudes, beliefs, and experiences related to AT integration.

2.2 Research Participants

The sampling technique used in this study was purposive sampling. This method was selected to ensure the inclusion of participants with specific characteristics relevant to the study's focus. Purposive sampling is useful for targeting individuals with attributes or expertise related to the research objectives (Schreier, M., 2018). The study included 303 teachers involved in education programs at selected local colleges. The participants were teacher education instructors from local colleges in the 2nd District of Misamis Oriental, Philippines, teaching professional education (ProfEd), major, and general education (GenEd) courses. By focusing on this specific geographical area, the study aimed to achieve a homogeneous sample, thereby enhancing its internal validity by ensuring that the sample reflects a consistent educational context.

2.3 Research Instruments

The primary instrument used in this study was the questionnaire developed by Areej Ahmed (2018), which assesses teachers' perceptions of using assistive technology for students with or without disabilities in the classroom. This instrument was adapted to fit the context of the 2nd district of Misamis Oriental, Philippines. The adaptation involved modifying the original instrument to better suit the study's context, ensuring that it captured teachers' perceptions in this particular geographic and educational setting (Sousa et al., 2017). To establish the content validity of the adapted questionnaire, a validation process was employed. Six (6) experts in the field reviewed the questionnaire to assess its relevance and appropriateness for the study's objectives. Their evaluations resulted in a Content Validity Index (CVI) of 0.89, indicating excellent content validity, meaning the questionnaire effectively covers the relevant content areas determined by the experts (Yusoff, 2019).

To further ensure the instrument's appropriateness and reliability in this context, a pilot test was conducted with thirty (30) teachers who were not part of the main study. This step verified that the adapted questionnaire suited the local educational setting. The reliability of the questionnaire was assessed using Cronbach's Alpha, which resulted in a coefficient of 0.975. This high value indicated excellent internal consistency, ensuring the instrument provides reliable and stable measures of the constructs it intended to assess. By adapting the questionnaire and following rigorous validation procedures, the study ensured that the research instrument was both valid and reliable, enhancing the findings' strength.

2.4 Data Gathering Procedure

The data collection for this study was carried out by administering a validated questionnaire to a selected sample of teachers in higher education institutions within the 2nd District of Misamis Oriental, Philippines. The questionnaire assessed teachers' perspectives on integrating assistive technology (AT) in inclusive classrooms. It had undergone content validation by an expert panel and a pilot test before distribution. To ensure accessibility and ease of response, the questionnaire was distributed electronically over a specified period, allowing participants ample time to complete it. Clear instructions were provided to ensure uniformity and consistency in the responses. Informed consent was obtained from all participants before data collection, ensuring their voluntary participation and the confidentiality of their responses.

Data collection was conducted within a defined timeline, allowing sufficient time to gather a representative number of responses from the 303 teachers involved in the study. After data collection, the responses were systematically compiled and entered into data analysis software for further examination. Descriptive statistics were used to summarize the data, while correlational analysis was employed to identify patterns and relationships between variables. The analyzed data provided insights into teachers' perspectives on integrating AT in inclusive classrooms, which were used to address the study's research objectives. Following analysis, the results were interpreted and discussed, as well as the existing literature, offering conclusions and recommendations for future practice and research. To ensure transparency and compliance with ethical guidelines, the data were securely stored and retained for a specified period, after which they were properly disposed of to maintain participant confidentiality.

2.5 Data Analysis

Quantitative data analysis was conducted using statistical techniques to explore teachers' perspectives on integrating assistive technology (AT) in inclusive classrooms. The data analysis procedures followed a systematic approach, employing quantitative methods to address the research questions. The process began with data collection, gathering information on variables such as sex, age, highest educational attainment, years of teaching experience, and technological device usage in teaching. A descriptive analysis was then conducted to summarize the teachers' profiles. Frequencies and percentages were calculated for categorical variables like sex, educational attainment, age, and years of teaching experience.

For analyzing teachers' perceptions regarding technology integration in inclusive classrooms, responses were collected on various aspects, including the integration of assistive technology, academic benefits, social acceptance, challenges, and overall assessment. Descriptive statistics, such as mean scores and standard deviations, were calculated for each perception category, providing an understanding of the overall sentiment. Data was grouped according to profile variables to investigate the relationship between teachers' perspectives and their profiles, ensuring adequate sample sizes for meaningful analysis. Correlation analysis was conducted to assess whether a significant relationship exists between teachers' perspectives on integrating AT in inclusive classrooms and their profiles. Despite a rigorous methodology, this study faced certain limitations. The generalizability of findings was constrained due to the specific sample characteristics and geographical focus. Additionally, the reliance on self-reported data and potential response biases may have influenced the accuracy and validity of the responses.

2.6 Ethical Considerations
Ethical considerations were a top priority in this study to ensure that participants' rights, privacy, and confidentiality were upheld. Participants were provided with informed consent forms that outlined the purpose of the study, their voluntary participation, the procedures involved, and the confidentiality of their responses. They were also informed of their right to withdraw from the study without consequence. Anonymity was strictly maintained throughout the data collection, analysis, and reporting processes, ensuring that individual participants were not identified. To further safeguard privacy, all data were securely stored, and access was restricted to authorized personnel only. These measures were implemented to minimize potential biases, risks, or discomfort for the participants in full compliance with ethical research standards and institutional guidelines.

3.0 Results and Discussion
3.1 Profile of the Participants
Results revealed that 234, or 77%, of the total population were female, while males represented 69, or 23%, of the population. This indicated a significant gender disparity in the teaching profession, with more women than men entering and remaining in the teaching field. Research suggests that teaching is increasingly dominated by women, partly due to historical gender norms associating teaching with nurturing roles traditionally assigned to women (Dela Cruz et al., 2020). This has implications for gender dynamics within educational settings and may reflect broader societal trends in career choices.

210, or 69%, of the teachers were between 26 and 44 years old, suggesting that a large proportion of the workforce was in their mid-career stage. The next largest group was younger teachers (18-25 years old), who made up 52, or 17%, of the total. The smallest group consisted of 41, or 14%, older teachers (45-59 years old). This distribution suggested that the teaching profession is relatively young but also has a healthy representation of experienced professionals, which is important for mentoring and passing on expertise. The older age group is also important for mentoring younger teachers, ensuring a steady flow of experienced teachers (Ewing, 2021).

The data also showed that 123, or 41%, of teachers held a bachelor's degree, and 87, or 29%, had pursued a degree with MA units. Seventy-three, or 24%, held a master's degree, and only 7, or 2%, had completed a doctoral degree. This indicated that while many teachers continued their education beyond undergraduate studies, a smaller proportion advanced to the highest levels of academic attainment. This reflected the trend where teachers often pursued further qualifications to improve their teaching effectiveness or career prospects (Ewing, 2021). Professional development and advanced qualifications could be key investment areas to enhance education quality further.

Forty-one percent (125) of the respondents had 0-5 years of teaching experience, indicating that many were relatively new to the profession. Another 32% (96) had 6-10 years of experience. This suggested that the teaching workforce was dynamic, with a constant influx of new teachers. However, only 2% (5) had over 31 years of experience, indicating that few teachers remained in the profession for their entire careers. This could raise concerns about retention and the need for support for long-term career development. This highlighted a dynamic workforce and the need for ongoing professional development and support to retain talent in the long term (Dela Fuente, 2021).

Lastly, the most commonly used assistive technology was the laptop, utilized by 54% (163) of teachers, followed by televisions at 26% (79) and computers at 7% (20). The use of more advanced technologies, such as interactive whiteboards, tablets, and digital interactive whiteboards, was minimal at 1%. This highlighted a reliance on basic technology, with limited adoption of more specialized tools. It suggested a potential area for growth in integrating more diverse and advanced technological resources into the classroom, which could enhance teaching and learning outcomes. However, the lower usage of advanced technologies like interactive whiteboards suggested that there was still room for technological advancements in classrooms (Ewing, 2021).

Overall, the data revealed a teaching workforce that was predominantly female, relatively young, and varied in educational attainment and experience. The use of technology in teaching was widespread but could be expanded to incorporate more advanced tools. These findings suggested that while the teaching profession is evolving, there are opportunities for further professional development, gender balance initiatives, and enhanced technology integration in education.

3.2 Perception of Teachers on the Importance and Integration of Assistive Technology

Table 1 reveals teachers' perceptions of assistive technology in their classrooms. Teachers overall strongly agreed (M = 3.28, SD = 0.51) on the importance and benefits of integrating assistive technology into their lessons, highlighting its value in enhancing student learning. However, differences emerged in teachers' perceptions of specific aspects, such as adapting assignments and students' enthusiasm for these technologies. The highest agreement among teachers was on the importance of having assistive technology available in classrooms (M = 3.45, SD = 0.61), suggesting an increasing awareness of its potential to meet diverse learning needs and improve educational outcomes, reflecting a broader trend of digital tool integration in education. Teachers' strong agreement (M = 3.34, SD = 0.63) on the benefits of technology integration in lessons aligned with the workforce profile, where laptops and other basic devices were the main technological resources used.

Table 1. Perception of teachers on the importance and integration of assistive technology

Indicators	Mean	SD	Interpretation
1. The availability of assistive technology devices for students is important in my class.	3.45	0.61	Strongly Agree
2. Integrating technology into lessons for students is beneficial in my class.	3.34	0.63	Strongly Agree
3. Adapting assignments for students, including using assistive technology, is appropriate in my class.	3.15	0.64	Agree
4. A growing number of students in my class are eager to use assistive technology devices.	3.17	0.60	Agree
Total	**3.28**	**0.51**	**Strongly Agree**

Despite this positive perception, teachers showed slightly lower agreement on adapting assignments with assistive technology (M = 3.15, SD = 0.64), potentially indicating certain challenges or reservations. This may suggest additional training or resources to help teachers utilize assistive technology effectively for personalized instruction. Teachers observed that students were generally enthusiastic about using assistive technology (M = 3.17, SD = 0.60), indicating a favorable reception among students. However, this enthusiasm likely depended on device availability and students' familiarity with technology, consistent with findings that most teachers relied on basic technological tools and had limited access to advanced resources.

Given that many teachers had fewer than 10 years of experience and primarily relied on basic technology, providing additional training in assistive technology could help them adapt more confidently. Research supports that successfully implementing assistive tools requires adequate professional development (Alsolami, 2022; Kisanga & Kisanga, 2022). As noted in the workforce profile, the low adoption of advanced technology tools suggests that improving access to diverse technological resources is essential. Providing interactive devices like tablets and interactive whiteboards could allow teachers to diversify instructional approaches. This aligns with studies showing that teachers' access to resources impacts the effective use of assistive technology (Bice & Tang, 2022).

Since most teachers were early or mid-career professionals, targeted professional development in assistive technology could support career satisfaction and retention by equipping them to meet students' needs effectively. This investment in training and resources could contribute to long-term workforce stability, especially given the relatively high turnover rate among those with fewer years of experience. With a predominantly female workforce, investing in technology could empower teachers by providing diverse tools to address various learning needs. Research shows that assistive technologies are particularly valuable in inclusive settings, supporting differentiated instruction and equitable student access (McNicholl et al., 2021). Encouraging equitable resource distribution could help make the profession more attractive across genders, emphasizing inclusivity and a progressive learning environment.

3.2 Perception of Teachers on the Academic and Learning Benefits of Assistive Technology

Table 2 reveals teachers' perceptions of the academic and learning benefits of assistive technology (AT) in their classrooms. While teachers generally agreed that AT was beneficial, their level of agreement varied across different aspects (M = 3.02, SD = 0.53). Teachers expressed skepticism regarding AT's impact on students' achievement scores (M = 2.88, SD = 0.72), indicating a potential need for more targeted professional development and evidence-based training. This skepticism suggested that teachers could benefit from exposure to concrete examples and data demonstrating how AT can directly improve academic performance (Dela Cruz et al., 2020). The mixed agreement on achievement scores implied a gap in confidence about AT's academic benefits, potentially due to limited firsthand evidence or experience with these outcomes in practice.

Table 2. Perception of teachers on the academic and learning benefits of assistive technology

Indicators	Mean	SD	Interpretation
1. Students who use assistive technology devices in my class will have higher achievement scores.	2.88	0.72	Strongly Disagree
2. Assistive technology devices in my class will help students achieve independence.	3.04	0.66	Agree
3. Students using assistive technology devices in my class can identify their strengths and weaknesses.	2.99	0.64	Agree
4. Assistive technology devices used in my class are effective in the students' learning process.	3.17	0.59	Agree
Total	**3.02**	**0.53**	**Agree**

On a more positive note, teachers showed stronger agreement (M = 3.04, SD = 0.66) that AT helped students work towards independence. This finding aligned with research showing that AT enhances student autonomy, especially for students with disabilities (Alsolami, 2022), suggesting teachers recognize AT's role in fostering self-reliance, which is critical for long-term student success. Teachers also agreed (M = 2.99, SD = 0.64) that AT supported students in identifying their strengths and weaknesses. This reflected an appreciation for AT's role in promoting personalized learning and self-assessment, enabling students to understand their learning processes better. The overall agreement (M = 3.17, SD = 0.59) on AT's effectiveness in the learning process indicated that teachers generally believed in its benefits, though they were cautious about specific outcomes like achievement scores. This cautious optimism suggested that while teachers valued AT's role in supporting independence and self-assessment, they had reservations about its direct impact on traditional academic measures.

The skepticism about AT's impact on academic achievement indicated a need for professional development focused on evidence-based approaches. Providing teachers with data and real-life examples of AT's positive influence on student outcomes could bridge this confidence gap. Research shows that strong training and support increase teachers' confidence in using AT effectively in classrooms (Al-Dababneh et al., 2022). Teachers' recognition of AT's value in self-assessment and identifying strengths and weaknesses highlighted a belief in personalized learning's potential. Schools could leverage this by implementing AT tools that support self-paced learning, aligning instruction with students' strengths. This approach aligns with research that AT enhances personalized instruction, improving engagement and learning outcomes over time (Alsolami, 2022). Since the workforce profile showed a relatively young workforce reliant on basic technology, these findings highlight the need for ongoing support to help teachers deepen their understanding and use of AT. Continuous professional development, mentorship from experienced teachers successfully using AT, and resources that connect AT use with student success would support this growth.

3.3 Perception of Teachers on Social Acceptance and Support

Table 3 revealed teachers' perceptions of social acceptance and support for using assistive technology (AT) in classrooms. The overall mean score of 3.11 (SD = 0.56) indicated that teachers generally agreed that students using AT were accepted by their peers and supported by the school community. Teachers strongly believed (M = 3.20, SD = 0.64) that students using AT would be accepted by their peers, reflecting a positive outlook on social inclusion in classrooms. This aligns with the previous profile, showing that mid-career teachers are particularly aware of inclusivity's importance in the learning environment. The recognition of peer acceptance suggests that these teachers value AT's role in fostering social integration, which is essential for the long-term success of all students, especially those with disabilities.

Table 3. Perception of teachers on social acceptance and support

Indicators	Mean	SD	Interpretation
1. Students who use assistive technology devices in my class will be accepted among their peers.	3.20	0.64	Strongly Agree
2. Administrators, teachers, and parents will be helpful when I need assistance or explanations regarding assistive technology devices for my class.	3.01	0.70	Agree
3. I believe my classroom set-up is important for students who use assistive technology devices.	3.12	0.67	Agree
Total	**3.11**	**0.56**	**Agree**

Teachers also agreed (M = 3.01, SD = 0.70) that administrators, other teachers, and parents supported AT implementation, reflecting a collaborative environment. However, this score suggests that more proactive involvement and structured support systems may be beneficial while support exists. Since 69% of respondents were mid-career teachers, they may have experienced the challenges and benefits of AT integration. Still, they might seek more robust backing from administrators and parents to sustain these efforts. Additionally, teachers recognized (M = 3.12, SD = 0.67) the importance of classroom arrangements for students using AT, showing an understanding of necessary physical and instructional modifications. This awareness aligns with the evolving needs of the profession, particularly for mid-career teachers who might benefit from guidance on adapting classroom spaces to integrate AT better. Research by Roose et al. (2019) supports the notion that strong beliefs in peer acceptance can reduce stigma and promote social integration, particularly for students with disabilities.

These findings have several implications, especially considering the teacher profile, which indicates a workforce that values inclusivity but may need additional support in certain areas. First, while teachers generally agree on support from administrators, teachers, and parents, there is room for improvement. Schools could enhance support systems by providing proactive assistance, including dedicated training, troubleshooting resources for AT tools, and targeted professional development (Zepeda, 2019). Since many teachers are mid-career, they likely seek structured and ongoing support as they integrate AT into their practices. Teachers' recognition of classroom arrangements' importance implies that schools should provide resources to enable effective AT use. This could include adapting physical spaces, such as offering adaptive furniture or technology that enhances accessibility (Ewing, 2021). For mid-career teachers with established classroom setups, guidance on updating spaces to accommodate AT better would be beneficial.

The strong teacher belief in peer acceptance highlights the value of creating an inclusive environment for students using AT. Schools could benefit from fostering an atmosphere where all students feel accepted, regardless of AT use. Social integration is crucial, as peer and teacher support contributes to emotional and social growth beyond academic achievement (McNicholl et al., 2021). Mid-career teachers, in particular, could be encouraged to promote an inclusive culture that reduces stigma around AT use. Lastly, recognizing that administrators, teachers, and parents need to support AT integration suggests the need for open communication and involvement from all parties. When stakeholders actively participate, AT implementation is more successful, leading to better student learning and social outcomes (Kisanga & Kisanga, 2022). As key stakeholders, teachers should be empowered to facilitate this collaborative effort.

3.4 Perception of Teachers on Challenges and Overall Assessment

Table 4 presents teachers' perspectives on the benefits and challenges of assistive technology (AT) in their classrooms. While teachers generally agreed on AT's usefulness, they also identified significant barriers to its effective implementation. Teachers reported (M = 3.11, SD = 0.67) that a lack of training is a major challenge, emphasizing the need for professional development. With 69% of the respondents being mid-career teachers, this finding suggests they may face unique challenges as they adapt to an increasingly technology-integrated educational landscape and could benefit from targeted, skill-enhancing training.

Table 4. Perception of teachers on challenges and overall assessment

Indicators	Mean	SD	Interpretation
1. I believe the lack of teacher training in using assistive technology devices is a major barrier to students' success in my class.	3.11	0.67	Agree
2. There will be challenges to overcome to accommodate students who use assistive technology devices in my class.	3.15	0.61	Agree
3. I believe that overall, assistive technology devices used in my class are useful and helpful for students.	3.06	0.62	Agree
4. I believe assistive technology devices are useful for all core academic classes.	3.16	0.58	Agree
5. I believe assistive technology devices help students with independent living skills.	3.10	0.61	Agree
6. I believe assistive technology devices help students with job skills.	3.16	0.57	Agree
7. I believe assistive technology devices help students with community skills.	3.15	0.58	Agree
8. I believe assistive technology devices help students accomplish their tasks in my class.	3.23	0.58	Agree
Total	**3.14**	**0.50**	**Agree**

Teachers also expressed (M = 3.15, SD = 0.61) that accommodating students who use AT poses distinct challenges, likely related to limited resources, technical difficulties, or unfamiliarity with AT integration. This finding points to the need for structural and instructional support to address these challenges. For experienced mid-career teachers, specialized training that addresses complex AT integration could enhance their ability to meet the needs of students who rely on these technologies. Teachers acknowledged (M = 3.06, SD = 0.62) AT's value in supporting students' skills, specifically in areas like independent living (M = 3.10, SD = 0.61) and job readiness (M = 3.16, SD = 0.57). This reflects teachers' recognition of AT's potential to promote autonomy and future success for students. However, the gap in effective integration suggests a need for further support to help teachers maximize AT's impact on these outcomes. The teacher profile reveals limited use of advanced tools—such as interactive whiteboards and tablets, used by only a small percentage—highlighting a disconnect between perceived AT benefits and the resources available.

Research supports that while teachers acknowledge AT's value, many feel unprepared to utilize it fully due to inadequate training and resources (Al-Dababneh et al., 2022). This is particularly relevant given the limited access to advanced technology tools among teachers in the study. The data thus suggests an essential need for professional development and improvements in infrastructure to bridge the gap between teachers' perceptions and their ability to integrate AT effectively. These findings hold several implications for schools and educators. First, the lack of AT training highlights the need for comprehensive, ongoing professional development. For mid-career teachers, specific hands-on workshops could bridge gaps between traditional methods and modern AT practices. Second, the identified challenges—such as insufficient resources and technical support—highlight the need for improved technological infrastructure in schools. This could involve providing necessary devices, consistent internet access, and technical assistance, especially as many classrooms lack access to more sophisticated tools like tablets and interactive whiteboards.

Recognizing AT's role in supporting student autonomy suggests that teachers understand its potential but may require further guidance for effective incorporation. Schools could support this by organizing specialized workshops and fostering peer collaboration to share best practices. Research also highlights that collaborative, skill-based learning approaches can empower teachers to feel more confident and effective in using AT (Zepeda, 2019).

3.5 Relationship Between the Teachers' Perspectives on the Integration of Assistive Technology in Inclusive Classrooms and Sex

This study hypothesized that sex does not significantly impact teachers' perspectives on integrating assistive technology (AT) in inclusive classrooms. Results revealed that this hypothesis was confirmed. The correlation coefficient ($r = 0.009$) showed a very weak relationship, and the high p-value ($p = .880$) indicated that the result was not statistically significant. Thus, the study found no meaningful association between teachers' sex and their views on AT integration, suggesting that gender does not influence their attitudes toward AT. This finding aligns with research studies suggesting that sex differences in attitudes toward technology are becoming less relevant in educational contexts. Studies by Reilly et al. (2019) and McNicholl et al. (2021) support that other factors, such as teaching methodology and technology proficiency, play more influential roles than sex in shaping teachers' views on technology. In this study, even with a predominantly female teacher sample (77% female and 23% male), no significant differences were found between sexes in attitudes toward AT, reinforcing that experience and proficiency matter more than gender.

The teacher profile, particularly that 69% of participants are mid-career professionals, suggests that factors such as experience with digital tools and confidence in technology use are likely more influential in shaping AT perspectives. Teachers' access to basic technology tools (e.g., laptops and televisions) and limited access to advanced tools indicate varying levels of technology proficiency. This may mean that male and female teachers encounter similar challenges in effectively integrating AT, pointing to a shared need for skill development rather than gender-specific intervention. Since sex does not appear to influence perspectives on AT, professional development efforts should be designed to address common technology proficiency challenges across all teachers. Training programs could focus on enhancing specific skills related to AT usage and providing strategies for overcoming common integration barriers. Tailoring professional development to meet teachers' diverse skill levels will ensure that educators, regardless of gender, are better equipped to use AT effectively.

The absence of gender differences in AT perspectives highlights the value of fostering an inclusive, collaborative classroom culture. Teachers of all genders can benefit from sharing best practices and supporting one another in integrating AT to enhance student learning. Such collaboration improves instructional outcomes and builds a supportive network for teachers navigating the integration of new technologies. While sex does not significantly influence teachers' perspectives on AT integration, this study highlights the importance of focusing on technology proficiency, experience, and professional development. By addressing these factors, schools can support teachers in using AT effectively in inclusive classrooms, ensuring that all students benefit from these tools regardless of teacher demographics.

3.6 Relationship Between the Teachers' Perspectives on the Integration of Assistive Technology in Inclusive Classrooms and Age

The hypothesis speculated that there was no significant relationship between age and teachers' perspectives on AT integration. However, the analysis revealed a strong negative correlation of -0.931, indicating an inverse relationship: as teachers' age increased, their perspectives on integrating AT became more negative. The significance level ($p = 0.000$) was well below the 0.05 threshold, making this finding statistically significant. Thus, the null hypothesis was rejected. The strong negative correlation suggests that older teachers are generally less favorable toward integrating AT than younger teachers. This trend aligns with existing literature on generational differences in technology adoption. Younger teachers, who are more comfortable with technology and have grown up in digital environments, tend to embrace AT integration more readily (Kisanga et al., 2022). In contrast, older teachers may face challenges such as lower technological literacy, fewer training opportunities, or differing personal beliefs, impacting their views on AT (Dela Cruz et al., 2020).

The teacher profile provides additional context, indicating that 69% of respondents are mid-career teachers aged 26-44. Most teachers in this study are young to middle-aged, which may explain why a significant portion is more open to integrating AT into their classrooms. These teachers likely had more exposure to technology in their education and are thus more familiar with its potential benefits. The 14% of respondents aged 45-59, who may have had less exposure to emerging technologies earlier in their careers, showed a more cautious or negative view toward AT integration. Challenges they face could include adapting to new tools, lack of familiarity, or insufficient training, which aligns with the study's findings on age-related differences.

The results suggest that professional development initiatives should be tailored to the needs of teachers based on age and technological proficiency. For older teachers who may need more support in adapting to AT, programs offering hands-on training and demonstrating the practical benefits of AT could be beneficial. Younger teachers, already comfortable with technology, might benefit from more advanced training focusing on specialized AT tools or classroom integration strategies. Schools must adjust their approaches to AT integration to accommodate varying levels of comfort and proficiency across age groups. Implementing peer mentoring programs, where younger teachers share their experiences with older colleagues, could help bridge the gap in technology adoption. The study's findings emphasize the importance of demographic factors, particularly age when implementing AT in inclusive classrooms. Tailoring professional development and support initiatives to address specific needs by age group could enhance technology adoption effectiveness, fostering a more inclusive and supportive learning environment.

3.7 Relationship Between the Teachers' Perspectives on the Integration of Assistive Technology in Inclusive Classrooms and Highest Educational Qualification

The Pearson Correlation Coefficient (r = 0.80) reflected a strong positive relationship between teachers' educational qualifications and attitudes toward integrating AT. A coefficient close to 1 suggests that as one variable increases, so does the other (Schober et al., 2018). The p-value (0.000), well below the 0.05 threshold, confirmed that this correlation was statistically significant, indicating the relationship was not due to random chance. Teachers with higher educational qualifications tended to have more positive perspectives on AT integration. Advanced education contributes to a better understanding of AT's role and benefits in inclusive classrooms. Higher qualifications often come with more training and exposure to AT, enhancing teachers' understanding of how it can support diverse students. This finding aligns with Bice and Tang (2022), who noted that higher-formal teachers are more inclined to recognize AT's benefits and incorporate it into their teaching.

Among the study's respondents, 41% held a bachelor's degree, 29% had MA units, and 24% held a master's degree, while only 2% held a doctoral degree. The relatively high proportion of teachers with master's degrees or MA units aligns with the finding that higher qualifications favor AT integration, suggesting that advanced education equips teachers with the necessary knowledge and experience for effective AT use. The study revealed that 69% of respondents were mid-career teachers aged 26-44. This group likely benefited from advanced training and exposure to AT during their educational journeys. With both higher qualifications and familiarity with technology, these mid-career teachers are well-positioned to integrate AT into their practices. In contrast, the smaller percentage of teachers holding doctoral degrees (2%) may reflect a focus on leadership and research rather than practical classroom technologies.

The findings highlight the importance of continuing education and professional development to enhance teachers' perspectives on AT. Schools could invest in programs offering advanced AT training, encouraging teachers to pursue further qualifications that strengthen their technological skills. Given the correlation between higher qualifications and positive attitudes toward AT, supporting ongoing educational opportunities could further promote AT integration. While teachers with higher qualifications are more positive about AT, providing support across all qualification levels is essential. Tailored training programs could address the specific needs of teachers with varying educational backgrounds, ensuring that all educators, regardless of qualification, can integrate AT effectively in inclusive classrooms. The study highlights the significance of educational qualifications in shaping teachers' attitudes toward AT. Higher qualifications are associated with more positive perspectives on AT integration, indicating that advanced education enhances teachers' readiness and effectiveness in using assistive technology in inclusive classrooms.

3.8 Relationship Between the Teachers' Perspectives on the Integration of Assistive Technology in Inclusive Classrooms and Years of Teaching Experience

The Pearson Correlation Coefficient (r = -0.023) indicated a very low negative correlation between teaching experience and teachers' views on integrating AT, suggesting an almost nonexistent relationship. The p-value (p = 0.688), much higher than the 0.05 significance threshold, confirmed that the correlation was not statistically significant. Thus, the hypothesis that no significant relationship existed between years of experience and attitudes toward AT integration was supported. The findings revealed that years of teaching experience did not significantly affect teachers' perspectives on AT integration. Whether a teacher was new or experienced did not influence their attitudes toward using AT in the classroom, contrasting with the expectation that experience might shape familiarity and openness to technology.

This study’s respondents varied in teaching experience: 41% had 0-5 years, 32% had 6-10 years, and only 2% had over 31 years of experience. This profile reflects a younger, less experienced teacher population. Despite this, the findings suggested that experience level was not a significant factor in AT attitudes, implying that other factors—such as training, resources, and personal interest—might play a more substantial role. The results highlight the importance of providing professional development tailored to individual needs rather than years of experience. The teacher profile, showing many newer teachers, highlights the value of introducing effective AT training early in their careers. For experienced teachers, especially those less familiar with newer technologies, ongoing professional development should be emphasized to build confidence and skills in AT use.

The study suggests that collaborative learning communities and mentorship programs could support novice and experienced teachers. These programs allow teachers to exchange experiences, share best practices, and stay updated on AT advancements (Dela Fuente, 2021). Consistent with Hersh and Trief (2020), the findings stress the need for continuous support and training to enable teachers at all experience levels to integrate AT effectively. Overall, the study’s findings indicate that the effectiveness of AT integration is not closely related to teaching experience. Rather, it depends on the quality and focus of professional development and support initiatives. Schools should offer training programs that are accessible and relevant to all teachers, regardless of their experience level, to maximize the impact of AT in inclusive classrooms.

3.9 Relationship Between the Teachers’ Perspectives on the Integration of Assistive Technology in Inclusive Classrooms and Assistive Technological Device Used in Teaching

The study revealed a strong positive relationship between teachers' perspectives on assistive technology (AT) integration and the specific AT devices they used in their teaching. The Pearson Correlation Coefficient ($r = 0.870$) indicated a high positive correlation, suggesting that increased use of AT devices was associated with more favorable attitudes toward AT integration. The p-value (0.010), below the 0.05 significance threshold, confirmed that this correlation was statistically significant. Teachers who used specific AT devices were more likely to have positive views on integrating AT, likely due to their firsthand experiences with the benefits of these tools in supporting diverse students. Direct interaction with AT devices helped teachers appreciate their utility, leading to a stronger endorsement of AT integration in classrooms.

The teacher profile provided further context, showing that 54% of respondents used laptops, 26% used televisions, 7% used computers, and only 1% used advanced tools like interactive whiteboards and tablets. The reliance on basic technology suggests that teachers' positive attitudes were shaped by their experiences with accessible devices like laptops and televisions. Additionally, a significant portion of respondents were mid-career professionals (69% aged 26-44), who may have more exposure to technological devices, reinforcing their favorable attitudes toward AT integration. The limited use of advanced AT tools among respondents indicates a need for training and resources to expose teachers to a wider range of assistive technologies. Teachers' experiences with diverse AT tools, beyond basic devices, could further enhance their perspectives on AT integration.

The findings highlight the value of hands-on experience with AT devices in training programs. Providing teachers with direct interaction with various AT tools can enhance their understanding of how these tools support students with diverse learning needs. Schools should offer teachers flexibility in selecting AT devices that meet their students' needs, thereby increasing engagement with AT. Expanding teachers’ access to advanced AT tools, such as text-to-speech software or interactive whiteboards, could foster more positive attitudes toward AT in inclusive education. Ongoing support and exposure to these devices are essential for sustaining positive attitudes and effective integration practices. Schools can help teachers recognize the benefits of AT by allowing them to experience the tangible impact of these tools, as supported by Schober and Schwarte (2018) and McNicholl et al. (2021).

Thus, the findings highlight that teachers' attitudes toward AT integration significantly shaped their experiences with specific AT devices. Positive firsthand experiences contributed to more favorable perspectives on AT in inclusive classrooms, emphasizing the need to improve teachers' access to and training with various AT tools to promote effective integration in educational settings.

4.0 Conclusion

The study on teachers' perspectives regarding assistive technology (AT) in inclusive classrooms in Philippine higher education has several key implications for educational institutions, policymakers, and stakeholders. The study highlights teachers' willingness to embrace AT and the need for further training and support. Training programs on AT can be tailored to teachers' diverse backgrounds and preferences, as understanding AT's practical applications requires technological literacy. Institutions should prioritize promoting technological literacy among teachers to maximize the potential of assistive technologies. This could enhance teaching effectiveness, particularly in inclusive education settings.

The findings can also serve as a valuable resource for policymakers aiming to improve teaching practices and inclusion in higher education. By acknowledging the significant influence of demographic factors such as age and educational qualifications, policies should be designed to address the specific needs of different teacher groups. Institutions should establish ongoing initiatives to incorporate AT into educational curricula and develop strategies to support teachers through workshops, technical support, and cross-institutional collaborations.

The overall positive perception of AT among teachers suggests a receptive environment for further AT integration. Teachers are open to AT enhancing learning and inclusion, which could facilitate the adoption of new AT tools and methods. Despite existing challenges, the willingness of teachers to integrate assistive technology provides a strong foundation to explore its applications further, suggesting that future efforts should focus on building upon this enthusiasm.

Since age and educational qualifications significantly influence perspectives on AT, policymakers and administrators may benefit from considering these factors when planning AT-related interventions. For instance, younger teachers or those with higher educational qualifications may have different needs or attitudes toward AT than older or less qualified teachers. The lack of correlation between sex and years of teaching experience with attitudes toward AT suggests that these factors may not need to be heavily prioritized when designing training or interventions.

Effective AT integration requires collaboration between teachers, administrators, policymakers, and technology providers. By working together, these groups can address challenges, such as resource constraints or training gaps, and ensure that assistive technologies are used effectively in classrooms. Support systems for teachers should include professional development and administrative support, funding for AT devices, and avenues for collaboration to share best practices.

The study suggests that further research is needed to explore the nuances of AT integration, including how specific AT devices influence teaching and learning outcomes. Additionally, further investigation could explore how different technologies impact various student demographics in inclusive settings. Since the study was correlational, longitudinal research could be useful to examine how sustained exposure to AT training and resources affects teacher attitudes and the quality of education in inclusive classrooms over time.

The study highlights the importance of a multifaceted approach to AT integration in Philippine higher education. A combination of targeted professional development, supportive policy frameworks, collaboration, and further research is essential to fully realize the potential benefits of assistive technology in inclusive classrooms.

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6.0 Conflict of Interests

No conflict of interest.

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Student-Parents' Challenges in Nursing School

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Abstract. Student-parents, those learners who have to care for their children, manage to carry out studies, child-rearing, and more often gainful employment, are peculiarly placed in a way that may affect their performance as well as other areas of their lives. This paper is focused on designing a learning guide to facilitate the student-parent learning of their roles in managing overlapping roles. In the present study, there is a concern with working students and/or parents but little attention has been given to lived experiences of working students and parents combined. This study addresses that gap by exploring student parents' management of time, roles, and stress. Only eight participants were chosen for the study with a purposive sampling technique adopted; four male and four female participants were interviewed using the developed self-administered two-part questionnaire. An attempt was made to reduce the data collected through Colaizzi's method to fundamental experiential characteristics and seek out significant themes. These indicate many challenges, including time management and role conflicts, whereby there is often a need to compromise health and academic achievements. The lack of formal support structures also intensified these challenges; however, participants' defiance revealed functional coping mechanisms such as pragmaticism in task orientation, family and peer support, and limited availability of supportive campus resources. These six themes offer a clear and all-around view of student-parents' challenges: These results imply that appropriate support needs to be provided, as well as efficient strategies and policies that embrace the diversity of the environmental context in education in their facilities and especially in nursing schools. School administrators can apply specific strategic policies based on the study's recommendations concerning student-parents to enhance learning and overall success, or lack thereof, of student-parents.

Keywords: Coping strategies; Education; Role conflict; Student-parents; Time management.

1.0 Introduction

Student parents in nursing programs face unique and formidable challenges as they strive to balance academic responsibilities, parenting duties, and, in many cases, employment. The complex interplay of these roles often results in significant time constraints and financial pressures, making the pursuit of higher education a daunting endeavor for this demographic. Existing literature underscores these difficulties, highlighting time management struggles, emotional stress, and the potential for academic underperformance due to the overwhelming demands placed on student-parents (Concerto et al., 2017; Prikhidko & Haynes, 2018).

In the Philippines, where the familial and cultural context strongly emphasizes educational attainment and family obligations, student-parents often find themselves in a particularly precarious situation. According to Andrewartha et al. (2023), despite increased access to education, student-parents continue to face substantial hurdles, often resulting in compromised academic performance or withdrawal from educational programs. Similarly, Ashipala and Natanael (2021) discuss the profound dilemma faced by student-parents who must navigate the demanding spheres of parenthood and academia without neglecting either responsibility.

The literature reveals that while student-parents exhibit remarkable resilience and determination, leveraging support systems and exceptional time management skills to succeed (Hall et al., 2018), their support structures are often insufficient. This insufficiency is particularly evident in the context of nursing programs, where the intensive and inflexible nature of the curriculum further exacerbates these challenges. Moreau and Kerner (2013) note that the dual role of caregiving and studying demands unique skills, often leading to physical and emotional exhaustion.

Despite the rich body of research on student-parents, there is a notable gap in understanding those in nursing programs' specific experiences and coping strategies. This study addresses this gap by exploring student-parent experiences at World Citi Colleges, Quezon City. By doing so, the research aims to uncover the unique challenges they face, their coping mechanisms, and the support structures that can enhance their academic success. This study provides a detailed account of the experiences of student-parents in a nursing program, thereby contributing valuable insights to the existing body of knowledge. The findings are intended to inform the development of targeted support systems and policies that accommodate student-parent needs, ultimately fostering a more inclusive and supportive educational environment. This research is significant as it sheds light on student-parent struggles and offers practical recommendations for institutions that support this often-overlooked demographic.

2.0 Methodology

2.1 Research Design

The study employed a descriptive phenomenological approach to explore the unique experiences of student-parents.

2.2 Research Locale

The research was conducted at World Citi Colleges (WCC) in Quezon City, Philippines. WCC is a well-established institution offering a wide range of programs: Bachelor of Science in Medical Technology, Bachelor of Science in Nursing, Bachelor of Science in Pharmacy, Bachelor of Science in Physical Therapy Bachelor of Science in Psychology, Bachelor of Science in Radiologic Technology Bachelor of Science in Nutrition & Dietetics, Bachelor of Science in Hospitality Management, Bachelor of Science in Tourism Management, Bachelor of Science in Information Technology, Bachelor of Science in Business Administration. The College of Nursing is known for its rigorous academic program and diverse student body, including student-parents. The locale was chosen due to its relevance to the research topic and the accessibility of the student-parent population within the nursing program. The research involved direct interaction with the student-parents in the nursing program, making WCC an ideal locale for this study.

2.3 Research Participants

We employed a purposive sampling method in our research to ensure the correct data acquisition. This method involved the deliberate selection of participants based on specific criteria, allowing us to focus on individuals who can provide rich, relevant, and diverse data. Our inclusion criteria encompass all male and female students enrolled in the College of Nursing at World Citi Colleges (WCC). Using the sampling method and our inclusion criteria, the researchers interviewed four male students and four female students, all in the College of Nursing. Only students who confirmed being parents were considered eligible for our study. The homogenous sampling technique, a subset of purposive sampling, played a crucial role in shaping the composition of our study's participants. By focusing on specific criteria, we ensured the careful selection of participants who fit the profile of student-parents at the College of Nursing, WCC.

2.4 Research Instrument

This study used a two-part questionnaire to gather comprehensive data about the participants' experiences. We meticulously designed and executed the questionnaire with precision. We also conducted pilot testing to validate the questionnaire and ensure its reliability. This involved administering the questionnaire to a few participants similar to the target population. The feedback from the pilot test was used to make necessary adjustments to the questionnaire, enhancing its reliability and validity. The first part of the questionnaire collected profile information about the participants, providing us with a clear understanding of their backgrounds. The second part consisted of face-to-face or online interviews, which allowed us to delve deeper into the lived experiences of the student-parents. This approach helped us explore many participants' experiences systematically and comprehensively. The pilot testing and subsequent adjustments ensured that the questionnaire was clear and understandable and effectively elicited the desired information from the participants. This contributed to the overall quality and trustworthiness of the research study.

2.5 Data Gathering Procedure and Analysis

This study employed a systematic approach to data collection, involving several well-defined steps. First, each participant was identified and asked for permission to participate in the study. Once consent was obtained and after establishing the participants' eligibility, the researchers conducted in-depth interviews with the World Citi Colleges and QC student-parents using our research instrument; we used a questionnaire to collect information that was aligned with the research instrument we used.

The selected student-parents participated in face-to-face or online interviews with permitted recorded devices. These interviews are designed to capture their experiences in balancing their roles at home, school, and work, their perspective on time management and participant recommendations. The data was then analyzed using Colaizzi's Descriptive Method for phenomenological analysis to identify themes and patterns in these experiences. Ethical considerations were used throughout the study, with informed consent obtained from all participants and their identities kept confidential. The results included detailed descriptions of the student-parent experiences, identification of common themes and patterns, and recommendations for policy and practice based on these findings.

2.6 Ethical Considerations

This research study followed ethical guidelines. We emphasized ethical considerations, particularly as our research involved participants, and aimed to explore and describe their experiences. We adhered to several fundamental moral principles to ensure the ethical integrity of our research. We respected the principle of Autonomy by obtaining informed consent from all participants, recognizing their right to participate or decline to participate in the study voluntarily. We upheld the principle of Beneficence by ensuring the welfare of our research participants and safeguarding them from physical, emotional, and psychological harm. Justice was maintained by treating all participants fairly and avoiding any exploitation or abuse. We ensured Confidentiality by protecting the privacy of the participants, keeping the data collected secure, and not disclosing the identity of participants without their consent.

We upheld the principle of non-maleficence by ensuring that the research did not harm or cause discomfort to the participants. We also respected the principle of Respect for Persons by acknowledging the participants' autonomy and treating them courteously. Regarding Fidelity and Scientific Integrity, we conducted our studies honestly, transparently, and rigorously. We ensured the research was reliable and valid by conducting pilot testing to validate the questionnaire and ensure its reliability and maintaining a transparent and thorough documentation process. This rigorous approach also helped us ensure the trustworthiness of our research. We respected the principle of Privacy by ensuring that the data collected was strictly used for the research and not for any other purpose. We also maintained Cultural Sensitivity by being aware of and sensitive to cultural differences and not imposing our cultural values on the participants. This involved understanding and respecting the cultural contexts of our participants and incorporating this understanding into our research approach.

3.0 Results and Discussion

Utilizing the questions that focus on the lived experiences of the student-parents, a total of six (6) specific themes emerged: (1) Juggling Life's Roles: Home, School, and Work, (2) Against the Clock: The Essentials of Time Management, (3) Double Duty: Navigating Parenting and Academics, (4) Pillars of Strength: The Power of Support Systems, (5) Navigating the Storm: Unveiling Coping Strategies, and (6) Path to Progress: Improvement Strategies.

Juggling Life's Role at Home, School, and Work

The participant's verbalization points (see Table 1) out the struggle to focus on studies while caring for a child and the guilt associated with feeling like they cannot devote enough time to their child due to academic responsibilities.

Table 1. Experiences of student-parents in terms of juggling life's role at home, school, and work

Theme	Subtheme	Statement
Juggling Life's Roles: Home, School, and Work	Balancing Responsibilities Managing Multiple Roles Role as Head of the Family Successful Multitasking and Responsibility Management Parenting Challenges Conflicting Demands Prioritizing their Family and Children Focusing on Your Goal Career Planning	"It is hard to study when, of course, you have a child. You will be teased; you will be teased. So, of course, you can autofocus. So, the hardest challenge there is you do not have focus when he is awake." "But I feel like I have little time with my son. Because I have to finish my studies, his life seems to be going well. So, the time between me and my mother is somewhat reduced, which I should be able to give fully. Because he was divided when studying."

Being a parent and a student is challenging due to multiple role and time conflicts between school and parenting that become a source of stress, anxiety, and depression among students (Concerto et al., 2017). Some student mothers felt they neglected their children due to prioritizing their studies, especially during demanding academic periods (Ashipala & Natanael, 2021). Student-parents may perceive balancing graduate school and parenting as challenging, feeling guilty for not spending enough time at school and with their children and experiencing stress choosing between school and parenting responsibilities (Prikhidko & Haynes, 2018). A related study found that student-parents share the challenges of balancing parenthood and academic pursuits (Ashipala & Natanael, 2022). Student-parents in this study constantly struggled to balance their studies with the demands of parenthood. The student-parents emphasized these challenges, describing the difficulties of caring for sick children, breastfeeding, and bonding with their babies while keeping up with schoolwork. The student-parents felt the pressure to provide for their children's needs while pursuing their education, adding another layer of stress to their already demanding lives.

Time Management

Participant 8's statement (see Table 2) highlights the struggle to maintain a strict schedule, carefully balancing school, work, and parenting demands. Setting aside time for their children, they acknowledge their longing for connection. They avoid becoming overly consumed by academic or professional pursuits, understanding the importance of spending quality time with their kids. A study showed that time management variables such as short-range, long-range, and time attitude significantly correlate to students' academic achievement. Another study also posits that time management variables should include independent variables such as prioritization, procrastination, socialization, and student's academic performance (Adebayo, 2015).

Specifically, his study claimed a positive relationship between time management factors such as prioritization, procrastination, and socialization and the student's academic performance. Since time management is a method of organizing, arranging, and planning one's time for the use of more effective in both work and productivity, it is imperative that faculty members, regardless of age, must set plans before accomplishing tasks and set urgencies tasks daily. Learn how to prioritize the work to be accomplished and how individuals use the time efficiently by handling the necessity of the tasks and the time to be used so that time is maximized (Sayari et al., 2017).

Table 2. Experiences of student-parents in terms of time management

Theme	Subtheme	Statement
Against the Clock: The Essentials of Time Management	Time Management Challenges Time Management and Scheduling Prioritization Planning and Scheduling Effective Time Management Proper Time Management Set Priorities First Mind Mapping	"There. Extreme time management. It is like balancing school and then balancing your time with the kids. Do not just focus on school; do not just focus on work. Of course, children are also my priority. So, I give them time." "However, by venturing into business and work, I discovered the value of effective time management in balancing multiple responsibilities."

Caregiving demands layered on top of the demands of work and school can lead student-parents to experience "time poverty" or the lack of time to complete day-to-day responsibilities (Reichlin Cruse et al., 2018). The studies suggest effective time management positively influences academic performance, emphasizing prioritization and overcoming procrastination. They highlight the importance of setting plans and priorities to maximize productivity. However, balancing responsibilities such as family, work, school, and self-care pose significant challenges for students, particularly those with dependent children. While Participant 8 emphasizes the importance of balancing time between school, work, and parenting, some research suggests that time management variables such as prioritization, procrastination, and socialization significantly correlate with academic achievement.

This contradicts the notion that strict time management solely focused on family and avoiding becoming overly consumed by academic or professional pursuits is the most effective approach. Effective time management involves setting plans before accomplishing tasks and prioritizing work to maximize productivity (Sayari et al., (2017). This suggests that while spending time with children is important, it is also crucial for individuals, including faculty members, to prioritize tasks effectively to enhance productivity. It says they note the struggle of balancing school, work, and parenting, while research suggests prioritization, procrastination, and socialization impact academic success. Participant 8 talks about the challenge of balancing school, work, and being a parent while still making time for their kids. They try to balance everything to ensure they have enough time for their children. This matches what studies say about how important it is to manage time well.

Navigating Parenting and Academic Responsibilities

Participant 1's statement (see Table 3) highlights the struggle to find time for their children while also needing to sacrifice it to complete their studies. In this theme, we can say that student-parents often struggle between their academic responsibilities and parenting duties. The time and energy required for studies can significantly reduce the time available for family, leading to feelings of inadequacy in both roles. Despite the inherent difficulties of juggling academic and family duties, many parents seek education in today's environment (Sandstrom et al., 2019). Part-time study can make it difficult for students to get financial help, which increases the need for work, creating a vicious cycle (Noll et al., 2017).

According to Oyegun and Oyegun (2019), Parenting is a difficult task that demands discipline and strategy. Some challenges these student-parents face are feelings of not doing enough for their children, focusing on rigorous studies, and sometimes not giving them their time. As some participants have stated, balancing being a parent and a student is hard. Furthermore, concentrating becomes a challenge when studying intensively (examinations and seminars). Even while trying to keep an eye on the kids, there are too many distractions from all sides. All this time was spent studying on the go. A study found that student-parents faced significant challenges establishing a healthy balance between their academic pursuits and parenthood (Maluleke et al., 2023). They expressed feelings of being pulled in two directions, wanting to be good parents while performing well in their studies. This internal conflict made it difficult to fully focus on either role, as thoughts of their child would intrude on study time.

Table 3. Experiences of student-parents in terms of navigating parenting and academic responsibilities

Theme	Subtheme	Statement
Double Duty: Navigating Parenting and Academics	Parenting Duties Academic Performance Trade-offs Maintaining Performance Despite Challenges Impact on Learning Academic Challenges Struggle with School Sharper Memory Use of Learning Mechanisms Application of Parenting Strategies to Learning Process Being Determined and Inspired by Academics Being Irresponsible means Wasting Money.	"You do not have time for your children, and simultaneously, you must sacrifice that to finish school." "I cannot fully teach my children, which affects the bonding time between me and my mother."

Further complicating the situation, some student-parents also had to work additional jobs to financially support themselves and their children. This additional layer of responsibility created a complex web of demands on their time and energy, making it difficult to excel in any one role. The constant need to juggle these competing priorities left them feeling overwhelmed and stretched thin.

Social Support System

Table 4. Experiences of student-parents in terms of social support system

Theme	Subtheme	Statement
Pillars of Strength: The Power of Support Systems	Family Support Emotional Support Financial Support Work Support Considerate Employers Workplace Benefits Seeking Support	"My mother and then my stepfather, what at that time? I have no plans to do nursing again. I said I would just work here in Manila, I would just do business, and then according to their support emotionally and financially because that is also there. It became clear that "yes, I need to do nursing; what an opportunity." "Financially, it should be. So, if given a chance, it should be; if I get more stable with my financial situation, it would be much better. Like balancing work and school."

Participant 5 shares that their ability to balance work and school depends heavily on achieving financial stability. They feel that being financially secure would greatly enhance their ability to manage both responsibilities effectively. Participant 7 emphasizes the critical role of family support in balancing their dual roles as students and parents, highlighting how such support has been indispensable. The research underscores these personal accounts, showing that family stability and financial education play significant roles in the academic success of student-parents.

For instance, Adekeye, Gesinde, and Abimbola (2014) find that while family stability might not directly correlate with better academic results, it significantly contributes to social adjustment and competence. Moreover, studies by Sabri et al. (2020) indicate that children from families prioritizing financial education tend to experience less economic stress and achieve higher grades in college. Phung et al. (2023) note that parents involved in financial decisions typically raise children with better financial literacy and budgeting skills. Though challenging, balancing work and family life can be successfully managed with the right strategies. Fialor (2023) suggests setting clear priorities, crafting a flexible schedule, delegating tasks, and practicing effective time management. These strategies, along with integrating work-life aspects and involving family in these efforts, help maintain a quality family life without sacrificing professional responsibilities. Additionally, emotional support from families is particularly crucial for low-income students' academic success, as noted by Roksa and Kinsley (2018), emphasizing that support systems are vital for overcoming academic challenges.

Participant 8 shared how his mother and stepfather's emotional and financial support played a crucial role in his decision to pursue a career in nursing. Initially hesitant about continuing his education, the encouragement and backing from his family highlighted the importance of seizing the opportunity to further his nursing career. It illustrates parental support's significant impact on student-parent decisions and well-being. Parental emotional and financial support has a significant impact on the well-being and academic success of student-parents. Research supports this personal account, indicating that parental involvement is crucial in shaping students' academic and emotional health. Lindell et al. (2020) found that strong parent-child relationships, particularly with minimal financial strain, can help reduce symptoms of depression and anxiety among female college students. Further studies by Can Zuo et al. (2022) demonstrate that parental support, encompassing emotional, informational, and financial aspects, aids college students in their ability to self-regulate, enhancing their academic performance as supported by Participant 8's experience, indicating that parental support, including emotional, informational, and financial aspects, enhances students' academic performance and emotional well-being. Additionally, the study emphasized the importance of perceived parental support in boosting students' self-esteem and overall well-being (Hoferichter et al., 2021).

Researchers also highlighted a strong link between parental support—especially from mothers—and students' academic success and self-confidence. Popa (2016) also aligns with Participant 8's experience and emphasizes the crucial role of parental support in fostering student-parents academic achievements. These studies underscore the vital role of parental support in fostering the success and well-being of student-parents, supporting both the personal experiences shared by Participant 8.

Coping Strategies

For participants (see Table 5), rest serves as an essential coping mechanism, providing moments of respite amidst life's challenges. The presence of a child becomes a source of profound inspiration, offering glimpses of innocence and wonder that rejuvenate the soul. Witnessing the child's happiness becomes a beacon of personal joy, illuminating their path with warmth and contentment. The limited-time student-parents have for the "triple duty" of being a parent, a student, and an employee makes access to safe, reliable, and convenient care for their children especially important (Chase-Lansdale et al., 2017; DeMario 2017; Gardner et al., 2017). Likewise, those who do not have access to the care they need often find themselves making tough decisions about whether to continue with their education. Interviewees described taking advantage of any available care options to make it work (Hess et al., 2014; Reichlin Cruse et al., 2018). It underscores how the child inspires in life, bringing joy and contentment. The text also mentions student-parents challenges juggling multiple responsibilities, including being a parent, a student, and possibly an employee. Access to reliable childcare becomes crucial for these individuals, and the lack thereof may lead to difficult decisions regarding education continuation (Reichlin et al., 2018). Participant 3 talks about how their baby brings them happiness and inspires them. Just seeing their baby smile makes them feel happy, too. Her statement emphasizes that being a student parent with a job is not easy, and managing being a parent, studying, and working does not leave much time.

Table 5. Experiences of student-parents in terms of coping strategies

Theme	Subtheme	Statement
Navigating the Storm: Unveiling Coping Strategies	Planning Ahead Organizing Schedules Support Systems Bonding with the Family Self-Care, Relaxation, and Rest Finding Inspiration Finding Strategies for Solving Problems at School Having Perseverance Be Strong Believing in Yourself Self-Care and Rest Facing Challenges head-on	"I set, you know, the activities that I need to accomplish. I have a list of activities I must accomplish within the day or the deadline. So everything is arranged." "My baby will still be my rest. Because he is one of my inspirations. So, that too. When I see him smiling, happy, I am happy too."

Improvement Strategies

Table 6. Experiences of student-parents in terms of improvement strategies

Theme	Subtheme	Statement
Path to Progress: Improvement Strategies	Understanding People around Supportive Family and Friends Being Consistent Goal Setting Balancing of Priorities Flexibility Organization Skills Communication Skills Resourcefulness Financial Stability	"What can help? What else? Apart from what I said. My feeling is that the things that help me are focus, time management, and then what is the goal. I already have that. But it is also different if you have firm and more established time management, goals, and focus. So that is it. Time management, goals, and then focus." "It is necessary; you know what you want to happen. If you want to be goal-driven, at the same time, take care of yourself. Once you did not do it, you did not take care of yourself because you are too goal-driven. You are too focused; okay, this is all I will do. When that is the case, you will be more stressed and tired. So it is okay, it seems, the most effective thing is what you need the most, which is to have what is called the work-life balance. However, go with work-life balance with a baby."

Student-parents face several challenges, balancing academics, childcare, employment obligations, and financial concerns. This results in student-parents having heavy demands on time and energy and would create some barriers for them in achieving success academically and in different aspects of their lives (Andrewartha et al., 2023). In this statement, the participant acknowledges the current qualities they possess to cope and improve their life as student parents. They also believe that further improvement in these key aspects would enhance their ability to navigate their complex life challenges. This highlights the coping strategies student-parents use in handling difficult positions and several roles that help keep general stress from affective parent-child relationships in which parents find motivation within themselves (Hall et al., 2018).

The participant's statement emphasizes the importance of knowing what you want and having a clear goal while at the same time taking care of yourself. The participant acknowledges the hardships and burden of having several obligations, so she suggests that being overly focused without self-care could lead to burnout or exhaustion. The phrase "work-life balance with a baby" recognizes the responsibility in the home setting and strongly suggests that balancing the demands of studying and parenting requires much focus, careful prioritization, and time management, which are all essential for the participant's well-being and success. A study conducted regarding time allocation of college student-parents using data from the American Time Use Survey explored time allocation decisions of student-parents. They found that student-parents spend less time in educational activities and more time in paid work (Crispin & Nikolaou, 2019). A study also suggests that work-life balance is a key factor or issue for student mothers juggling different roles in achieving academic success and responsible parenting (Thomas et al., 2021). Several approaches regarding balancing academics and parenthood require positive thoughts about life circumstances, including it begins with you or taking the initiative, being a supporter at work, being a Mom or a parent at home, striving to be happy, organizing your day, efficiency, communication, being honest and most importantly, family comes first (Shields, 2021). Contrary to this, other studies showed that recommending higher institutions to support those student-parents on college campuses could greatly improve their lives and ease their struggles (Rana et al., 2022). Considering flexible schedules and online learning options can also solve time allocation problems for student parents and support them with childcare resources in their institutions (Crispin & Nikolaou, 2019). Based on interviews with 18 parents enrolled in higher education, implementing support programs for student-parents and providing flexible academic policies to accommodate their family responsibilities will help them navigate their academic, familial, and professional responsibilities.

4.0 Conclusion

This study at World Citi Colleges' College of Nursing sheds light on the unique challenges student-parents face while juggling academic, parenting, and work responsibilities. Through in-depth interviews, six key themes emerged, including time management, balancing duties, and the importance of support systems. These findings highlight the critical need for policies that promote cultural sensitivity and offer tangible support, such as flexible scheduling, on-site childcare, and academic assistance. By aligning with Comfort Theory, these recommendations emphasize environmental and sociocultural comfort, recognizing student-parents dedication and resilience. Future research should explore broader samples and longitudinal outcomes to provide deeper insights into effective support strategies. Implementing these recommendations can significantly improve student-parents academic experiences and outcomes, making a compelling case for institutional and policy changes to support this unique group of students. This study contributes to understanding student-parents multifaceted lives and offers practical solutions to enhance their educational journey. Future work could expand on the effectiveness of specific interventions and track long-term impacts on student-parents academic and career success.

5.0 Contributions of Authors

CJY - Research leader, assigning tasks, overseeing the research process, ensuring deadlines are met, literature review, definition of terms, theoretical framework, study assumption, research ethics, thematic analysis, research instrument, contributing to writing and editing.
JLI - Literature review, SOP, scope and delimitations, key informant selection, contributing to writing and editing, revising the manuscript, reviewing and finalizing the paper.
AJT - Literature review, significance of the study, research locale, contributing to writing and editing, revising the manuscript, sourcing and organizing references.
AJM - Background of the study, data collection procedure, research design, contributing to writing and editing.

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This study contributes to the understanding of the unique challenges faced by student-parents in balancing their academic and parental responsibilities, with implications for support systems within educational institutions.
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Development and Validation of Strategic Intervention Materials (SIMs) in Projectile Motion for Science 9

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Abstract. While Strategic Intervention Materials (SIMs) are widely used, empirical research on their impact on learners' understanding of projectile motion in Science 9 is limited. Existing studies typically focus on general science concepts, leaving a gap in evaluating the effectiveness of SIMs tailored to specific topics, such as motion in two dimensions. Many learners struggle with misconceptions about projectile motion, particularly viewing horizontal and vertical motion as interdependent rather than independent. Current SIMs often fail to address these misconceptions, contributing to underperformance. The study aimed to develop and validate instructional materials—specifically SIMs—to reteach topics deemed "least mastered" by learners in projectile motion. The developed SIMs were validated by experts through experimental and descriptive evaluative methods and were found to be highly valid and acceptable in both content and technical aspects. To evaluate their effectiveness, 136 heterogeneous Grade 9 learners from public (68) and private schools (68) were divided into control and experimental groups, with 34 learners in each group. The experimental group was taught using the developed SIMs, while the control group followed conventional teaching methods. Pre- and post-tests were administered, and data were analyzed using means and t-tests. The findings revealed a significant difference in academic achievement between the groups, with the experimental group demonstrating better results. This indicates that the SIMs effectively supported the learning process in projectile motion and helped learners master the least-mastered competencies. The study recommends continuous revision and expert validation of the SIMs to enhance their effectiveness. Feedback from learners' post-usage is essential for ongoing improvement, and further research should explore additional least mastered competencies in Science 9. Additionally, professional development for Science teachers through seminars and training should be provided to support effective SIM implementation.

Keywords: Strategic Intervention Materials (SIMs); Projectile Motion; Science 9; Curriculum development; Instructional materials.

1.0 Introduction

Various challenges have emerged as the Philippine Education System undergoes significant changes due to the implementation of the K–12 Basic Education Curriculum since 2015 (Reyes, 2024; Gurobat & Lumbu-an, 2022). Teachers must meet the objectives and competencies outlined in this curriculum and ensure that learners achieve them. However, in the early years of implementation, one significant issue faced by the education sector—particularly by teachers at the forefront of the teaching-learning process—was the inadequacy of learning materials (Dela Cruz, n.d.; Reyes, 2024). In addition to the department's limited resources for continuous improvement, some teachers lack sufficient knowledge in developing instructional materials, particularly for interventions (Sanguenza & Gamao, 2021).

Teachers are sometimes responsible for providing resources that the department should supply to facilitate an effective teaching-learning process. However, due to a lack of instructional materials and differentiated methodologies (Weselby, 2014), learners often struggle to meet specific competencies, particularly in Science. Although Science is frequently recognized as significant due to its connection to technology—a government priority for economic development (Elkington, 2015)—learners still perceive it as a difficult subject, regardless of its importance. Research and student feedback consistently indicate that Science subjects, particularly Physics, Chemistry, Biology, and Earth Science, are seen as challenging. Many learners report difficulties with abstract concepts, complex problem-solving, and the high demand for critical thinking required in these subjects, compounding the difficulty. For example, Physics is frequently cited as one of the most challenging subjects due to its reliance on mathematics and a conceptual understanding of the physical world. Learners often feel overwhelmed by the volume of content they need to master, contributing to negative attitudes toward these subjects (CollegeVine, 2024; Debon, n.d.).

As a result, Science education has never been an enjoyable avenue for learners to grasp important concepts relevant to societal situations, leading to relatively low academic achievement in this field (Dacumos, 2016; Bernardo et al., 2023; Galvez & Reyes, 2023). Recent research highlights that Filipino learners' academic achievement in Science has remained low. This is evident in international assessments, such as the 2022 Programme for International Student Assessment (PISA), where Filipino learners scored significantly below the global average in Science. With an average score of 356 (compared to 357 in 2018) against the OECD average of 489, the Philippines ranked third from the bottom in scientific literacy among participating nations (Bernardo et al., 2023; SLA-PH, 2024). This raises questions about whether the evolving curriculum affects learners' performance levels despite numerous efforts by the education sector. This highlights the importance of utilizing Strategic Intervention Materials (SIMs), especially for assessing learners' mastery of specific competencies.

Asuncion (2013) and Luzano (2020) describe Strategic Intervention Materials (SIMs) as learning kits that promote critical thinking, independent and self-directed learning, and creativity among learners by providing ready information in various formats, detailed instructions, content summaries, and diverse learning situations that facilitate maximum attainment of scientific knowledge through engaging activities. Dela Cruz (2012) and Limbago-Bastida and Bastida (2022) emphasize that using SIMs in teaching Science contributes to high-performance levels among learners. For this reason, the researcher developed instructional materials, specifically a re-teaching tool, to help learners better understand abstract concepts in Science and Technology, particularly in physics. Since Science is a nature-based discipline, instructional challenges can be addressed by constructing and utilizing instructional materials to enhance learner performance. The Department of Education (DepEd) Schools Division Office of Marinduque strongly encourages its members to incorporate and adopt SIMs across all subjects to improve learners' performance levels, particularly in Science.

Recognizing her dual role as researcher and teacher and as a stakeholder in this research, she developed and adopted a specific Strategic Intervention Material (SIM) in Science 9: Projectile Motion to test and validate its effectiveness and impact on learners' performance. She believes that the SIM will significantly assist low-performing learners in understanding and improving their performance in various concepts related to projectile motion. Additionally, given that their comprehension of English texts often remains at a literal level due to limited vocabulary and exposure to higher-level language structures (de Guzman, 2009; Fajardo, 2018; Sarmiento, 2021; Gatchalian & Nacario, 2019; Aduna, 2020), the developed intervention materials are tailored to their reading abilities to facilitate concept assimilation and skill acquisition, particularly regarding the challenging topic of projectile motion. The materials are specifically designed for Grade 9 learners at two (2) selected secondary schools. The researcher aims to accomplish the following: identify the least mastered concepts in Science 9: Projectile Motion during the fourth quarter; describe the learners' pretest scores; evaluate their posttest scores; determine if there is a significant difference between the scores of the experimental and control groups in the pretest and posttest; and explain the process of developing the SIM, which was evaluated and validated by Junior and Senior High School Master/Key Science Teachers in the province of Marinduque in terms of content, technical validity, and acceptability.

2.0 Methodology

2.1 Research Design

The experimental and descriptive evaluative methods were employed in this study to develop and validate refined instructional materials in Strategic Intervention Materials (SIMs) to enhance learner performance in the least mastered competencies in Science 9, specifically in topics such as Projectile Motion. Experimental methods are essential for determining the validity and effectiveness of educational interventions like SIMs. By utilizing control and experimental groups, researchers can isolate the impact of the intervention on learner outcomes (Creswell & Clark, 2018) and statistically analyze quantitative data to determine significant differences in learner performance before and after the intervention (Campbell & Stanley, 1963), thereby establishing causality.

Conversely, descriptive, evaluative methods focus on understanding the context and processes of implementing SIMs. These methods help researchers capture the nuances of educational practices, including teacher attitudes, student engagement, and barriers to implementation (Yin, 2014). Additionally, they facilitate the collection of feedback from participants, which informs revisions to the SIMs, ensuring they meet the needs of diverse learners (Stake, 2010). The development and validation of the Strategic Intervention Material (SIM) adapted and utilized an existing instructional design model, specifically the ADDIE Model (Center for Educational Technology at Florida State University, 1975), to create structured, effective, and learner-centered resources. This model includes the following stages: analysis (preparation), design, development, implementation, and evaluation (validation).

2.2 Research Locale

The study was conducted at two (2) secondary schools in the Schools Division of Marinduque. One is a public high school in the Buenavista District, while the other is a private high school in Mogpog District.

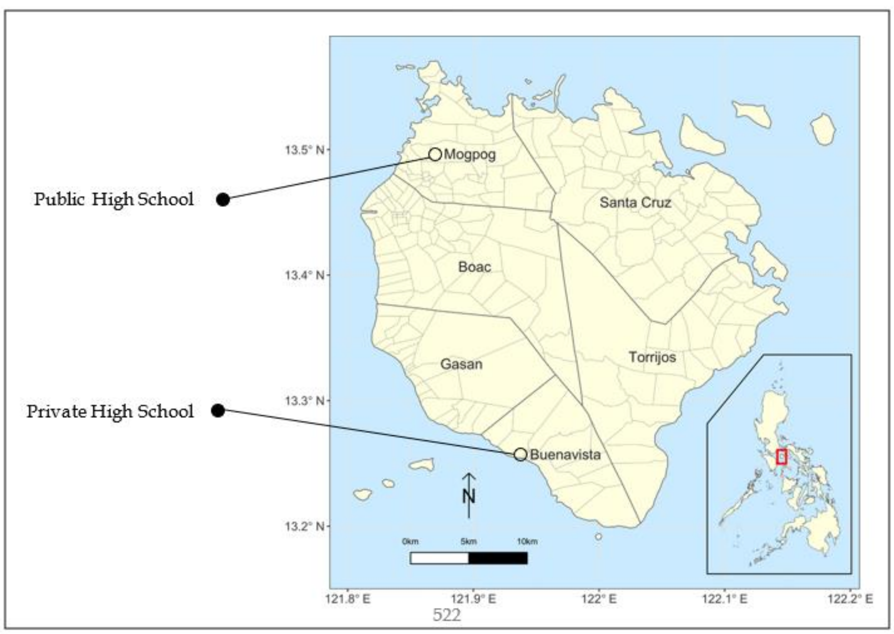

Figure 1. Location Map of the Selected Secondary Schools
(Image Source: Salvacion, 2022)

2.3 Research Participants

The participants of the study were Grade 9 learners officially enrolled during the school year in which the study was conducted at two (2) identified secondary schools within the Schools Division of Marinduque. These learners were studying lessons related to Motion in Two Dimensions, particularly projectile motion. Using Slovin's formula to determine the sample size, 68 out of 82 Grade 9 learners were selected from the public high school, and 68 out of 82 learners were chosen from the private high school. The learners were randomly selected using the fishbowl method to ensure a representative, unbiased, and ethically sound sample selection process, contributing to the overall reliability and credibility of the study (Creswell & Creswell, 2018; Levy & Lemeshow, 2013; Babbie, 2015). These 136 participants were then given a diagnostic test to identify the least mastered competencies in Motion in Two Dimensions, particularly projectile motion. The participants were divided into two (2) groups: the experimental group (SIM group) and the control group (non-SIM group). The SIM group utilized the researcher-made SIMs, while the non-SIM group did not use the researcher-made SIMs and instead followed the conventional teaching methods for the same topic. Following the development and validation of the SIMs based on these competencies, the learners were given a pretest and posttest to measure the effectiveness of the intervention and to assess improvements in their mastery of the competencies after the intervention (Creswell & Clark, 2018).

To evaluate the content and validity of the developed Strategic Intervention Materials (SIMs) for Science 9 on projectile motion, the researcher used purposive sampling to intentionally select expert validators with specialized knowledge or expertise, thereby increasing the validity and reliability of the findings (Robinson, 2014). The inclusion criteria for the expert validators required them to be graduates of Education, major in Science—mainly Physics or Physical Sciences—and to be either Master Teachers from the Department of Education (DepEd) or Assistant/Associate Professors/Professors from higher education institutions (HEIs).

2.4 Research Instrument

Questionnaire

The study utilized a questionnaire checklist to validate the developed Strategic Intervention Materials (SIMs). The expert validators were given questionnaires using a five-point scale to evaluate the validation of the SIMs based on a similar study conducted by Dy (2007). The content and technical validity of the developed SIMs were assessed using the scale below, with five (5) degrees of intensity, where 5 represents the highest rating and 1 represents the lowest. The scale of the statistical values adopted to assess the aspects is as follows:

Table 1. Likert scale for evaluating the validity and acceptability of the strategic intervention materials (SIMs)

Weighted Mean	Arbitrary Value	Descriptive Rating	Verbal Interpretation	
			Content and Technical Validity	Acceptability
4.50 – 5.00	5	Very Evident (VE)	Very Much Valid	Very Much Acceptable
3.50 – 4.49	4	Evident (E)	Much Valid	Much Acceptable
2.50 – 3.49	3	Moderately Evident (ME)	Moderately Valid	Moderately Acceptable
1.50 – 2.49	2	Less Evident (LE)	Least Valid	Least Acceptable
1.00 – 1.49	1	Least Evident (LtE)	Not Valid	Not Acceptable

Diagnostic Test

The researcher utilized a researcher-made diagnostic test with content aligned to the Curriculum Guide for Science 9. To ensure that all learning competencies were met and fully represented, a Table of Specifications (TOS) was prepared. This included specific learning objectives, levels of learning, number of hours, corresponding item numbers, and equivalent percentages. The test was also validated by at least eight (8) expert validators. The 50-item test followed a multiple-choice format, with four (4) choices per item and one (1) correct answer, and was administered in a paper-pencil format within 60 minutes. The results of this diagnostic test were used to identify the least mastered in the content related to Motion in Two Dimensions, which would then be the focus of the development of specific Strategic Intervention Materials (SIMs).

Pretest/Posttest

The pretest and posttest, both researcher-made, consisted of 50 items and were almost identical in difficulty to the diagnostic test. The pretest/posttest underwent the same validity process as the diagnostic test. Each item was considered valid if all expert validators deemed it essential and appropriate for inclusion in the pretest/posttest. The test followed a multiple-choice format, with four (4) choices per item and one (1) correct answer. After necessary validation corrections were made, the revised and finalized pretest/posttest was subjected to pilot testing with learners who were not part of the study but were also Grade 9 learners from the two (2) selected secondary schools. The pilot testing, with the same number of participants as in the research sample, confirmed the instrument's reliability, with a Cronbach's alpha of 0.8916. Based on Cronbach's alpha's general rule of thumb, a value above 0.70 is good, above 0.80 is better, and above 0.90 is best (Statistics Solutions, n.d.).

The test was administered in a paper-pencil format within 60 minutes, and its content was aligned with the competencies specified in the curriculum guide. The results of these tests were subjected to an item analysis comparing the upper 27% group and the lower 27% group. After the result was analyzed, five (5) items were discarded, and the remaining test items were used for the experiment's pretesting and post-testing. The results of these tests were reused to evaluate the effects of using the Strategic Intervention Materials (SIMs) on learners' performance throughout the session.

2.5 Data Gathering Procedure
Based on the ADDIE Model, The study began by developing Strategic Intervention Materials (SIMs) in Science 9. The procedures for gathering materials and information and organizing the SIMs are as follows:

Phase I: Analysis, Design, and Development Phase
In preparation for developing the Strategic Intervention Materials (SIMs), the researcher identified the topics that were least mastered within the specific learning competencies related to Motion in Two Dimensions during the fourth grading period. The selection of topics was based solely on the results of a diagnostic test on projectile motion administered to the selected respondents of this study. Out of the two (2) learning competencies related to projectile motion, both were identified as the basis for the final preparation of the SIMs developed by the researcher. The second part of the development phase involved organizing each identified topic. Corresponding SIMs were created for each topic. Each SIM consists of a guide card, activity card, assessment card, enrichment card, and reference card.

Phase II: Validation Phase
The experts validated the SIMs, specifically selected Junior and Senior High School Master/Key Teachers in Science from the Schools Division of Marinduque, using a five-point scale rating. The materials were evaluated in terms of content and technical aspects. The experts were given questionnaire checklists and asked to use the five-point scale rating to validate the SIMs. The components used for validation included the Guide Card, Activity Card, Assessment Card, Enrichment Card, and Reference Card.

Phase III: Implementation and Evaluation Phase
To determine the effectiveness of the validated SIMs, they were implemented with selected Grade 9 learners from two (2) secondary schools in the Schools Division of Marinduque. Two (2) sections from these schools were used as subjects for the study, with one section as the experimental group and the other as the control group. The study did not reassign learners to the experimental or control groups, as all sections were heterogeneous. A pretest was administered to assess the learners' prior knowledge of projectile motion. The researcher personally administered most of the research instruments, including the SIMs, to the respondents. Although the teacher-researcher did not teach Science 9 at the identified secondary schools, she implemented the SIMs during the teaching-learning process for projectile motion. Pretest and posttest scores were collected from the learners after the materials were used.

The researcher personally administered the questionnaire checklist to the Science teachers, specifically the selected Junior and Senior High School Master/Key Teachers in Science from the Schools Division of Marinduque. Before distributing the instrument, she discussed the significance of the study with the respondents. The respondents were given ample time to complete the questionnaire–checklist to avoid rushed responses and ensure they had time to evaluate every part and detail of the developed SIMs. The results were tallied and tabulated after the developed SIMs were used and the questionnaire checklists were completed. These data were then subjected to analysis and interpretation.

2.6 Ethical Considerations
To protect respondents' rights, the researcher obtained informed consent from all participants, including learners, teachers, and administrators, ensuring they fully understood the purpose and procedures of the study. The research prioritized confidentiality and anonymity, safeguarding participants' personal information and responses. It also ensured that the Strategic Intervention Materials (SIMs) were inclusive, culturally sensitive, and equitable, providing equal learning opportunities for all learners, regardless of their background or abilities. Additionally, the study was designed to avoid causing any psychological or academic stress to the learners,

ensuring that the materials were educationally beneficial without creating unnecessary pressure. Finally, the researcher upheld transparency in reporting results, avoided plagiarism, and acknowledged all contributors throughout the study.

3.0 Results and Discussion

3.1. Topics Learners Find Difficulty in Learning and Understanding Projectile Motion Based from the Selected Fourth Quarter Learning Competencies in Science 9

The learners' learning skills encompass the areas they find most difficult. The data were obtained from the Diagnostic Test on Motion in Two Dimensions (Projectile Motion). As shown in the table, the least mastered competencies were based on the K to 12 Basic Education Curriculum Learning Competencies.

Table 2. Fourth quarter learning competencies in science 9: projectile motion

Rank	K to 12 Basic Education Curriculum Learning Competencies	Item Nos.	No. of Items	Type of School	MPS	Verbal Descriptive
1	Describe the horizontal and vertical motions of a projectile. (LS: S9FE-IVa-34)	1 – 25	25	Public	29.58	Low Mastery
				Private	30.91	Low Mastery
2	Investigate the relationship between the projection angle and the height and range of the projectile. (LS: S9FE-IVa-35)	26 – 50	25	Public	27.30	Low Mastery
				Private	31.82	Low Mastery

Table 2 reveals that, among the topics covered in the 4th Quarter Learning Competencies in Science 9: Projectile Motion, the following competencies were identified as the least mastered: *1) Describe the horizontal and vertical motions of a projectile* and *2) Investigate the relationship between the projection angle and the height and range of the projectile*. Both competencies were rated as having "low mastery." These results align with Burk's (2010) findings, which suggest that more than any other topic, projectile motion is often regarded as particularly challenging in the Sciences. Given these results, this topic requires additional focus and attention to enhance learners' understanding and mastery of these competencies.

3.2 Strategic Intervention Materials (SIMs) Developed Based on the Fourth Quarter Least Mastered Competencies in Science 9: Projectile Motion

Among the least mastered competencies identified in the learners' 4th Quarter Diagnostic Test on Motion in Two Dimension (Projectile Motion), two (2) were used as the basis for developing the Strategic Intervention Materials (SIMs). These competencies are: *1) Describe the horizontal and vertical motions of a projectile; and 2) Investigate the relationship between the projection angle and the height and range of the projectile.*

Summary of the Grand Means of the Content and Technical Validity of the Developed Strategic Intervention Materials (SIMs)

Validating the content of any research materials (e.g., questionnaires, modules) is essential for evaluating whether they accurately measure what they designed to assess. In the case of the Strategic Intervention Materials (SIMs), experts validated them based on their key components: Guide Card, Activity Card, Assessment Card, Enrichment Card, and Reference Card.

Table 3. *Content and technical validity of the developed strategic intervention materials (SIMs)*

Indicators	Mean	Descriptive Rating	Verbal Interpretation	
			Content and Technical Validity	Acceptability
A. Content Aspect Indicator	4.33	Evident	Much Valid	Much Acceptable
1. Guide Card	4.44	Evident	Much Valid	Much Acceptable
2. Activity Card	4.37	Evident	Much Valid	Much Acceptable
3. Assessment Card	4.42	Evident	Much Valid	Much Acceptable
4. Enrichment Card	4.21	Evident	Much Valid	Much Acceptable
5. Reference Card	4.23	Evident	Much Valid	Much Acceptable
B. Technical Aspect Indicator	4.59	Very Evident	Very Much Valid	Very Much Acceptable
Grand Mean	**4.46**	**Evident**	**Much Valid**	**Much Acceptable**

As shown in Table 3, the overall validity and acceptability of the developed Strategic Intervention Materials (SIMs) are revealed. In general, the SIMs registered a grand mean validity score of 4.46, indicating they are *much valid* and *much acceptable*. Therefore, these materials can be effective as remediation tools. Specifically, the content validity of the SIMs in terms of their Guide Card, Activity Card, Assessment Card, Enrichment Card, and

Reference Card scored 4.44, 4.37, 4.42, 4.21, and 4.23, respectively, with an average mean of 4.33. Similarly, the technical validity of the SIMs received an average score of 4.59, confirming that they are *much valid* and *much acceptable*.

3.3 Effectiveness of the Strategic Intervention Materials (SIMs) in Science 9: Projectile Motion

To determine the effectiveness of using SIMs for re-teaching the concepts and skills related to the least mastered competences in Science 9: Projectile Motion, the researcher developed two (2) SIMs based on the following topics: *1) Describe the horizontal and vertical motions of a projectile;* and *2) Investigate the relationship between the projection angle and the height and range of the projectile*. The experimental groups in selected public and private schools in Marinduque used these materials as instructional tools for nearly one week.

Summary of t-Test Statistics for the Comparison between the Pretest, Posttest and Gained Scores of the Experimental and Control Groups from both Public and Private Schools in Science 9: Projectile Motion

Table 4. Summary of t-test statistics for the comparison between the pretest, posttest and gained scores of the experimental and control groups from public school in science 9: projectile motion

	Treatment	Mean
*	Pretest Results of the Experimental Group	13.7
	Pretest Results of the Control Group	13.3
**	Posttest Results of the Experimental Group	22.9
	Posttest Results of the Control Group	18.6
***	Pretest vs. Posttest Results of the Experimental Group	9.24
****	Pretest vs. Posttest Results of the Control Group	5.29
*****	Gained Scores of the Experimental Group	9.24
	Gained Scores of the Control Group	4.23

** t = 0.102 at df = 33 is Not Significant at a = 0.05*
*** t = 0.000 at df = 33 is Significant at a = 0.05*
**** t = 0.000 at df = 33 is Significant at a = 0.05*
***** t = 0.000 at df = 33 is Significant at a = 0.05*
****** t = 0.000 at df = 33 is Significant at a = 0.05*

Based on the data presented, most of the computed p-values indicate a significant difference between the pretest and posttest means for the two (2) groups from the public school, except for the pretest results between the experimental and control groups. These results highlight the effectiveness of the developed SIMs over the conventional method in teaching Science 9: Projectile Motion. However, they do not directly suggest that the conventional method is ineffective as a re-teaching tool for improving learners' performances, as evidenced by the pretest and posttest means of the control group. At a 95% confidence interval, the t-test significantly differentiated the two (2) types of tests administered to the control group. This suggests that while the conventional method remains effective, it is insufficient to replace using SIMs as both a re-teaching tool and a remediation aid in enhancing learners' proficiency, particularly in Science subjects.

In consonance, similar studies have also highlighted the positive impact of SIMs on academic performance. The findings suggest that learners who engaged with SIMs demonstrated improved understanding and retention of key concepts compared to those who did not use these materials (Limbago-Bastida & Bastida, 2022; Martinez, 2019).

Table 5. Summary of t-test statistics for the comparison between the pretest, posttest and gained scores of the experimental and control groups from private school in science 9: projectile motion

	Treatment	Mean
*	Pretest Results of the Experimental Group	15.6
	Pretest Results of the Control Group	13.7
**	Posttest Results of the Experimental Group	25.9
	Posttest Results of the Control Group	26.3
***	Pretest vs. Posttest Results of the Experimental Group	10.2
****	Pretest vs. Posttest Results of the Control Group	12.6
*****	Gained Scores of the Experimental Group	10.2
	Gained Scores of the Control Group	12.6

** t = 0.102 at df = 33 is Not Significant at a = 0.05*
*** t = 0.000 at df = 33 is Significant at a = 0.05*
**** t = 0.000 at df = 33 is Significant at a = 0.05*
***** t = 0.000 at df = 33 is Significant at a = 0.05*
****** t = 0.000 at df = 33 is Significant at a = 0.05*

As shown in Table 5, most of the results (in terms of the p values) and the interpretations are almost identical to the list of findings enumerated in Table 7. Employing the t-test of difference between the means of independent samples, results significantly differentiated the experimental and control groups from the private school except for the posttest results of the two groups with t equal to 0.710 at 33 degrees of freedom (df), which considered not significant at $a = 0.5$ indicating that after the use of the developed Strategic Intervention Materials (SIMs) and the conventional method in re-teaching the lessons in Science 9: Projectile Motion, the learners' knowledge after the conduct of the experiment was still the same level.

However, given such results, the effectiveness of the developed Strategic Intervention Materials (SIMs) over the conventional method in teaching Science 9: Projectile Motion is apparent, considering it both a productive and functional re-teaching tool and a remediation aid in increasing learners' proficiency, especially in terms of Science subjects. Unlike the means obtained from the experimental and control groups in the public school, as shown in Table 5, the means acquired by the two groups in the private school are higher. This further implies that the level of knowledge and performance of the learners in this school is positively different from those in the public school. Aranda et al. (2019), however, stated in their study's findings, similar to this case, that the significant difference and increase in the posttest scores of the control group could be attributed to the fact that the subject taught using the conventional method is merely a repetition of what had been covered in the previous grading period. Despite this observation, the findings indicate that the science performance of the control group remained low.

Overall, the effectiveness of the developed Strategic Intervention Materials (SIMs) as the study employed the experimental design is seen throughout the experiment. Its aim is to assist teachers in providing their learners the needed reinforcement given the pretest and posttest results of both groups to create a progression in their respective subjects is attained as well. Furthermore, according to Dacumos (2016), different studies have also singularly pointed out the effectiveness of utilizing Strategic Intervention Materials (SIMs) in their respective Science lessons.

4.0 Conclusion

The findings from this study underscore the need for targeted educational interventions, such as Strategic Intervention Materials (SIMs), to help learners master difficult concepts in projectile motion. Developing and validating SIMs presents a promising approach to enhancing learning outcomes. By recognizing learners' unique challenges and leveraging innovative instructional strategies, educators can foster a deeper understanding of scientific principles, ultimately improving learner performance and engagement in Science Education. The study suggests that the developed SIMs should undergo continuous revision and expert validation to enhance their effectiveness in improving learners' performance in Science. Collecting feedback from learners after using the materials is crucial for ongoing improvement, and further studies should explore additional least mastered competencies in Science 9. Additionally, professional development opportunities, such as seminars and training for science teachers, should be provided to support the effective implementation of SIMs.

5.0 Contributions of Authors

The author initiated, conducted, and completed this study.

6.0 Funding

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7.0 Conflict of Interests

The author declares no conflict of interest.

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Thriving Through Culture Shock: The Psychological and Adaptive Challenges of First-Year Nursing Students

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Abstract. First-year nursing students experience a demanding transition period, encountering culture shock due to academic rigor and unfamiliar expectations. Culture shock impacts an individual's psychological well-being and ability to adapt to the rigorous demands of nursing school. This study investigated the relationship between the level of culture shock and the adaptation and psychological well-being of first-year nursing students at a selected university in Quezon City. The study employed a descriptive correlational design to investigate the interplay between culture shock, student adaptation, and psychological well-being. A pre-screening form identified eligible individuals and was selected randomly using purposive sampling. A sample of 285 first-year nursing students consented and completed the questionnaire. All adapted instruments were presented on a 5-point Likert scale and were analyzed using Pearson's correlation coefficient to examine the relationships between the variables. The study's findings showed a significant positive correlation with a statistical value of $r = 0.592$, $p < 0.001$, meaning that as culture shock increased, adaptation also increased. On the other hand, a significant positive correlation between culture shock and psychological well-being was found, with a statistical value of $r = 0.520$, $p < 0.001$, which suggests that as culture shock increases, psychological well-being increases as well. The study reported a moderate level of culture shock among first-year nursing students, emphasizing the importance of support programs, tailored methods, and accepting settings to aid adaptation and psychological well-being of the nursing students.

Keywords: Culture; Culture shock; Nursing; Student adaptation; Psychological well-being.

1.0 Introduction

The nursing program is widely recognized and regarded as one of the most competitive health-related fields in the Philippines, requiring more than interest and passion. Nurses must possess exceptional interpersonal abilities, sharp analytical thinking, and the ability to function efficiently in high-pressure situations (Sajili, 2023). Additionally, nursing education is a rigorous and demanding process to equip individuals with the skills necessary to provide excellent patient care. Due to the high competitiveness of the nursing program, student's qualifications are determined by their performance. Furthermore, in the first year of college, nursing students encountered numerous and diverse challenges, particularly as they transitioned from being high school students to college students. These challenges include academic, personal, socioeconomic, language barriers, and clinical challenges (Mudaly, 2023). Difficulties like these cause significant distress for student nurses, leading to potential course failure and/or complete dropout from the Higher Education Institution (HEI). In a study by Allaili et al. (2021), culture shock occurs when students tasked with navigating social and academic realms independently find themselves in unfamiliar or foreign environments, coming across foreign cultural practices in various societal and academic environments. As noted by Raco (2018), students who experience culture shock find it difficult to acquire information since they must acclimate to a new, unfamiliar setting. Culture shock is a natural part of change and adaptation, especially in nursing. By acknowledging its existence and being mindful of the emotions involved, nursing students can better manage their reactions and develop strategies to overcome challenges more effectively.

The primary goal of this study is to examine the correlation between the intensity of culture shock and the adaptation and mental well-being of first-year nursing students at a specific university in Quezon City. Additionally, the investigators suggested that it is imperative to discern any disparities in the level of culture shock among these students based on their respective school origins. This comprehension is crucial to facilitate the smooth adjustment of future nursing students and foster their familiarity with the nursing environment. Lastly, it allowed the investigators to develop well-informed recommendations, such as expanding the student orientation program with a more comprehensive and extended duration, to address the identified issue effectively.

2.0 Methodology

2.1 Research Design

The study utilized a descriptive correlational design to investigate relationships between culture shock, student adaptation, and psychological well-being among first-year nursing students while gathering data without variable manipulation. This design choice enabled researchers to employ descriptive statistics and Pearson's correlation coefficient to analyze patterns and relationships between variables, aiming to inform support programs for nursing students' transition.

2.2 Research Locale

The research was carried out at a private, non-religious university founded sixty-one years ago in Quezon City, Philippines.

2.3 Research Participants

The respondents for this study were First-year Nursing students enrolled at a University in Quezon City for the academic year 2023-2024. Out of 550 first-year Nursing students enrolled during the midyear semester, 285 students consented to participate in the study and completed the questionnaire. The study utilized a purposive sampling technique, selecting respondents who met specific inclusion criteria to ensure relevant and targeted data collection. The criteria required that participants be First-year Nursing students enrolled in the midyear semester of the academic year 2023-2024 in the designated locale during data gathering. Participants were required to be between 18 and 23 years of age, enrolled as regular students, have graduated from Senior High School, and provide informed consent by agreeing to the terms and conditions set forth by the investigators.

2.4 Research Instrument

A socio-demographic questionnaire was used to solicit the age, sex, province of origin, senior high school strand, type of student educational institution last attended, location of the previous school, and experience for at least 6 months of hybrid or face-to-face classes before entering college. In addition to the socio-demographic questionnaire, three (3) instruments were utilized in this study. The first instrument is the Measurement of Culture Shock originated by Mumford (1998), cited in the study of Almukdad and Karadag (2024). It was employed to gauge the extent of culture shock experienced by the participants. The Measurement of Culture Shock questionnaire had 12 items on a five-point Likert scale. Under the measurement of culture shock are questions regarding 'core' culture shock and interpersonal stress. The Cronbach alpha from the pilot study was 0.736. Another instrument that was used to determine the first-year nursing student's adaptation will be adapted from the Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1989), cited in the study of Dominguez-Lara et al. (2019) entitled "Internal Structure of Student Adaptation to College Questionnaire (SACQ) in first-year university students." Moreover, the questionnaire for the students' adaptation contained 27 items that have four parts: (1) academic adaptation, (2) social adaptation, (3) institutional adaptation, and (4) personal-emotional adaptation. The Cronbach alpha from the pilot study was 0.802. Finally, the third instrument used to assess the psychological well-being of first-year nursing students will be based on the Six Factor Model of Psychological Well-being developed by Ryff (1989) and cited in Martinez and Tiamzon's (2022) study. The original questionnaire, which includes 18 items rated on a seven-point Likert scale, will be adapted to a five-point Likert scale for this study. The questionnaire covers autonomy, environmental mastery, personal growth, positive relationships with others, and self-acceptance. The Cronbach alpha from the pilot study was 0.823.

2.5 Data Gathering Procedure

A preliminary screening was conducted to identify first-year nursing students who met the specific inclusion criteria to participate in the study. Participants were chosen using a purposive sampling method through invitations distributed through their university email, containing a brief study overview and a link to a Google Forms questionnaire. Participants obtained the terms and conditions and consent forms when they accessed the questionnaire and continued with the survey. Participants were requested to complete a socio-demographic questionnaire, providing information on their age, gender, previous educational background, and other relevant details. Upon completion, participants submitted their responses through Google Forms.

2.6 Ethical Considerations

The investigators presented the details about the study's background, significance, duration, and potential advantages and drawbacks to the participants to ensure they could make an informed decision before consenting. Additionally, the consent form features the investigators' contact details for any inquiries. It indicates that involvement is optional, and participants may exit the study anytime.

3.0 Results and Discussion

3.1 Demographic Profile of the Respondents

Table 1 shows the demographic profile of the respondents in terms of age. Out of the 285 respondents, 182 are 19 years old (63.86%), 54 are 18 years old (18.95%), and 46 are 20 years old (16.4%). In Aloka's (2023) research of freshmen at a public institution, age greatly affected adjustment processes, with younger students having higher obstacles than their older counterparts. This emphasizes the relevance of age in adjusting to university life since older students often have superior adjustment mechanisms.

Table 1. Frequency distribution of the demographic profile of the respondents

Age	Frequency	Percentage
18	54	18.95%
19	182	63.86%
20	46	16.14%
21	1	0.3%
22	1	0.3%
23	1	0.3%
Sex		
Male	54	18.95%
Female	231	81.05%
Province of Origin		
NCR (National Capital Region)	136	47.72%
Region IV-A (Calabarzon)	59	20.7%
Region III (Central Luzon)	41	14.39%
Senior High School Strand		
STEM (Science, Technology, Engineering, and Mathematics)	221	77.54%
HUMSS (Humanities and Social Sciences)	8	2.81%
GAS (General Academic Strand)	19	6.67%
ABM (Accountancy, Business and Management)	13	4.56%
Type of Educational Institution Last Attended		
Private	241	84.56%
Public	44	15.44%
Location of Senior High School		
Inside NCR	206	72.28%
Outside NCR	79	27.72%
Experienced of Hybrid or Face-To-Face Classes		
Yes	277	97.19%
No	8	2.81%

Table 1 also presents the respondents' demographic profile regarding sex. Most of the nursing students gathered were 231 female respondents (81.05%), while were 54 male respondents (18.95%). The results show that the majority of respondents from the data gathered are female nursing students since long-held societal and cultural conventions equate nursing with feminine attributes like empathy and caring (Liu & Li, 2017; Prosen, 2022). These stereotypes are maintained by media representations and deeply ingrained societal views that regard nursing as a typically feminine occupation. Furthermore, family and social pressures play an important role, with many female students urged or pushed to seek a career in nursing by their families and peers.

In addition, a recent report from the Commission on Higher Education (CHED) indicates that were 101,574 students enrolled in nursing programs nationwide (Yang, 2022). Moreover, social, cultural, and educational factors contribute to the low number of male student nurses. The current patriarchal structure continues to hinder men's opportunities in nursing, which is typically seen as a female-dominated profession. This view is reinforced by media representations and long-held cultural norms that equate nursing with feminine characteristics. As a result, male students frequently encounter challenges and prejudice, feeling compelled to continuously prove themselves by displaying characteristics like strength and leadership (Liu & Li, 2017; Prosen, 2022).

On the other hand, regarding the demographic profile of the respondents in terms of their province of origin, most of the respondents gathered are from the National Capital Region (NCR), with 136 respondents (47.72%). The distribution also includes lesser numbers from several locations around the Philippines, emphasizing the study's scope and the participants' diverse geographic backgrounds. The NCR is home to several public and private preschools, elementary and secondary schools, and the most prestigious university schools in the Philippines. Given the tremendous value that Filipinos place on education, these schools draw numerous migrants from various regions (Basa, et al., 2009; Manalo et al., 2021). Moreover, NCR is also an area for professional development across several industries, including healthcare. The city's business network improves employment prospects and allows networking opportunities, making it excellent for driven students seeking an array of career pathways and educational opportunities (Business Diary Philippines, 2020).

The frequency distribution of respondents by their Senior High School Strand also revealed a predominant preference for the STEM strand, with 77.54% (221 out of 285) of students enrolled. Based on the study of Malaga and Oducado (2021), when first-year nursing students were grouped according to their senior high school strand, there was a significant difference in their academic achievement (p=0.000) and academic self-regulated learning (p=0.045). The STEM graduates' academic performance and self-regulated learning were significantly higher than those of non-STEM completers. This implies that compared to their non-STEM peers, nursing students with prior STEM education may benefit from learning styles and academic achievement advantages. Considering that STEM graduates show notably higher academic performance and self-regulated learning, the preference for the STEM strand suggests that students may be looking for the academic benefits linked to STEM education. The high number of students in the STEM strand corresponds with findings that those with a STEM background generally perform better academically and have more effective learning styles, which likely influences their choice to pursue this strand in senior high school.

The table above also displays the distribution of respondents by the type of educational institution they last attended. The data indicates that a significant majority, 84.56% (241 respondents), attended private institutions, while only 15.44% (44 respondents) attended public institutions. Private and privately owned and funded schools often offer advantages compared to public schools (Allianzcare, n.d.). Moreover, according to the study by Orbeta and Paqueo (2022), private schools' increased freedom in curriculum design and extracurricular programs enables them to do better than public schools in various aspects. This corresponds with the large number of respondents opting for private education, suggesting that private schools' perceived advantages and flexibility make them a popular choice among students.

Moreover, the frequency distribution of respondents based on the location of their senior high school revealed that the majority, 72.28% (206 respondents), attended schools within the National Capital Region (NCR). In comparison, 27.72% (79 respondents) attended schools outside the NCR. The research conducted by Brownie et al. (2023) underlines how living circumstances and access to possibilities for higher education impact the geographic location of students' learning. Attending school in a remote or rural location may influence one's decision about which higher educational institution to attend, but it does not necessarily impact program completion or academic success. On the other hand, program completion and achievement in higher education are highly impacted by commute time and distance. With 72.28% of respondents having attended schools within the National Capital Region (NCR), it is clear that location significantly influences educational choices. This supports the idea that being closer to higher education institutions impacts where students decide to study. It also highlights the importance of commute time and distance, suggesting that students in the NCR benefit from shorter commutes and better educational opportunities than those outside the NCR.

Furthermore, Table 1 also reveals that 97.19% (277 respondents) had at least six months of hybrid or in-person classes before starting college, while only 2.81% (8 respondents) did not. Wahid et al. (2023) found that students perceive in-person learning as notably more effective and efficient than other methods. This preference likely stems from the direct interaction with instructors, immediate feedback, and the structured environment that traditional classrooms provide. However, the study also highlights that a blended learning approach combining in-person and online elements could be a compelling alternative. This hybrid approach can cater to diverse learning styles and needs, making education more adaptable and inclusive. Chin and Jung (2020) and Lee et al. (2020) found that nursing college students who are highly committed to learning and receive education through mixed methods and online learning show enhanced academic performance, better adaptation to college life, and higher satisfaction levels. Moreover, this highlights that students who have had these experiences are well-prepared to adjust to college environments that incorporate both in-person and online elements, demonstrating the readiness promoted by hybrid learning approaches.

3.2 Level of Culture Shock Experienced by First-Year Nursing Students

In terms of Core Culture Shock

Table 2 shows the "core" culture shock of first-year nursing students, with an overall mean score of 3.07, which is verbally interpreted as "Moderate," indicating a modest amount of "core" culture shock among first-year nursing students. Among all the questions, "Do you feel generally accepted by the local people in the new culture?" has the highest mean of 4.13 with a verbal interpretation of "High." These findings indicate first-year nursing students experienced moderate "core" culture shock. These findings are consistent with various points made in the literature. According to Lovin et al. (2023), the crisis phase occurs when people must adjust to new circumstances for an extended period, resulting in frustration, perplexity, and homesickness. The moderate levels of core culture shock observed in the study are consistent with this phase since the students are neither fully integrated nor upset. They endure a moderate culture shock that does not considerably interfere with their everyday functioning or adapting process.

Table 2. The core culture shock of first-year nursing students

Indicators		Mean	Interpretation
1.	Do you feel the strain from the effort to adapt to a new culture?*	2.33	High
2.	Have you been missing your family and friends back home?*	2.28	High
3.	Do you feel generally accepted by the local people in the new culture?	4.13	High
4.	Do you ever wish to escape from your new environment altogether?*	3.47	Low
5.	Do you ever feel confused about your role or identity in the new culture?*	3.14	Moderate
6.	Have you found things in your new environment shocking or disgusting?*	2.99	Moderate
7.	Do you feel helpless or powerless when coping with the new culture?*	3.18	Moderate
Overall Mean		**3.07**	**Moderate**

Note: Items marked with (*) are reverse-scored.

In contrast to Allaili et al. (2021) assertion that people experiencing culture shock feel less confident, worthless, afraid, and isolated, the findings show that first-year nursing students do not overwhelmingly want to leave their new environment. This implies that they may face difficulties but are not overwhelmed or pressured to leave their new surroundings. Overall, the findings indicate that first-year nursing students experienced a moderate level of core culture shock, as evidenced by a sense of acceptance and manageable challenges. This is consistent with the literature's emphasis on the ability to adapt and thrive despite initial discomfort.

Interpersonal Stress

Table 3 shows the interpersonal stress of first-year nursing students. The respondents displayed an overall mean score of 3.20 and a verbal interpretation of "Moderate," indicating moderate interpersonal stress among first-year nursing students. Among all the questions, the statement, "When talking to people, can you make sense of their gestures or facial expressions?" scored the highest mean of 4.24 with a verbal interpretation of "Very High." These findings explain that first-year nursing students are experiencing a moderate stress level. They may encounter stressful situations that do not positively or negatively affect them. In contrast to the claims of Reisinger (2009) stated that students who experience culture shock may feel pressure, and social interaction could be hard for them. However, the findings revealed that students easily understood verbal cues, which are essential factors in avoiding misunderstandings and relationships with other people. In addition, it was also found that students have a low level of suspicion or mistrust among the people they are with, which means the student also feels secure and accepted in the environment despite being in a new environment.

Table 3. The interpersonal stress of first-year nursing students

Indicators	Mean	Interpretation
1. Do you feel anxious or awkward when meeting local people?*	2.63	Moderate
2. When talking to people, can you make sense of their gestures or facial expressions?	4.24	Very High
3. Do you feel uncomfortable if people stare at you when you go out?*	2.38	High
4. When you go out shopping, do you feel as though people may be trying to cheat you?*	3.58	Low
5. Are you finding it an effort to be polite to your hosts?	3.15	Moderate
Overall Mean	**3.20**	**Moderate**

Note: Items marked with (*) are reverse-scored.

In these findings, it is evident that interpersonal stress moderately affects a student's culture shock level. According to Pedersen (cited in the study of Furnham, 2019), several variables influence the occurrence of culture shock, including interpersonal aspects such as communication skills, past cross-cultural experience, personal character such as independence or tolerance, and access to resources. Reactions to cultural shocks differ from person to person, ranging from complex to moderate reactions. Similarly, the influence of cultural shocks on a person varies, with some appearing rapidly and others appearing gradually (Andani, 2018). Furthermore, the student's previous cross-cultural experiences and personal characteristics, such as tolerance and independence, are likely to play an essential role in mitigating the impacts of culture shock. Access to resources, especially support services provided by educational institutions, helps alleviate the interpersonal stress associated with culture shock. Overall, the findings emphasized the significance of a supportive and welcoming atmosphere in reducing the impacts of cultural shock on first-year nursing students. This observation aligns with the literature emphasizing the complexities of culture shock and the different factors that can influence its impact on students.

Table 4. Overall level of culture shock of first-year nursing students

Level of Culture Shock	Reference Range	Mean	Frequency
Very High	4.21 - 5.00	4.43	9
High	3.41 - 4.20	3.71	81
Moderate	2.61 - 3.40	3.01	139
Low	1.81 - 2.60	2.34	56

Table 4 shows the level of culture shock experienced by first-year nursing students. These findings revealed that a significant portion of the population experienced high culture shock. This indicates that some students may find it difficult to adapt and adjust to their new environment. This coincides with findings from Aryani et al. (2021), "Culture Shock Communication of University Students from Outside of Madura," in which those experiencing culture shock may struggle to adapt and find physical or mental comfort. Various factors, such as cultural disparities, attitudes, languages, social settings, climate, cuisine, attire, and living habits, collectively contribute to students' challenges during this transition. Also, many students experienced a moderate culture shock, as revealed in the findings. This explains that these students still experience difficulties adapting to the new culture, yet they can manage it without disrupting their daily activities.

In contrast to the claims of Burns (1996), a person who experiences culture shock will have difficulty in expressing their feelings and thoughts. However, based on the indicators, students find communication easier, whether verbal or non-verbal, making navigating the new environment more tolerable. According to Allaili et al. (2022), it emphasized that overcoming culture shock is indeed necessary. In addition, it expounds the claim that culture shock could indicate an individual not being ready to undergo changes and transitions, which are naturally occurring in the nursing profession. Thus, these results provide the basis for creating focused assistance plans that vary according to each student's unique needs and help them adjust effectively. Therefore, the thorough information offered in this study provides an essential foundation for comprehending and resolving the culture shock that first-year nursing students encounter when they adjust to college life, underscoring the necessity of comprehensive and individualized support strategies.

The overall mean score for the Measurement of Culture Shock is 3.13. This suggests that these students generally experience a moderate level of culture shock. Considering the demographics of the chosen population, these students come from various regions of the country, which justifies the occurrence of culture shock. As Jafarov (2022) expressed, while some cultures may be similar, others can be very different and contradictory. Also, as educational institutions adapt their teaching methodologies to meet the evolving demands of the labor market, students may encounter unfamiliar academic environments and social dynamics, potentially exacerbating culture shock as mentioned by Rojas (2016). According to the study, most of the respondents came from private institutions prior to college. This makes the students somewhat familiar with navigating university life, thus explaining the moderate level of culture shock existing among the population.

This finding aligns with a study conducted by Hasibuan (2014) found that 69.4% of 85 students experienced a moderate level of culture shock. Hasibuan explained that culture shock exists within students due to the strain of adjusting to and blending into a new environment. Indicators such as acceptance and understanding of behavioral cues further elaborate on this phenomenon, making it a subtle but significant issue.

3.3 First-Year Nursing Students' Adaptation

In terms of Academic Adaptation

Table 5 shows that the respondents displayed an overall mean score of 3.59, indicating a high level of academic adaptation among first-year nursing students. The statement "I have been keeping up to date on my academic work" had the highest arithmetic mean score of 4.42 and verbal interpretation of "Very High," indicating that most first-year nursing students agree that they have been keeping up with their academic responsibilities.

Table 5. Academic adaptation of first-year nursing students

Indicators	Mean	Interpretation
I have been keeping up to date on my academic work.	4.42	Very High
I am satisfied with the level at which I am performing academically.	3.47	High
I enjoy writing papers for courses.	3.20	Moderate
I am not doing well enough academically for the amount of work I put in.*	3.27	Moderate
Overall Mean	**3.59**	**High**

Note: Items marked with (*) are reverse-scored.

Hussain and Shen's study (2019) highlighted the significance of readiness factors such as pre-departure preparedness and on-campus orientation in facilitating academic adjustment. For nursing students, this could involve understanding academic rigor and expectations about nursing education. Demiral Yilmaz et al. (2020) stated that familiarity with academic standards and cultural norms is essential for managing academic responsibilities effectively. This finding collectively suggests that while first-year nursing students generally adapt well academically, a significant challenge is related to their enjoyment of writing papers. The high overall mean score indicates strong adaptation to academic responsibilities.

In terms of Institutional Adaptation

Table 6 shows the respondents displayed an overall mean score of 4.57, indicating a high level of adaptation to institutional factors among first-year nursing students. The statement, "I expect to stay at this college for a bachelor's degree," had the highest arithmetic mean score of 4.82, with a verbal interpretation of "Very High," indicating that most first-year nursing students expressed their strong confidence in their intention to complete their degree at their current college and highlight a positive outlook and commitment towards their academic journey. Insights from Ricks and Warren (2021) on the transition experiences of first-generation college students emphasize the broader influence of social and support networks on students' adjustment to college, including their engagement with academic work. Addressing these factors could enhance students' satisfaction with academic tasks and contribute to their overall adaptation and success in nursing school. Therefore, creating a supportive academic environment that promotes institutional adaptation and satisfaction with academic work is essential for enhancing students' learning experiences and outcomes.

Table 6. Institutional adaptation of first-year nursing students

Indicators	Mean	Interpretation
I know why I am in college and what I want.	4.56	Very High
I am pleased now about my decision to go to college.	4.69	Very High
I expect to stay at this college for a bachelor's degree.	4.82	Very High
I am enjoying my academic work at college.	4.11	High
Lately, I have been giving much thought to transferring to another college.*	4.66	Very Low
I find myself considering taking time off from college and finishing later.*	4.60	Very Low
Overall Mean	**4.57**	**Very High**

Note: Items marked with (*) are reverse-scored.

These findings collectively suggest that while first-year nursing students generally demonstrate strong adaptation to institutional factors, there is an opportunity further to enhance their satisfaction and enjoyment of academic tasks. Enhancing this could improve overall adaptation to college life and enhance academic success. Studies underscore the significance of innovative teaching methods and fostering a strong commitment to learning to enhance students' academic performance and adaptation to college. Additionally, prioritizing a supportive academic environment that addresses institutional adaptation and satisfaction with academic tasks is crucial for optimizing students' overall success and learning experiences in nursing school.

In terms of Social Adaptation

Table 7 shows that first-year nursing students had an overall mean score of 4.10, indicating a "High" level of social adaptation. The statement "I have some good friends or acquaintances at college with whom I can talk about any problems I may have" had the highest mean score of 4.31 with a verbal interpretation of "Very High," indicating that most first-year nursing students felt they had very high levels of supportive social relationships at college.

Table 7. Social adaptation of first-year nursing students

Indicators	Mean	Interpretation
I am adjusting well to college.	4.00	High
I have several close social ties at college.	4.09	High
I have some good friends or acquaintances at college with whom I can discuss problems.	4.31	Very High
I am quite satisfied with my social life at college.	4.00	High
Overall Mean	**4.10**	**High**

Note: Items marked with (*) are reverse-scored.

A study of first-year students in Ireland by McLean et al. (2022) found that both genders reported moderate peer assistance, while those with higher levels reported reduced stress. Another study measured perceived social support among nursing students by Hamaideh et al. (2024) and reported high levels of social support. This study demonstrated that friends were the most important source of social support, followed by significant others and family members. However, students reported lower satisfaction with the statements "I am adjusting well to college" and "I am quite satisfied with my social life at college," with a mean score of 4.00. Park and Hong (2021) found that challenges remained despite positive correlations between social support and college adjustment. These findings could be proven by the study of H. Lee et al. (2022), which found that nursing students could more easily adjust to college life by learning how to build social support, self-efficacy, and problem-solving skills. In addition, a study by Jennifer Jothi Mary et al. (2020) found that 9% of first-year nursing students transitioning to college had good social support, 83% had moderate social support, and only 8% had poor social support.

In terms of Personal−Emotional Adaptation

Table 8 showed that first-year nursing students had an overall mean score of 2.71, indicating a "Moderate" level of personal-emotional adaptation. The statement "I have given much thought lately to whether I should ask for help from the Psychological/Counseling Services Center or a psychotherapist outside of college" had the highest mean score of 3.56, interpreted as "Low," suggesting that most students did not consider seeking help.

Table 8. Personal-Emotional adaptation of first-year nursing students

Indicators	Mean	Interpretation
I have been feeling tense or nervous lately.*	2.82	Moderate
I am finding academic work at college difficult.*	2.48	High
Lately, I have been feeling blue and moody a lot.*	2.72	Moderate
I have felt tired much of the time lately.*	1.92	High
Being on my own, taking responsibility for myself, has not been easy.*	2.49	High
I haven't been able to control my emotions very well lately.*	3.07	Moderate
I have been having a lot of headaches lately*	2.77	Moderate
I've given a lot of thought lately to whether I should ask for help from the Psychological/Counseling Services Center or from a psychotherapist outside of college.*	3.56	Low
I've put on (or lost) too much weight recently.*	2.97	Moderate
I have been getting angry too easily lately.*	3.03	Moderate
I haven't been sleeping very well.*	2.14	High
Sometimes my thinking gets muddled up too easily.*	2.44	High
I am experiencing a lot of difficulty coping with the stresses imposed upon me in college.*	2.85	Moderate
Overall Mean	**2.71**	**Moderate**

Note: Items marked with (*) are reverse-scored.

Cankaya and Duman (2010), cited in the study of Linden and Stuart (2020), found that lower year levels were less likely to seek psychological assistance. Özdemir et al. (2023) also noted that female students were more open to seeking help, while males faced higher social stigma. Conversely, the statement "I have felt tired much of the time lately" had the lowest mean score of 1.92, indicating frequent fatigue, which could be due to academic and clinical responsibilities or environment adjustment in college. This aligns with Isac and Abraham (2020), who linked excessive fatigue to academic pressures. Additionally, studies by Demiral Yilmaz et al. (2020) and Francisco (2020) emphasized the importance of coping strategies in addressing fatigue and emotional challenges, while Alharthi (2019) highlighted the role of positive peer relationships in psychological adjustment.

Table 9 presents the adaptation levels of first-year nursing students. These findings suggest that most first-year nursing students adapted well, though not as exceptionally as those in the very high category. These students were likely managing their new responsibilities and challenges effectively, although there may still be areas for improvement in their adjustment process.

Table 9. Level of student adaptation to college

Level of Student Adaptation	Reference Range	Mean	Frequency
Very High	4.21 - 5.00	4.41	21
High	3.41 - 4.20	3.75	128
Moderate	2.61 - 3.40	3.10	126
Low	1.81 - 2.60	2.43	10

These findings are relevant as Gause et al. (2024) noted that, in contrast to other first-year courses, the transition from primary to higher education is perceived as more difficult and challenging during the first year of nursing school. This insight is aligned with the current investigation such that even though most students were managing their transition effectively, the difficulty of this transition is evident as only a minority were adapting exceptionally well. This indicates that some students find the transition more difficult and may need additional support, further emphasizing the challenging nature of the first year in nursing school. According to a Van Tuan (2020) study, first-year students' academic performance is mostly determined by their ability to adapt to learning activities. The researcher concluded that helping students succeed requires an awareness of their adaptability levels. The researcher's conclusion is reflected in the findings. By identifying the levels of adaptation among first-year nursing students, targeted support can be developed for those with low to moderate adaptation levels to enhance their academic performance and overall success.

The overall mean score of the Student Adaptation to College Questionnaire was 3.46, with a verbal interpretation of relatively high levels of adaptation among first-year nursing students. This score indicates that these students generally adapt to college life, performing well across academic, social, institutional, and personal-emotional domains. While they encounter some challenges, these do not significantly hinder their adjustment. Sister Callista Roy's Adaptation Model emphasizes that individuals interact with their environment (both internal and external) to maintain balance and adapt to stimuli. According to this model, environmental changes stimulate adaptive responses, allowing individuals to grow, develop, and enhance their well-being. In the context of the overall mean score of SACQ, Roy's model suggests that first-year nursing students actively respond to new challenges and stimuli in their college environment, reflecting a solid level of adaptation. This high score indicates that these students effectively engage with their environment to maintain balance and support their personal growth and well-being. Wahid et al. (2023) support this finding by highlighting that students with prior hybrid or face-to-face learning experience reported higher effectiveness and engagement in such settings might find it easier to adapt to college life, which often incorporates both traditional and online elements.

This finding aligned with previous studies that emphasized the relevance of psychological well-being, control of stress, and confidence in oneself during this transitional period (Hughes et al., 2020). Additionally, Hussain and Shen (2019) underscored the significance of support systems and readiness factors in facilitating academic adjustment. He and Xu (2022) highlighted the impact of well-designed introduction courses on students' college transitions and academic adaptation. Furthermore, Datu and Buenconsejo (2021) provided insights into how motivation and self-efficacy beliefs were crucial for academic adaptation and overall performance. These elements contributed to the high adaptation levels observed among first-year nursing students, as reflected in their overall mean score.

3.4 First-Year Nursing Students' Psychological Well-Being

In terms of Self-Acceptance

As shown in Table 10, self-acceptance achieved a mean score of 3.80, reflecting a high level of self-acceptance. According to Ryff's (1989) psychological well-being scales, a high self-acceptance score suggests that first-year nursing students hold a positive view of themselves, recognizing and embracing various aspects of their identity, including strengths and weaknesses. Arslan and Coskun (2022) mentioned that when students feel valued and accepted in their school community, they are more likely to feel motivated and supported to tackle academic challenges, leading to greater resilience and buoyancy.

Table 10. Self-acceptance of first-year nursing students

Indicators	Mean	Interpretation
I like most parts of my personality.	3.97	High
When I look at the story of my life, I am pleased with how things have turned out so far.	3.99	High
In many ways, I feel disappointed about my achievements.*	3.45	Low
Overall Mean	**3.80**	**High**

Note: Items marked with (*) are reverse-scored.

The psychological well-being (Self- Acceptance) statement "When I look at the story of my life, I am pleased with how things have turned out so far" achieved the highest mean of 3.99, with a verbal interpretation of a high level of psychological well-being, suggesting that first-year nursing students feel satisfied with their accomplishments and view their current life experiences positively. According to Roy's Self Concept Model under Self Concept Mode, the Personal Emotional Dimension of Adaptation is centered on the emotional response and coping mechanisms individuals utilize to deal with stressors. Similarly, research conducted by Monika et al. (2023) discovered that when adolescents experience elevated psychological and subjective well-being, they often demonstrate enhanced academic performance, improved social abilities, and superior physical and emotional health.

In terms of Purpose in Life

According to the results, Purpose in Life has a mean score of 3.71, which is a verbal interpretation of a high level. Ryff's (1989) psychological well-being scales revealed that individuals with high scores for purpose in life possess clear goals and a sense of direction. They perceive meaning in their current and past experiences, believing that this imparts purpose and establishes aims and objectives for living.

Table 11. Purpose in life of first-year nursing students

Indicators	Mean	Interpretation
Some people wander through life, but I am not one of them.	3.65	High
I sometimes feel as if I have done all there is to do in life.*	3.84	Low
I live life one day at a time and don't really think about the future.*	3.65	Low
Overall Mean	**3.71**	**High**

Note: Items marked with (*) are reverse-scored.

According to Sister Callista Roy's Adaptation Model, as the environment evolves, individuals can persist in growing, developing, and enriching the significance of life for everyone.

In terms of Environmental Mastery

Handling the possibilities and requirements of one's surroundings to achieve personal needs and skills is a vital element of effective environmental management. Considering a mean score of 3.63, first-year nursing students are considered to have a high degree of competence when managing everyday tasks and taking advantage of chances in their environment (see Table 12). This result corresponds with the findings of Mustafa et al. (2020), who observed that moderate to high psychological well-being promotes improved social environment adaptation and community integration. Ryff's (1989) psychological well-being scales revealed that a high degree of environmental management reflects an individual's competence in navigating their surroundings. They efficiently handle various external activities, utilize available opportunities effectively, and can select or shape their environment to align with personal needs and values.

Table 12. Environmental mastery of first-year nursing students

Indicators	Mean	Interpretation
The demands of everyday life often get me down.*	2.93	Moderate
In general, I feel I am in charge of the situation in which I live.	4.11	High
I am good at managing the responsibilities of daily life.	3.84	High
Overall Mean	**3.63**	**High**

Note: Items marked with (*) are reverse-scored.

First-year nursing students presented a variety of responses on various aspects of psychological well-being as measured by the statement, "The demands of everyday life often get me down.." The score for thoughts of disappointment regarding life successes was 2.93, with a verbal interpretation of a moderate level of psychological well-being. This suggests that the respondent may encounter stress and feel overwhelmed at times, meaning they might feel down at times but are not necessarily in distress. Similarly, Sister Roy's Self Concept Model mentioned that the emotional dimension of adaptation is connected to self-concept because most people's emotional response is usually linked to how they view themselves and their capacity to cope with challenges. On the other hand, the statement "In general, I feel I am in charge of the situation in which I live." achieved an average score of 4.11, with a verbal description of a high level of psychological well-being, suggesting that first-year nursing students feel a strong sense of control and command over their lives.

In terms of Personal Growth

As shown in Table 13, an average of 4.52 is a very high level for personal growth. This is an encouraging finding, suggesting that first-year nursing students experience ongoing development, embrace new experiences, and recognize growth in self-knowledge and effectiveness over time. Ryff's (1989) psychological well-being scales defined a high level of personal growth as having a continuous sense of development, viewing oneself as evolving and receptive to new experiences. They feel a sense of realizing their potential and notice improvements in themselves and their behavior over time. This aligns with Rapuano's (2019) study, which showed a positive correlation between academic success and psychological well-being across various domains. The high score suggests that these students are making the most of their nursing education's opportunities for learning and growth.

Table 13. Personal growth of first-year nursing students

Indicators	Mean	Interpretation
Life has been a continuous process of learning, changing, and growth.	4.82	Very High
I gave up trying to make big improvements or changes in my life long ago.*	4.11	Low
I think having new experiences that challenge how I think about myself and the world is important.	4.62	Very High
Overall Mean	**4.52**	**Very High**

Note: Items marked with (*) are reverse-scored.

The average score for the statement "For me, life has been a continuous process of learning, changing, and growth." was 4.82, revealing that the students had made significant personal progress. The very high personal growth scores may also indicate that these students are capable of dealing with academic stress and adapting to a new settings. Indreswari et al. (2021) investigated the inverse relationship between psychological well-being and academic burnout, highlighting how well-being acts as a protective factor in alleviating stress and improving adaptation to academic pressures. In the statement "I gave up trying to make big improvements or changes in my life a long time ago," students scored an average of 4.11, indicating a tendency toward resignation or a lack of proactive engagement in personal development activities. Doğanülkü's (2024) research suggests that persons with lower levels of proactive activity may struggle to adapt to life transitions and problems.

In terms of Positive Relations with Others

As shown in Table 14, positive relationships with others have a mean score of 3.91, which means that the average score suggests that first-year nursing students have a high level of positive relationships with others. Ryff (1989) suggested that a high level signifies nurturing, fulfilling, and trusting connection with others. They possess a strong capacity for empathy, affection, and closeness, recognizing the mutual exchange in human relationships. As also noted by Mustafa et al. (2020), moderate to high levels of psychological well-being influence students to adapt effectively to those around them and their community.

Table 14. Positive relations with other of first-year nursing students

Indicators	Mean	Interpretation
People would describe me as giving and willing to share my time with others.	4.28	Very High
I have not experienced many warm and trusting relationships with others.*	3.94	Low
Maintaining close relationships has been difficult and frustrating for me.*	3.51	Low
Overall Mean	**3.91**	**High**

Note: Items marked with (*) are reverse-scored.

The statement, "People would describe me as a giving person, willing to share my time with others," achieved the highest mean of 4.28, with a verbal interpretation of a very high level of psychological well-being. This indicates that others view first-year nursing students as generous in dedicating their time to others and helping those in need. Similarly, Arslan and Coskun (2022) mentioned that a sense of inclusion fosters positive student interactions, contributing to better social functioning and overall well-being.

In terms of Autonomy

The average score for autonomy, as seen in Table 15, indicates a mean of 3.29, representing that first-year nursing students have a moderate level of autonomy. This implied that although these students display a certain level of independence, they also clearly care about the social expectations and opinions of others. Ryff's (1989) psychological well-being scales indicated that high autonomy levels signify being self-governing and self-reliant. Individuals with high autonomy can withstand social pressures to conform and make independent choices. Conversely, those with low levels of autonomy are often preoccupied with the expectations and judgments of others, depending on external opinions to make significant decisions.

Table 15. Autonomy of first-year nursing students

Indicators	Mean	Interpretation
I have confidence in my own opinions, even if they differ from how most other people think.	3.94	High
I judge myself by what I think is important, not by the values of what others think is important.	3.62	High
I tend to be influenced by people with strong opinions.*	2.30	High
Overall Mean Score	**3.29**	**Moderate**

Note: Items marked with (*) are reverse-scored.

Psychological well-being statement, "I have confidence in my own opinions, even if they are different from the way most other people think," scored an average of 3.94, reflecting a high level of confidence in their own opinions among the students. In line with Mustafa et al. (2020) discovered that students who have a greater sense of autonomy in their learning generally outperform their peers academically, highlighting the significance of autonomy in improving educational achievements. Furthermore, the statement "I tend to be influenced by people with strong opinions" gathered a mean of 2.31 with a verbal interpretation of a high level of psychological well-being, implying that first-year nursing students are persuaded through the value of confidence in others, potentially viewing strong opinions as a sign of knowledge or expertise.

The number of first-year nursing student respondents is a total of 285. The mean was used to interpret psychological well-being, while the frequency shows the total number of students per category. The overall mean of psychological well-being is 3.81, with a verbal interpretation of " High.". This means that first-year nursing students have highly positive emotions, a sense of purpose, and adaptability.

Table 16. Level of psychological well-being

Level of Psychological Well-being	Reference Range	Mean	Frequency
Very High	4.21 - 5.00	4.44	59
High	3.41 - 4.20	3.80	172
Moderate	2.61 - 3.40	3.17	54

These findings are similar to the research conducted by Franzen et al. (2021); results show that higher scores in academic satisfaction were associated with Psychological well-being, while lower scores were strongly associated with depression, anxiety, and stress. In the study of Indreswari et al. (2022), individuals with good psychological well-being can deal with pressure consciously, have no academic worries, and adapt to difficult situations. These results provide a basis for an increase in psychological well-being that positively affects other aspects contributing to satisfaction. Therefore, through this information put forward by the study, enhancing the psychological well-being of first-year nursing students could contribute to the initiatives that promote psychological well-being and social connections that help manage expectations and promote positive learning to first-year nursing students.

3.5 Relationship Between First-Year Nursing Students' Level of Culture Shock and Adaptation to College

Pearson's Rank Correlation Coefficient was used to assess the relationship between first-year nursing students' level of culture shock and their student adaptation. Table 17 showed a statistically significant positive correlation ($r = 0.592$, $p < 0.001$) between culture shock and student adaptation. As first-year nursing students experienced higher levels of culture shock, they also tended to show higher levels of adaptation to their student roles. Although statistically significant, the correlation coefficient 0.592 revealed a moderately strong positive relationship. This suggested that as the intensity of culture shock experienced by first-year nursing students increases, their level of adaptation to the student role tends to increase, and other factors likely also play significant roles in determining student adaptation levels.

Table 17. Relationship between first-year nursing students' level of culture shock and their adaptation to college

	Culture Shock		Decision
Students' Adaptation to College	Pearson's r	0.592	Reject H_0
	p-value	< 0.001	Significant

It was stated that one factor being investigated in student adaptation is social adaptation. In Roy's Adaptation Model, one of its modes is interdependence mode, where behaviors are associated with interdependent relationships. It focuses on how an individual gives and receives love, respect, value, and security in nurturing relationships. Both McLean et al. (2022) and Hamaideh et al. (2024) observed that nursing students with substantial social support experienced lower stress levels and highlighted the positive impact of robust support systems on reducing stress. These statements provide credibility to the positive relationship between culture shock and student adaptability to college. This high degree of social support promotes a nurturing atmosphere, allowing students to develop resilience and effective coping techniques, resulting in a better adaptation to college life despite facing cultural shock. In conclusion, Pearson's r Correlation Coefficient analysis showed a substantial positive association ($rho = 0.592$, $p < 0.001$) between culture shock and student adaptation among first-year nursing students. Furthermore, the findings align with Adler's perspective, implying that culture shock promotes personal growth and cultural learning, increasing students' resilience and cross-cultural understanding. Therefore, educators and administrators should facilitate support mechanisms such as orientation programs and cultural sensitivity training to help students adapt and improve their educational experience.

3.6 Relationship Between First-Year Nursing Students' Level of Culture Shock and Psychological Well-Being

The relationship between first-year nursing students' level of culture shock and their psychological well-being was evaluated using Pearson's r Correlation Coefficient. The gathered data were normally distributed with a Shapiro-Wilk p-value of 0.101 for Culture Shock and 0.329 for Psychological Well-Being. Table 18 shows a statistically significant positive correlation between culture shock and psychological well-being, with $r = 0.520$ with $p < 0.001$, indicating a moderate positive relationship. This suggests that psychological well-being also tends to increase as culture shock increases.

Table 18. Relationship between First-Year Nursing Students' Level of Culture Shock and their Psychological Well-being

	Culture Shock		Decision
Psychological Well-being	Pearson's r	0.520	Reject H_0
	p-value	< 0.001	Significant

As stated by Mulyadi et al. (2024), students who successfully adapt to a new culture tend to exhibit better academic performance and psychological well-being, demonstrating enhanced coping mechanisms to navigate the challenges associated with their new environment. According to Roy's model, individuals strive to maintain a balance by responding to environmental stimuli through adaptive or maladaptive responses. Successful adaptation, supported by strong coping strategies, results in enhanced psychological well-being and academic performance. This model aligns with the finding that students who effectively adjust to cultural changes experience better psychological well-being.

The moderate correlation (r= 0.520), indicates that although culture shock significantly impacts psychological well-being, it is just one of several factors that affect the overall psychological condition of first-year nursing students. The low p-value ($p < 0.001$) confirms the importance of this relationship, highlighting the need to consider culture shock in initiatives designed to support these students. In conclusion, a notable positive correlation exists between first-year nursing students' experience of culture shock and their psychological well-being. While culture shock impacts psychological adaptation, other factors contribute significantly. Callista Roy's Adaptation Model offers a useful framework for understanding this relationship, demonstrating how adaptive responses to environmental changes, such as culture shock, can improve psychological well-being.

4.0 Conclusion

Analyzing the relationship between culture shock and student adaptation revealed a statistically significant positive correlation among first-year nursing students. Although the correlation is moderate, it highlights the significance of culture shock in the adaptation process. It acknowledges that additional factors play a crucial role in students' adjustment to college life. Notably, the impact of social support is emphasized, as research indicates that robust social networks can alleviate stress and improve coping strategies among nursing students. These findings support the notion that, despite the difficulties of culture shock, it contributes to personal development and resilience. The findings have shown a weak positive relationship between culture shock and psychological well-being. The challenges of adjusting to a new environment lead to a positive psychological outcome when seen in a positive outlook. Students with higher psychological well-being handle culture shock more effectively and perceive it as a learning opportunity contributing to their growth and development. Furthermore, an effective adaptation wherein students manage to adapt to cultural changes experiences improved psychological well-being as well as better academic performance.

5.0 Contributions of Authors

All authors contributed to the conceptualization of the work. FMNC, MSDC, and CMFC obtained approval from the ethics committee to ensure compliance with ethical standards. GMC, JDGVC, and DFCC engaged experts to validate the questionnaire, ensuring its reliability for accurate data collection. JDGVC led the data analysis, applying rigorous methods to ensure data integrity. Each author contributed to drafting the manuscript, with CMFC, MKJSC, FHCC, and CRDC carefully revising it to enhance clarity and impact. Finally, all authors reviewed and approved the final manuscript.

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7.0 Conflict of Interests

The authors declare that there is no conflict of interest in this study.

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Written Corrective Feedback in Online ESL Academies

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Abstract. Written corrective feedback (WCF) 's usefulness in offline education has been extensively studied. However, studies examining online ESL instructors' perceptions and attitudes toward this kind of feedback in online ESL academies were conspicuously lacking. In this regard, this study aimed to identify (1) the lived experiences of online ESL instructors when giving written corrective feedback, (2) the common strategies they employ, (3) the challenges in their feedback practices, and (4) the impact of their written corrective feedback. It was grounded on Bandura's Social Cognitive Theory and Borg's Language Teacher Cognition Theory. The study used the qualitative phenomenological approach to examine the participants. Ten online ESL instructors from ESL academies participated through an in-depth interview. Based on the study, two themes were generated for lived experiences: feedback goals and feedback views. Regarding WCF strategies employed by online ESL instructors, data produced the following themes: feedback based on proficiency level and feedback clarity and personalization. Regarding the challenges online ESL instructors face when giving written corrective feedback, the findings revealed the following themes: student factors and feedback factors. Lastly, regarding the impact of written corrective feedback as perceived by online ESL instructors, results showed student skill refinement, teacher feedback technique development, and student behaviors.

Keywords: English language teaching; ESL academies; Lived experiences; Online ESL instructors; Written corrective feedback.

1.0 Introduction

Written Corrective Feedback (WCF) originated from second language acquisition (SLA). Language experts believe in the Contrastive Analysis Hypothesis, which claims that learners make errors in the second language because they are affected by their first language (Wagner, 2016). In the late 1960s, SLA scholars found that even first language (L1) students would make many errors during their learning process. Relevant studies and literature explore teachers' perspectives on written corrective feedback (WCF) in ESL contexts. First, Language Teacher Cognition Theory (LTC) focuses on understanding language teachers' thought processes, beliefs, knowledge, and decision-making in their instructional practices, including feedback provision (Borg, 2006; Feryok & Kubanyiova, 2015). According to LTC, teachers' beliefs and knowledge shape their instructional decisions and practices, including their approaches to WCF.

In the Philippine setting, teachers' beliefs about error correction may influence their attitudes and practices regarding WCF. Studies by Reyes and Santos (2015) suggest that Filipino teachers often prioritize error correction to improve language accuracy and proficiency. In addition, Filipino cultural values and norms may influence teachers' approaches to WCF. Research by Alcaraz (2018) highlights the importance of maintaining positive rapport and preserving students' self-esteem in feedback interactions, which may impact how Filipino teachers deliver corrective feedback. Furthermore, studies by Lomibao and Cruz (2017) examine Filipino teachers' strategies for providing WCF, including direct correction, indirect correction, and metalinguistic feedback. These studies suggest that Filipino teachers employ strategies influenced by their pedagogical beliefs and goals. They also face various challenges and constraints in providing effective WCF, such as large class sizes, limited resources, and time constraints (Magno, 2014). These challenges may shape teachers' perceptions of the feasibility and efficacy of different feedback approaches.

The usefulness of written corrective feedback (WCF) in the offline setting has been extensively studied, but studies examining online ESL teachers' perceptions and attitudes toward this kind of feedback were conspicuously lacking (Gonzales & Nassaji, 2020; Park et al., 2015; Karim & Nassaji, 2018). This emphasizes the need for more research to fully grasp the obstacles and possibilities for improving feedback practices in online ESL education. To address this research gap, this qualitative research paper explored how teachers view written corrective feedback in English writing contexts.

2.0 Methodology

2.1 Research Design

To get information on the lived experiences of online ESL instructors in giving Written Corrective Feedback to foreign students, the researcher used the qualitative phenomenological research approach, a type of study that offers perspectives on the issue or aids in developing ideas (Tenny et al., 2022). Data that provide a subjective account of who, what, and where the events or experiences took place are produced by qualitative research (Kim et al., 2017). This translates into researchers being interested in comprehending each human experience in its particular setting in qualitative phenomenological research.

2.2 Research Locale

The study used snowball sampling, a non-probability sampling approach, to choose the participants. This technique entails a primary data source, such as a teacher, recommending additional potential data sources, such as other online instructors who were eager to participate in the study. The study was conducted with ten online ESL teachers working for ESL academies based in Ortigas, Pasig City, who were in a work-from-home setup. After the interviews, the researcher found three experts in the online ESL education field to cross-reference the results; they served as the key informants of this study.

2.3 Research Participants

The researcher used triangulation of sources, wherein in-depth interviews were conducted with different stakeholders (Bhandari, 2023). To discover more about the study, the researcher found literature and studies relevant to the paper, provided her own experience and knowledge while making sure to set aside her judgment and biases, and conducted a written interview with the participants as well as key informants who are experts in the field of online ESL teaching. A written interview is a method to gather information using guide questions (George & Merkus, 2022). The interview was carried out with ten online ESL teachers working for online ESL academies based in Ortigas, Pasig City, who met the following criteria: (a) actively teaching or have experience assessing essays or providing written corrective feedback to foreign ESL learners, (b) have at least one year of ESL experience, and (c) a degree in English or communication. The invited key informants had more than a year of experience in online ESL teaching and finished a degree related to English or education. The results of their interviews were used to verify the validity of the participants' answers.

2.4 Research Instrument

Interviews with ten online ESL instructors from various online English academies in Ortigas, Pasig, were used to collect the data. The researcher formulated the interview questions to elicit responses to each research question. The research instrument was validated by inviting three validators who were experts in online language education to comment on the interview questions. The interview questions are comprised of four sections: *Lived Experiences on WCF, Common Strategies for WCF, Challenges in Providing WCF,* and the *Impact of WCF on Feedback Quality and Student Written Output*, which answer each research question of this study.

2.5 Tradition of Inquiry and Data-Generation Method

This study examined the structures of consciousness and how people experience events using the phenomenological approach (Larsen & Adu, 2021). In this approach, the researcher discovers a phenomenon or an essence through a group of individuals who have similar experiences through in-depth interviews. The researcher followed Jack Caulfield's six steps of thematic analysis (Caulfield, 2019) for this study. In the context of online ESL instructors and their practices in giving written corrective feedback (WCF) to foreign students, this method was used to delve deeper into the instructors' lived experiences and the intersubjective meanings related to them. First, the researcher familiarized herself with the data being studied. The data were collected through an in-depth written interview. The researcher selected participants who were online ESL instructors. The interview was done in a written form at a time that worked best for the participants, and they were given flexible time to answer each question more deeply. After familiarization, the researcher started labeling the excerpts from the interviews and assigned labels or initial codes for them. Next, themes were extracted, named, defined, and reviewed. Lastly, a diagram was constructed from the generated themes to represent the research study better, and then it was explained.

2.6 Ethical Considerations

Before they joined, each participant was told about the research goals, methods, and possible difficulties. The participants were also informed that they could leave anytime without negative consequences. The information was kept safe, and only the research team could access it. Should any of the study's activities or questions cause emotional discomfort, participants were assured of providing necessary support services, and sensitive issues were treated with care. Once the study concluded, a debriefing session ensured that participants felt at ease with their participation and addressed any concerns they had. Participation was voluntary, with individuals free to withdraw from the study at their discretion at any stage. The Data Privacy Act of 2012 or RA 10173. In this study, the researcher guaranteed that no personal information was revealed. The researcher requested authorization from the College of Education-Graduate Studies' Research Ethics Committee to ensure adherence to all ethical standards. Any potential conflicts of interest were disclosed. The collection, storage, and analysis of data were conducted ethically.

3.0 Results and Discussion

3.1 Lived Experiences of Online ESL Instructors

Table 1 below represents the participants' lived experiences with written corrective feedback. It demonstrates how participants understand and experience written corrective feedback, which is influenced by various factors, including their (a) feedback goals and (b) feedback views.

Table 1. Summary of themes: Lived experiences of online ESL instructors on WCF

Theme	Meaning	Sample Extracts
Feedback Goals	This refers to the desired result of online ESL instructors when giving written corrective feedback.	Giving written corrective feedback is critical for student development. Initial codes include feedback clarity, student-improved proficiency, student awareness and self-correction, and memory retention. *"From my experience working with ESL learners, I have noticed that Koreans commonly struggle with omitting articles, ensuring subject-verb agreement, and occasionally with spelling."*
Feedback Views	This refers to the perspectives of online ESL instructors on written corrective feedback.	Feedback can be provided in many different ways. Initial codes emphasize WCF's importance, provide personalized feedback, and utilize motivating English expressions. *"To assist students, see their errors, and learn how to remedy them, written corrective feedback is crucial in ESL instruction. It provides precise guidance on language use, which is essential to improving."*

Feedback Goals include the initial codes such as feedback clarity, student-improved proficiency, student awareness and self-correction, and memory retention. This theme and initial codes correlate to the Noticing Hypothesis (Zhang, 2022), which states that WCF assists students in two ways: First, it helps them become aware of shortcomings in their L2 knowledge, and then, it draws their conscious attention to the target form, which, according to this hypothesis, are the essential requirements for learning to occur. The participants mentioned how important WCF is in helping students become aware of their linguistic errors, such as grammar rules, vocabulary usage, and sentence structure, their mistakes and weaknesses, and shapes them into independent learners. In addition, based on the participants' answers, written corrective feedback allows students to focus more deeply on the intricacies of grammar, such as proper sentence construction and spelling. It helps students identify and correct errors in grammar, vocabulary, sentence structure, and spelling, enhances language learning for foreign students by providing specific guidance on errors, promotes self-correction, raises awareness of language rules, and improves accuracy, holds paramount importance in ESL instruction due to the prevalence of grammar errors among foreign students, evident not only in their speech but also in their writing, precisely identifies grammar errors, particularly because many of these mistakes stem from nuances in their native language, and leads to greater proficiency in written expression, showcasing their ability to articulate thoughts more effectively through writing than spoken English. The key informants of this study also agreed that written corrective feedback is particularly crucial in ESL teaching. They noted that what it does is help the students to notice their errors, guided by the indication that an editing text embodies the proper use of the language, enabling students to reflect on their text, reconsider their views, and eventually improve and change their language learning.

In addition, the findings are also congruent with Choi's (2017) study on the effects of written corrective feedback, whose findings demonstrated that students using WCF did exhibit improved accuracy based on grammatical structures and distinct feedback kinds. The indirect group he studied received the greatest mean score for verb tense use in the first composition, whereas the metalinguistic group received the highest score in their third composition. However, only the indirect group improved their scores when comparing the first and last compositions regarding article utilization. In contrast, the scores of the other two feedback groups decreased.

Moreover, the theme **Feedback Views** includes the initial code's emphasis on WCF importance, providing personalized feedback, and utilizing motivating English expressions. These findings align with Krashen's Monitor Model, which implies that learning differs from acquisition, a subconscious process. In interaction theories, L2 input must be pushed to give modified output in interactions. That is, learners need to pay attention to the input and output form to incorporate the explicit linguistic knowledge into their L2 system as L2 intake. The internalization process is affected by mediating factors such as learners' amount of attention, motivation, cognition, and affection (Robinson, 2013). According to the instructors, through WCF, language learners can do their best to write more accurately, and they can eventually learn the language independently because when students can analyze and reflect on their errors, they can automatically correct themselves and have autonomy in their language learning journey; it also teaches them to check their own work and learn from their errors (Park et al, 2015). On the other hand, they also agreed that positive reinforcement boosts their motivation. To strike a balance, constructive criticism, and encouraging words should be given to help students become more confident writers.

3.2 WCF Strategies of Online ESL Instructors

Table 2 presents the participants' strategies when giving written corrective feedback. It demonstrates the themes generated based on the strategies employed by the participants in their corrective feedback, such as (a) feedback type based on the student's level and (b) feedback clarity and personalization.

Table 2. Summary of themes: WCF strategies of online ESL instructors

Theme	Meaning	Sample Extracts
Feedback Type Based on Proficiency Level	This focuses on the methods for delivering feedback based on the student's competency level.	Direct and focused feedback is mainly effective for beginners. Indirect feedback is less explicit and encourages self-correction suitable for advanced-level students. Unfocused feedback, which is broad and specific, promotes a deeper understanding of lessons for advanced-level students. *"I have been applying direct and focused feedback since students' writing part of their learning is more focused on the grammar side of their language learning program."*
Feedback Clarity and Personalization	This highlights the significance of clear and tailored feedback to each student's requirements.	Through clear and personalized feedback, online ESL instructors can use the students' strengths, weaknesses, and learning preferences to make their feedback more relevant and effective. Initial codes include personalized feedback, comprehensive feedback, student feedback consideration, and building confidence and motivation. *"To tailor my feedback strategies, firstly, I assess the student's strengths, areas of improvement, and levels based on my corrections to their essays. After that, I give written comments and grammar tips when needed, like for students of lower levels."*

The **Feedback Type Based on Proficiency Level** theme is relevant to the types of feedback presented by different proponents. Three initial codes are under this theme: direct and focused feedback for beginners, indirect feedback for advanced students, and unfocused feedback for advanced students. First, Direct Feedback involves explicitly providing the correct form, indicating errors, and supplying the correct version (Aseeri, 2019). The reasons for the online ESL instructors' use of this feedback include using it along with focused feedback to beginner students, or those who commit a lot of mistakes, and to intermediate students. They can carefully correct errors and provide the correct form to reinforce language rules, as it highlights a grammatical error, and providing the correct form helps clarify mistakes for learners. One also noted that explicitly providing the correct form or indicating errors and supplying the correct version helps them understand the target language structures and build their confidence by openly correcting their mistakes. Meanwhile, some of the participants preferred Indirect Feedback. Indirect Feedback points out errors without explicitly providing the correct form, prompting learners to self-correct or reflect on their mistakes (Agbayani, 2022). When asked why, they explained that they give indirect feedback to advanced students to identify faults and encourage self-correction so that they may think critically and comprehend concepts at a deeper level. Seven of the participants discussed their use of Focused Feedback in employing WCF. This feedback type targets specific types of errors or language features, such as grammar or vocabulary (Berkant, 2020).

The participants declared that they provide focused and direct feedback to beginner students, or those who commit many mistakes, and sometimes to intermediate students. In addition, they use it for individual errors to specifically point out errors and provide the correct forms for targeted language elements, such as grammar or vocabulary, verb tense consistency, or word choice, which they believe can guide students in improving their writing skills effectively. Finally, only three of them considered Unfocused Feedback for WCF. Unfocused Feedback addresses errors broadly without targeting specific linguistic features, often providing general comments on overall writing quality (Al-Hazzani & Altalhab, 2018). Their reasons include using this method with students who commit only one mistake or write almost perfect essays, when they give them grammar tips at the end of their feedback, or combining another feedback type with unfocused feedback to address overall writing quality and development with specific feedback on reoccurring difficulties.

For the next theme, **Feedback Clarity and Personalization**, the participants explained that tailoring is utilized, with the initial codes including personalized feedback, comprehensive feedback, student feedback consideration, and building confidence and motivation. The findings are similar to a study in 2015 by two researchers. According to the study, tailored feedback is done by assessing the student's strengths, areas of improvement, and levels based on the corrections they have initially made (Bitchener & Knoch, 2015). In addition, another participant adjusts their wording depending on the level of the student or age in order to match their students' requirements, as they believe each student's unique proficiency level and learning objectives are crucial to satisfy their various demands. The instructors explained that based on the students' feedback, some who get direct and focused feedback appreciate the corrections and grammar tips they provide. Some also take note of the feedback students give through the questions they ask regarding the corrections they receive. Sometimes, students' sentences are grammatical but can still be improved to sound more natural, so suggestions are made. For the use of examples, when a student is struggling with the tenses of the verb, some instructors provide direct feedback, as it is important for the student to see their mistakes corrected, so they find giving examples very effective, especially for vocabulary. They further mentioned that providing specific examples and suggestions for improvement can further clarify the points being made.

Participants considered and incorporated students' personalities, backgrounds, and interests into the feedback; they also prioritized acknowledging students' narratives to convey that they had thoroughly read their submissions, and they also ensured their answers to questions determined their age. These findings correlate with a study by a professor in Pittsburgh who used personalized feedback to examine students. In her study, she found that the personalized feedback approach improved students' language and metacognitive skills and their emotive reactions to WCF. This is most likely due to the interpersonal character of the personalized feedback approach, which provided students agency and a say in the feedback process. Students who thought their lecturers were involved in their learning reacted positively to feedback since it made their opinions and beliefs relevant in the process (Denman, 2020). The critical informants of this study also agreed with these insights and even elaborated that as much as it is important to cater to students' needs, online ESL instructors should be aware of students' expectations and their level; they should also make sure to give useful feedback by providing seasonal updates and feedback about the students' work. They also added that credibility should be established if the instructors want students to listen.

3.3 WCF Challenges of Online ESL Instructors

Table 3 displays the participants' challenges when giving written corrective feedback. It demonstrates the themes of the challenges encountered by the participants in their corrective feedback, such as (a) student factors and (b) feedback factors.

Table 3. Summary of themes: WCF challenges of online ESL instructors

Theme	Meaning	Sample Extracts
Student Factors	This refers to online ESL instructors' challenges on how feedback affects students' emotions and willingness to engage and study.	It is beneficial to assess how feedback may influence students' emotions and deliver it in an approach. Initial codes include balancing motivation and correction, addressing cultural differences, student engagement, and student sensitivity. *"…it is a challenge to strike a balance between giving corrective feedback and motivating the student, especially when the student has made a lot of mistakes in their writing."*
Feedback Factors	This highlights the significance of making feedback understandable and actionable while effectively handling it.	Online ESL instructors encounter obstacles that students may have while comprehending feedback, such as distance and English words that are used differently in the students' L1. Initial codes include feedback interpretation and clarity, addressing recurrent mistakes, providing concise corrections, and managing feedback effectively. *"Even after corrections, students repeat the same mistakes, which frustrates students and instructors. Some students struggle with self-correction or do not understand feedback, causing repeated blunders."*

The theme **Student Factors**, which include the initial codes of balancing motivation and correction, addressing cultural differences, student engagement, and student sensitivity, were the main challenges as the participants dealt with foreign students. When asked regarding the reasons, the participants explained that it can be difficult when students mention cultural concepts that they are unfamiliar with; correcting these students can be sensitive, especially if they are not fully aware of the cultural context, emphasizing that these cases require extra care. Some even discussed that language hurdles, student competence gaps, and communication impediments resulting from cultural differences are common causes of problems in the feedback process and that overcoming these challenges calls for perseverance, cultural awareness, and the application of successful teaching techniques to guarantee that feedback is comprehended and helpful for every student. This coincides with similar studies that mention the affective component of WCF, the realities of teachers' tasks, and a disconnect between theory and practice. For instance, their studies found that Dayak students prefer the teacher WCF, followed by Javanese students, and Banjarese students prefer peer correction for their work. Based on these results, they recommended teacher development through cross-cultural awareness in writing instruction, which means considering the students' cultural context when providing WCF to students (Elhawwa et al., 2018; Hopper, 2023). The key informants of this study also agreed with this notion. They even added that communication breakdown that causes issues in the feedback process often stems from language barriers, student competence gaps, and cultural differences. For them, it is often challenging to provide pointed, clear criticism geared toward each student when grades include a mix of many students. The difficulty arises when one uses a general cognitive framework for all student types without considering students' levels and learning styles.

In addition, balancing feedback and motivation poses a dilemma when it comes to their feedback. They explained that writing corrective feedback to foreign students is difficult because they need to balance the number of corrections and the length of the explanation. Clarity and Understanding is also an ongoing problem because instructors' primary concern is whether their corrections would be understandable to students and whether the corrections are sufficient. One even cited that if they sense that their wording might not be clear to the students, they try to think of an alternative way to convey the message and rephrase it accordingly. "Ensuring the input is interpreted and applied appropriately presents a significant difficulty when giving written corrective feedback to international students."

Moreover, the theme **Feedback Factors,** which include the initial codes of feedback interpretation and clarity, addressing recurrent mistakes, providing concise corrections, and managing feedback effectively, was noted due to difficulties in comprehending students’ ideas, and four also cited tailoring feedback and distance and communication. When personalizing feedback, instructors find it difficult to modify feedback to suit every student's level (Ghandi & Maghsoudi, 2014). Some mentioned using templates when giving grammar tips, as they have already been meticulously checked. However, as students' levels differ, explanations and examples sometimes require modification for better understanding. They want to customize the feedback to each student's proficiency level and learning style to be understandable, precise, and useful. The participants who have difficulties comprehending students’ ideas noted that there are language and cultural differences, as it is hard to interpret their ideas and provide feedback accurately. Some struggle to understand the student's words or sentence construction, and one participant attributed this to the variance in the syntax of the student's first language (L1) and the syntax of American English. As for the issue regarding distance and communication, some mentioned the biggest challenge is distance, as they do not have the students face-to-face to ask what they mean with the sentences they wrote directly, so they would have to try and guess what they mean. Sometimes, the instructors struggle with explaining things, so they gauge how technical they should be with their feedback.

Meanwhile, this theme also includes issues about time management and handling recurring mistakes. When asked why time is also an issue, they provided examples such as meeting deadlines, especially when students’ essays are too long and have too many errors. They may find it difficult to give all the corrections and grammar explanations they originally planned to provide. They also mentioned Handling Recurring Mistakes, as some students still repeat the same errors even after being given corrections, which frustrates both the instructor and the student. They also explained that some students struggle with self-correction or do not understand feedback, causing repeated blunders. Because of this, studying writing without giving up or becoming discouraged is another challenge. Finally, only one participant mentioned handling limited student responses as a difficulty, stating, "*When students provide only a single-sentence answer, it becomes challenging to assess their capabilities thoroughly as their writing is limited.*"

3.4 Impact of WCF on Feedback Quality and Student Written Output

Table 4 illustrates the participants' perceived impact of written corrective feedback. It demonstrates the themes of the impact of written corrective feedback on the quality of feedback and the students’ written output, which includes (a) student output, (b) teacher feedback, and (c) student behaviors.

Table 4. Summary of themes: WCF impact on feedback quality and students’ written output

Theme	Meaning	Sample Extracts
Student Skill Refinement	This focuses on how feedback influences student learning progress and improvement.	There is a perceived impact on student progress and improvement. Initial codes include student transferable writing skill improvement and local writing skill improvement. “*It is rewarding to observe the progress of our students over time. Initially, many were not particular about using articles, but after months of learning with us, they have become increasingly conscious of their usage, demonstrating significant improvement in their language skills.*”
Teacher Feedback Technique Development	This highlights the necessity of how the online ESL instructors’ feedback is used by the students.	Students apply the feedback they receive, resulting in a decrease in errors committed. Initial codes include students’ feedback application and determining the appropriate correction approach. “*They learn to use words more carefully and comprehend writing standards. Feedback reduces frequent problems such as verb tense misuse and subject-verb agreement concerns in students' writing.* ”
Student Behaviors	This refers to the improvement of students' behaviors toward written corrective feedback given by their online ESL instructors.	Initial codes include student learning retention, confidence, motivation, and reactions and preferences. “*On the other hand, intermediate and advanced learners are more experimental with their vocabulary and start to emphasize the depth and context of their writing.* ”

Written corrective feedback impacts **Student Output Refinement,** which includes the labels student transferable writing skill improvement and local writing skill improvement**.** The participants pointed out that written corrective feedback improves ESL students' writing by improving their grammar, vocabulary, and sentence structure. This feedback type also reduces frequent problems such as verb tense misuse and subject-verb agreement concerns, enabling students to write essays with more clarity and better expressions (Aridah, 2016).

Moreover, the theme **Teacher Feedback Technique Development**, which includes the labels students' feedback application and determining appropriate correction approach, was also cited as students applied the feedback they received as the number of errors they commit decreases, and their sentences became easier to understand. When students repeatedly commit a certain grammatical error, they also receive repeated corrections. Next, when it comes to students' responses to feedback**,** the ESL instructors noted that many students take note of their mistakes, and as they better express themselves, they tend to write more frequently. The key informants of this study also agreed with these insights. They even elaborated that in their students' essays, they noticed that their students achieved better quality in their written work. Gradually, they could accommodate such feedback in their essays, making them more structured, detailed, and resourceful. They assumed that their writing skills improve with the help of text correction exercises, and using them in the right sequence reinforces beneficial effects.

Lastly, with the theme **of Student Behaviors,** which includes the initial codes of student learning retention, student confidence and motivation, and student reactions and preferences, the participants believed advanced students would react better to input on pragmatics and language nuances. In contrast, beginner students typically gain more from clear comments on grammatical problems. This further proves Denman's study (2020), in which she pointed out that suggestions, or constructive criticism, are one mitigation strategy that can reduce the negative implications of WCF. She defined mitigation as words containing "a positive phrase." previous criticism or the use of hedge words like "perhaps" or "maybe." L2 teachers frequently employ hedges, which are qualifiers like "some" or "a little" or verbs like "seemed" or "could" to soften criticism, and another method of mitigation is the use of questions designed to have students thinking about WCF. In addition, this finding emphasizes confidence and better interaction between student and teacher as a fundamental effect of WCF, which agrees with Al-Hazzani and Altalhab's study (2018). According to this finding, corrective criticism in English writing classes can be educational and encourage students to engage in writing tasks to be motivated to complete the writing activities. One participant noted, "Some of my students truly retain the feedback I offer, leading to increased confidence in their English abilities." They added that it helps foreign students become more motivated when they see they are improving. The research construct below shows the interconnection between the themes gathered from the data provided by the participants. It displays the lived experiences of selected online ESL instructors in online ESL academies in Ortigas, Pasig City when giving written corrective feedback to foreign students in ESL academies.

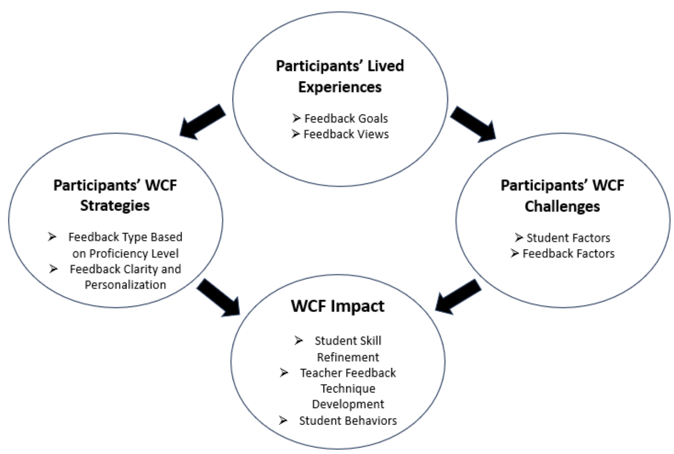

Figure 1. Research Construct

The participants' lived experiences with written corrective feedback include their views on its use and their goals. Based on these lived experiences, they emphasized their strategies and challenges when using this feedback practice. Participants drew the perceived impact of their written corrective feedback from the challenges and strategies.

4.0 Conclusion

In terms of lived experiences of online ESL Instructors when giving written corrective feedback, the results showed two themes: Feedback Goals and Feedback Views. Regarding strategies employed by online ESL instructors when giving written corrective feedback, the findings revealed these themes: Feedback Based on Proficiency Level and Feedback Clarity and Personalization. Regarding the challenges online ESL instructors face when giving written corrective feedback, results showed these themes: Student Factors and Feedback Factors. Lastly, findings revealed three themes: Student Skill Refinement, Teacher Feedback Technique Development, and Student Behaviors.

Based on the conclusions, here are the researcher's recommendations: The instructors may use error logs or journals for their students to record their feedback. With this, the students will also have their tracker for their writing progress and can easily verify their recurring linguistic issues. The teacher may also initiate peer correction activities before giving the teacher corrective feedback. This will allow students to check others' works using their knowledge of grammar and writing, thus promoting awareness of errors. Foreign beginner and intermediate-level students should be given explicit feedback for the initial writing activities. The comments can be error codes or abbreviations to indicate errors in the text or margin. For the succeeding activities, the instructors may use focused feedback to target the most important errors that affect the clarity of the students' work.

In order to address cultural diversity, it is crucial to develop a culturally sensitive communication environment. Increasing cultural sensitivity in feedback procedures involves using inclusive language, respecting students' opinions, practicing active listening, requesting clarity, avoiding preconceptions, being receptive to feedback, and apologizing as needed. In addition, online ESL instructors should be able to understand and adapt to students' communication styles. Furthermore, to eliminate potential confusion, provide feedback in clear and detailed language and avoid idioms, slang, or analogies that may not transfer well across cultural barriers, especially with beginner and intermediate students. To ensure that the quality of feedback boosts writing competence and improves students' confidence, online ESL instructors should give personalized feedback to meet each student's needs and requirements. This way, instructors can target both areas for improvement and motivate their students by balancing encouraging words and constructive criticism.

5.0 Contributions of Authors

The author reviewed and approved the final version of this work.

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7.0 Conflict of Interests

No conflict of interest is declared for this paper.

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Innovation Strategies Among Medium and Large Enterprises in Dumaguete City, Negros Oriental

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Abstract. This study investigated the ever-changing domain of innovation strategies and obstacles encountered by medium and large enterprises in Dumaguete City, Negros Oriental. Additionally, it put forth practical suggestions for higher education institutions (HEIs) to better align graduate education with the market's requirements. Surveys and interviews were used to meticulously collect data from 150 establishments using a comprehensive mixed-methods approach. Important insights were extracted through statistical analyses, such as frequency distribution and Pearson's correlation coefficient. The results indicated that the business environment was complex and varied, with organizations placing a high value on technological progress and product innovation while facing significant obstacles, including employee opposition, insufficient support from leadership, competitive forces, and regulatory intricacies. In order to tackle these challenges, the study proposed the implementation of capacity-building initiatives for decision-makers, targeted innovation support, the promotion of synergistic collaborations between academia and industry, and advocacy for policy frameworks that are conducive to progress. A comprehensive remedial strategy outlines pragmatic measures that local enterprises can undertake to strengthen their innovative capabilities; it emphasizes collaborative support networks, advocacy endeavors, and robust monitoring systems. This study made a substantial scholarly contribution to innovation management and business strategies, with significant implications for economic progress and the improvement of graduate education. When viewed through the lens of NOCCI, innovation becomes a critical factor in promoting entrepreneurial development and stimulating economic vitality in Negros Oriental. The proactive efforts undertaken by NOCCI to foster an innovative ecosystem via service provision, investment facilitation, collaborative ventures, and advocacy campaigns underscore the organization's dedication to promoting sustainable business growth and prosperity within the local community.

Keywords: Challenges; Innovation; Large establishments; Medium establishments; Strategies.

1.0 Introduction

As noted by Drucker (1985), innovation acts as a catalyst for entrepreneurship, transforming resources into drivers of wealth creation. This study explores innovation strategies in medium and large enterprises in Dumaguete City, drawing on prior research examining innovation's complexities within organizational contexts. Chesbrough's (2003) concept of open innovation shifted traditional views by emphasizing the importance of external collaboration and knowledge-sharing, a practice increasingly adopted by medium and large enterprises. Barney's (1991) resource-based view highlights how sustainable competitive advantage stems from strategically allocating valuable resources. This framework stresses the role of internal capabilities and external networks in fostering continuous improvement—critical for enterprises facing a fast-evolving business environment.

Empirical studies by Laursen and Salter (2006) underscore the importance of aligning research and development (R&D) with broader business objectives to drive innovation. These findings suggest that medium and large enterprises should prioritize innovation investments that yield measurable returns and long-term competitive advantages. Inspired by the Negros Oriental Chamber of Commerce (NOCCI), which recognizes innovation's role in driving local entrepreneurial success, this research examines the strategies employed by Dumaguete's enterprises. NOCCI supports businesses by promoting collaboration, resource allocation, and the alignment of R&D with business goals, echoing themes in scholarly research.

While much has been studied on innovation, there remains a gap in understanding the specific strategies and challenges faced by medium and large enterprises in Dumaguete City. This study seeks to bridge that gap, combining theoretical insights with empirical evidence to offer actionable recommendations to enhance local economic growth and competitiveness. This study's research question is: "What are the innovation strategies and challenges employed by medium and large enterprises in Dumaguete City, and how can HEIs improve graduate quality in response to market needs?"

2.0 Methodology

2.1 Research Design

This research utilized a mixed-methods approach, combining qualitative and quantitative methodologies to investigate the innovation practices of medium and large establishments in Dumaguete City. The study population included a diverse range of establishments, with a sample size of 150 carefully selected through stratified random sampling. This rigorous sampling method ensured representation across various sectors and sizes, enhancing the study's robustness and validity.

2.2 Research Locale

The City of Dumaguete in Negros Oriental is its provincial capital and is classified as a coastal component city. It has a land area of 33.62 sq. km. with a population of 134,103 based on the 2020 Census, registering a population density of 3,989 persons per square kilometer. Thirty barangays in the city embrace different demographic make-ups and population characteristics. Economically, the city of Dumaguete is growing consistently and has an annual regular revenue of ₱988.7 million in 2020. Real property tax, business tax, and other fees generate a large share of this revenue. The city has been witnessing steady population growth since 1903 when it hosted just 14,894; by 2020, the population had swelled to 134,103, with a median age of 27.21. The household population 2020 was 134,103 persons, and the total number of households was 32,726. The population structure indicates a considerable share of the youth population, with a youth dependency ratio of 35.84 and an old age dependency ratio of 8.62. Moreover, the city stands in proximity to other urban centers within Negros Oriental and neighboring provinces that function as strategic drivers for development and connectivity.

2.3 Research Participants

The research respondents for this study comprise managers and owners of medium and large establishments in Dumaguete City, Negros Oriental. Five hundred five potential respondents were identified, representing a diverse range of industries and sectors within the city's business landscape. These establishments were selected based on specific size criteria to ensure a comprehensive understanding of innovation strategies in medium and large businesses. The selection process was guided by the objective of advancing knowledge in innovation management and business strategies within the local context of Dumaguete City.

2.4 Research Instrument

The survey questionnaire served as the means for data gathering. It was a self-made instrument based on the general principles of survey design, the research objective of the study, and the best practices in questionnaire construction. Before the actual survey, the questionnaire underwent pilot testing. The first set of questionnaires determined the profile of the medium and large establishments in Dumaguete City and their innovations, challenges, and recommendations to HEIs. The Cronbach's alpha coefficient was employed to assess the internal consistency and reliability of the data sampling in this research. The result of Cronbach's alpha analysis yielded a value of 0.745806, indicating an acceptable level of internal consistency reliability for the measures used in the study. This suggests that the items included in the measurement instrument are sufficiently correlated with each other, demonstrating a reliable measure of the underlying construct. The second type of instrument used was the unstructured interview, which solicited qualitative answers from the selected prominent industry experts in Dumaguete City.

2.5 Data Gathering Procedure
In the first stage of the study, the researcher sought relevant data about the medium and enormous establishments in Dumaguete City at the Mayor's Office through the office of the City Admin. The researcher obtained permission from the dean of the graduate school, who agreed to administer the questionnaire and thus set a definite day and time to present the objectives and importance of the study to the respondents before the administration of the questionnaire. The informed consent was obtained from all the respondents, which involved the purpose of the study, the voluntary character of participation, the measures taken to ensure the anonymity and confidentiality of the results, and the right to withdraw from the study at any time without penalties.

The researcher personally distributed the instrument itself to control the number of non-responses. While answering the questionnaire, respondents were assisted by the researcher himself, who also conducted an unstructured interview. The second instrument was answered through structured interviews among pre-selected key business executives in Dumaguete City. The questions were predefined and guided the interview process. The researcher accommodated his time and efforts by holding the sessions in any of these people's offices within a convenient frame for the respondents and the researcher himself. The questionnaire was the leading guide in eliciting key insights and views on the subject matter.

2.6 Ethical Considerations
The study observes high ethical standards throughout the research process to ensure that the rights and well-being of the respondents are not compromised. The information is kept in such a way as to ensure the confidentiality and anonymity of the respondents, including the safe storage of data and control over access to it. Possible conflicts of interest are declared openly, and precautions are taken to minimize bias or undue influence on the findings. Moreover, relevant data protection regulations are adhered to when conducting the research, ensuring that the respondents' personal information is kept confidential. By upholding these ethical standards, the study ensures its findings can be trusted and are free from bias, with the primary goal of ensuring the ethical treatment of all individuals involved. Upon data collection, the researcher tabulated and examined the raw data and prepared tables for the various statistical analyses, interpretations, and implications.

2.7 Data Analysis Procedure
The statistical tools utilized include frequency, distribution, weighted mean, percentile, range, and Pearson's correlation coefficient (r).

Frequency Distribution
This tool arranges the values of one or more variables taken in a sample. Each entry in the table represents the frequency or count of occurrences within particular groups or intervals, summarizing the distribution of values in the sample.

Weighted Mean
This type of mean is where individual data values contribute variably to the mean. The weighted mean was used to determine the alignment of the establishment's vision for innovation, measure the significance of innovation efforts, and identify challenges in implementing innovation.

Percentage
This tool calculates the proportion of a particular data set relative to the whole. It was used to establish the profile of medium and large establishments in Dumaguete City, the type of innovation these establishments focus on, the measurement of innovation initiatives, methods to determine the success of innovation initiatives, performance indicators measuring innovation success, frequent challenges across sectors, the impact size of innovation, allocation of annual revenue, and recommendations for HEIs.

Range

The range, the difference between the highest and lowest values in a dataset, provides a measure of data dispersion or spread, indicating variability within the dataset. In this study, the range was used informally to describe overall variability or the extent of values within the dataset in qualitative terms rather than numerical ones. After calculating the weighted mean to determine the average value, the researcher examined data spread using the range to gain insights into the alignment of the establishment's vision for innovation, measure the significance of innovation efforts, and identify challenges in implementing innovation.

Pearson's Correlation Coefficient (r)

This measure indicates the strength and direction of the linear relationship between two continuous variables. The study used it to assess the relationship between innovation measures and challenges faced by medium and large establishments in Dumaguete City.

3.0 Results and Discussion

3.1 Business Profile

Table 1 presents a snapshot of the business landscape in Dumaguete City based on data from 150 establishments. A significant 69.33% of these businesses are corporations, aligning with the study's focus on medium and large-scale enterprises. This dominance reflects broader corporate growth trends in urban areas (Smith et al., 2023).

Table 1. Business Profile

Forms of Business Ownership	Frequency	Percentage (%)
Sole Proprietorship	41	27.34
Partnership	2	1.33
Corporation	104	69.33
Cooperative	3	2
Scope of Business		
1. Local	25	16.67
2. Regional	30	20
3. National	55	36.67
4. International	40	26.66
Years of Operation		
Less than 1 year	1	0.67
1-5 years	1	0.67
6-10 years	5	3.33
11-20 years	15	10
More than 20 years	128	85.33
Sector		
Manufacturing/ Production	15	10
Services/ Technology	51	34
Construction	8	5.33
Retail	37	24.67
Healthcare	34	22.67
Others	5	3.33
Annual Revenue		
Less than 1 Million	0	0
1 Million - `10 Million	10	6.67
11 Million - 50 Million	0	0
51 Million - 100 Million	0	0
More than 100 Million	22	14.67
Others	118	78.66

Sole proprietorships, constituting 27.34%, underscore the entrepreneurial spirit prevalent among small and medium-sized enterprises (SMEs) (Chowdhury & De, 2022). Cooperatives and partnerships, while less common, represent alternative business models that emphasize collaboration and shared ownership (Johnson & Smith, 2021; Brown & Green, 2020). The prevalence of corporate structures suggests a need for strategies tailored to the specific needs of large-scale businesses. As research on business dynamics and innovation indicates (Garcia et al., 2023), corporations must continually adapt and innovate to maintain their competitive edge.

The scope of business operations in Dumaguete City reflects broader global trends**.** A significant portion (36.67%) of businesses operate nationally, aligning with the increasing globalization of markets (Johnson & Smith, 2021). Additionally, 26.66% of businesses have an international focus, emphasizing the importance of a global outlook for competitiveness and innovation (Kumar & Kundu, 2022; Hitt et al., 2016). The presence of regional (20%) and local businesses (16.67%) highlights the importance of catering to both broader regional markets and local needs. This aligns with the literature on the role of businesses in regional economic development (Smith & Johnson, 2021) and localized economic development (Brown & Green, 2022). The diverse range of business scopes underscores the need for context-specific innovation strategies. Businesses operating on different scales, from local to international, face unique challenges and opportunities. Therefore, strategies must be tailored to each business's specific needs, considering factors such as market size, competition, and regulatory environment (Garcia & Martinez, 2020).

The data reveals that most establishments (85.33%) have been operating for over 20 years. This longevity suggests strong market positioning, customer loyalty, and a proven track record (Li & Liu, 2020; Li et al., 2022). Businesses in the 11-20-year range (10.00%) also demonstrate stability and adaptability, highlighting the importance of organizational learning (Li & Chen, 2021). The presence of businesses in the 6-10-year category (3.33%) indicates a dynamic business landscape with ongoing growth and evolution. These businesses may be expanding and diversifying, as suggested by the literature on business life cycles (Kim & Park, 2023). While newer businesses (1-5 years and less than 1 year) represent a smaller proportion, they contribute to the city's economic vitality and innovation. These startups face unique challenges, such as building a customer base and securing funding (Johnson & Smith, 2022). The sectoral distribution of establishments in Dumaguete City aligns with broader economic trends. The services/technology sector (34%) reflects the increasing importance of knowledge-based industries, mirroring global shifts towards digital economies (Smith & Johnson, 2021; Kumar & Kundu, 2022).

The retail sector (24.67%) plays a crucial role in the local economy, aligning with the literature on the importance of consumer-facing businesses (Thangavelu, 2019). The healthcare sector (22.67%) is also well-represented, reflecting the growing demand for healthcare services and opportunities for innovation in this field (Garcia & Martinez, 2020; West et al., 2021). While manufacturing and production (10%) still have a presence, the city's economy is increasingly shifting towards service-oriented sectors. This trend reflects the global shift from manufacturing-based economies to service-based economies (Smith, 2019). The presence of the construction sector (5.33%) aligns with the literature's recognition of its importance in urban development (Doe, 2020). The "other unspecified sectors" category (3.33%) highlights the diversity of businesses in the city, which may include niche industries or emerging sectors. Annual revenue distribution indicates a predominance of smaller businesses, likely SMEs, which are crucial for local economic development (Chowdhury & De, 2022; Brown & Green, 2022). The absence of mid-sized businesses may suggest challenges related to financing and infrastructure (Reyes et al., 2021). However, the presence of larger businesses indicates a more diversified economic landscape. Higher education institutions must provide tailored education and training programs to support the growth and innovation of businesses of all sizes (Tijssen et al., 2023; Brown et al., 2022). Additionally, fostering a culture of innovation and adaptability is crucial for businesses to thrive in an ever-changing economic environment (Kim & Park, 2023; Smith et al., 2023).

3.2 Vision and Strategic Innovations

Contemporary literature on innovation management and organizational behavior strongly resonates with the findings regarding the alignment of establishments' vision for innovation, the effectiveness of strategic initiatives, and the importance placed on innovation, among other related aspects. As shown in Table 2, the weighted mean scores indicate a commitment to innovation among establishments in Dumaguete City, Negros Oriental, which is consistent with recent studies in the field. The weighted mean of 4.26 for aligning the establishment's vision for innovation suggests a shared understanding of innovation's role in organizational goals, echoing findings in recent research emphasizing the importance of a clear and coherent vision for innovation (Brown & Anthony, 2021). Similarly, the weighted mean of 4.26 for the effectiveness of strategic initiatives aligns with the literature, highlighting the crucial role of effective strategies in fostering innovation within organizations (Chesbrough, 2020). Effective strategic initiatives are essential for guiding innovation efforts toward desired outcomes and ensuring organizational success.

Table 2. Vision and strategic innovations

Vision and Strategic Innovation	Mean	Interpretation
Alignment of Establishment's Vision for Innovation	4.26	Very High
Effectivity of Establishment's Strategic Initiative on Innovation	4.26	Very High
The Level of Importance of Innovation	4.31	Very High
Update on Vision for Innovation	3.36	Moderate
Conduct Assessments for Innovation and Strategies	3.33	Moderate
Employees' Involvement in the Innovation Process	3.82	High
Dedicated Budget or Funding for Innovation Projects	4.09	High
Satisfaction Level on Innovation	4.31	Very High
Cumulative Weighted Mean	**3.97**	**High**

Ranges: 5.00 - 4.20 = Very High (VH); 4.19 - 3.52 = High (H); 3.51 - 2.52 = Moderate (M); 2.51 - 1.76 = Low (L); 1.75 - 1.00 = Very Low (VL)

Recent studies have highlighted the pivotal role of innovation in fostering organizational growth and competitiveness, and Damanpour's (2020) findings corroborate the weighted mean of 4.31 for this level of importance. A weighted mean score of 4.31 for the level of satisfaction with innovation efforts aligns with previous research that links successful innovation with overall organizational success and satisfaction (Garcia & Martinez, 2020). A high level of satisfaction indicates a positive perception of innovation efforts and their contribution to organizational well-being. While the cumulative weighted mean of 3.97 indicates a strong commitment to innovation, areas for improvement, such as updating the innovation vision and conducting regular assessments, highlight opportunities for further enhancement. Recent studies emphasize the importance of continuous learning and adaptation in innovation management (Brown & Eisenhardt, 2018; Salter et al., 2021). With these findings, Participant B stated that traditional businesses, predominantly owned by Filipino Chinese, often face challenges in transitioning to modern systems. This can lead to stagnation in growth when their existing systems fail to keep up with increasing demands. Therefore, innovation is needed, especially in sectors beyond tourism, such as trading.

As shown in Table 3, the predominant focus among establishments in Dumaguete City, Negros Oriental, is on product innovation, revealing a concerted effort to create or enhance products in response to dynamic market demands or to gain a competitive edge through novel offerings. The significant emphasis on technological innovation indicates a strategic acknowledgment of technology's role in driving competitiveness and operational efficiency, with establishments likely investing in the adoption or advancement of technologies to stay abreast of industry trends. Many establishments emphasize organizational innovation, suggesting a commitment to improving overall effectiveness and adaptability through changes in structures, processes, or culture. This multifaceted approach aligns with the Resource-Based View (RBV) theory, emphasizing the significance of internal resources and capabilities in fostering innovation and sustaining a competitive edge.

Table 3. Type of innovation the establishment focus

Innovation Type	Frequency	Percentage (%)
Product Innovation	143	95.33
Technological Innovation	113	75.33
Organizational Innovation	111	74.00
Process Innovation	100	66.67
Marketing Innovation	98	65.34

Including process innovation as a key focus reflects a commitment to refining and optimizing internal operations, potentially for heightened efficiency and cost-effectiveness. This aligns with the literature discussing the importance of dynamic capabilities, where adaptability and learning contribute to sustained innovation. Moreover, recognizing marketing innovation among establishments signifies understanding the need for inventive approaches to reaching and engaging customers within competitive markets. Chesbrough (2003) championed the Open Innovation concept, advocating for collaboration and external knowledge to enhance innovation outcomes.

With these findings, Participant F stated that the current trend revolves around digitization and digital technology, facilitating borderless money transactions and user-centric flows, especially in online banking, e-transfers, and similar platforms. However, ensuring the security of ownership remains paramount amidst these changes. While many individuals are embracing the digital shift, a significant portion is still accustomed to traditional physical spaces due to past scams and concerns. Balancing the old-school and new-school approaches poses a challenge, yet online banking platforms, transfer banks, and digital loan applications offer convenience and security to industry stakeholders, ensuring timely payments and peace of mind.

Digitalization extends beyond financial sectors, infiltrating various aspects such as online communities within the UN and social media platforms like Twitter and TikTok, which recognize my expertise and research. However, challenges persist, particularly in data backup and database management. In Dumaguete, the focus is on the food industry, with coffee shops, shoe stores, and appliance retailers competing for market share. As businesses adapt to the digital landscape, innovation remains key to navigating these challenges and seizing opportunities for growth and development.

The analysis of establishments in Dumaguete City highlights a comprehensive approach to measuring the impact of innovation initiatives, reflecting an understanding of innovation's multifaceted contributions to organizational performance (see Table 4). All establishments uniformly prioritize revenue increase as a primary metric, showcasing a widespread acknowledgment of innovation's central role in driving financial growth and sustainability. This aligns seamlessly with the Resource-Based View (RBV) theory, emphasizing the pivotal role of internal resources and capabilities, including innovation, in sculpting competitive advantage (Barney, 1991).

Table 4. Measurement of innovation initiatives

Measurement Type	Frequency	Percentage (%)
Increase in Revenue	150	100
Customer Feedback and Satisfaction	133	88.67
Improved Operational Efficiency	113	75.33
Market Share Growth	108	72.00
Number of New Products/ Services introduced	100	66.67
Others (Not Specified)	5	3.33

Many establishments also emphasize customer feedback and satisfaction as metrics, underscoring the paramount importance of customer-centric innovation. This aligns with contemporary literature highlighting the significance of customer-focused strategies in ensuring the success and longevity of innovative initiatives (Brown & Anthony, 2021). Many establishments measure innovation by focusing on improved operational efficiency, signaling a deliberate effort to optimize internal processes for increased productivity and cost-effectiveness. Recent studies have shown that dynamic capabilities are very important. For example, Smith (2019) and Jones et al. (2020) show that learning and adaptability are two main factors that make innovation last and operations run smoothly.

Market share growth emerges as another important metric for many establishments, demonstrating an understanding of innovation as a catalyst for expanding market presence and bolstering competitiveness. This aligns with the open innovation concept, which champions collaboration and external partnerships to enhance innovation outcomes and competitive advantage (Chesbrough, 2003). A significant percentage of establishments track the introduction of new products or services, emphasizing a commitment to continuous product development and expansion of offerings. This multifaceted measurement strategy, encompassing financial indicators, customer satisfaction, operational efficiency, market share, and product/service expansion, aligns cohesively with the diverse dimensions of innovation outlined in the literature (Johnson et al., 2020).

Table 5 provides insights into the diverse methodologies establishments employ to evaluate the efficacy of their innovation initiatives. Customer feedback and satisfaction surveys emerge as pervasive tools, with a substantial 89.33% of establishments utilizing this method. This aligns seamlessly with contemporary literature emphasizing the centrality of customer-centric approaches in gauging the success of innovation (Brown & Anthony, 2021).

Table 5. Methods used to determine the success of innovation initiatives

Types of Methods	Frequency	Percentage (%)
Customer Feedback and Satisfaction Survey	134	89.33
Key Performance Indicators and Metrics Tracking	125	83.33
Market Share Growth	110	73.33
Increase in Sales Revenue	99	66
Customer Adoption and Usage rates of new products/ services	99	66
Return on Investment (ROI) Analysis	90	60
Number of new products and services launched	81	54
Time to Market for New Innovations	74	49.33
Employee feedback and engagement surveys	70	46.67
Competitive Analysis and Benchmarking	60	40
External Recognition or awards for innovation	54	36
Reduction in Production Cost	54	36
Innovation Performance Assessments by third-party organizations	54	36
Number of patents or intellectual property generated	54	36

Following closely at 83.33%, establishments employ key performance indicators (KPIs) and metrics tracking. This approach resonates with the Resource-Based View (RBV) theory, which underscores the importance of internal resources, capabilities, and metrics in shaping competitive advantage and firm performance (Barney, 1991). The array of methods extends to market share growth, an increase in sales revenue, customer adoption rates, and return on investment (ROI) analysis. This diversity underscores the multifaceted nature of innovation and its impact on various dimensions of organizational performance. The emphasis on market-related metrics aligns with the Open Innovation concept, which recognizes the importance of external collaboration and market-oriented outcomes (Chesbrough, 2003). According to these findings, hundreds of intellectual property rights have been filed since the opening of the IPOPHL Satellite Office in Dumaguete City in 2018, and more than 80 have already been registered (DTI Dgte).

As shown in Table 6, the majority of establishments (87%) rate the significance of innovation in their overall success as very high (VH), indicating a strong acknowledgment of innovation's pivotal role in contributing to businesses' overall success and sustainability. The mean score of 4.18 supports this, indicating a high level of consensus on the importance of innovation (Brown & Anthony, 2021).

Table 6. Measuring the significance of innovation efforts

Indicators	Mean	Verbal
Significance of Innovation in Overall Success	4.18	Very Significant
Significance of Internal Evaluations to Assess Impact of Innovation	4..25	Very Significant
Significance of Innovations Against Competitors	4.21	Very Significant
Significance of Measuring and Evaluation in Innovation	4.21	Very Significant
Satisfaction with the Measurement and Evaluation Process in Innovation	4.18	Very Significant
Cumulative Weighted Mean	**3.36**	**Moderately Significant**

The establishments exhibit a high regard for internal evaluations in assessing the impact of innovation, with a weighted mean of 4.25. This suggests that organizations recognize the value of internal assessments to gauge the effectiveness and outcomes of their innovation initiatives. The absence of low ratings (L or VL) emphasizes a consensus on the high importance of internal evaluations (Smith & Jones, 2020). Furthermore, the establishments place high importance on evaluating their innovations against competitors, with 87% giving a very high (VH) rating. This indicates a keen awareness of the competitive landscape and the need to benchmark innovations against industry standards. The dimension holds high significance, as supported by the mean score of 4.21 (Johnson & Smith, 2020). 87% of respondents give high ratings to measuring and evaluating the innovation process, indicating their significance. The moderate rating (M) in 5% of responses suggests some variation in opinions, possibly indicating diverse perspectives on the methodologies or tools used for measurement. The overall weighted mean of 4.21 confirms that measuring and evaluating innovation is important (Chesbrough, 2003).

Satisfaction with the measurement and evaluation process in innovation is generally high, with 87% providing high (H) or very high (VH) ratings. The presence of 10% moderate (M) ratings may indicate areas for improvement or varying expectations regarding satisfaction with the evaluation process. The weighted mean of 4.18 aligns with the overall positive sentiment regarding satisfaction (Johnson et al., 2020). According to these findings, establishments show a significant effort in measuring innovation, just as Participant C stated,

"In the past, installing a point system, also known as a point of sale or POS system, would typically cost between 80 to 100 thousand pesos. You can now download an app and pay a yearly subscription for about 1,500 to 2,000 pesos. So small and medium enterprises can now register and issue a thermal paper receipt for a much lower cost than before. So, number one, for me, is the cost of adopting innovative systems. The innovation that could help the local government, I think, is also another factor because I have yet to see and hear them creating programs for these small and medium enterprises. The DTI is trying to do its best. They're trying to come up with an initiative, but it's not enough. So it's not only DTI that should help these MSMEs, but also other departments, like perhaps the DOST, should turn these ideas into realistic and tangible systems that our business people and entrepreneurs can take advantage of."

Table 7 delineates the performance indicators utilized to gauge the success of innovation efforts. "Increase in revenue" is the most frequently occurring indicator, accounting for 100.00% (Brown & Anthony, 2021). Other noteworthy metrics encompass "Customer Satisfaction Ratings" (81.33%) (Brown & Eisenhardt, 2018), "Market Share Growth" (75.33%) (Barney, 1991), and "Number of New Products/Services Launched" (66.00%) (Chesbrough, 2003). Collectively, these indicators offer a well-rounded perspective on innovation success, spanning financial, customer satisfaction, and operational dimensions.

Table 7. Performance indicators that measures success of innovation effects

Performance Indicators	Frequency	Percentage (%)
Increase in Revenue	150	100
Customer Satisfaction Ratings	122	81.33
Market Share Growth	113	75.33
Number of New Products/ Services launched	99	66
Employees Satisfaction Engagement	97	64.67
Cost Reduction or Efficiency gains	94	62.67
Time to Market for new products/ services	69	46
Rate of Successful Innovation Projects	67	44.67

Several scholarly works have examined the challenges inherent in implementing innovation within organizational settings, yielding notable insights. The literature review meticulously categorizes and weights these challenges to provide a comprehensive perspective of the landscape. Table 8 systematically outlines challenges spanning diverse dimensions, encompassing financial constraints and regulatory impediments. Notably, it acknowledges the relatively minor nature of challenges such as the lack of dedicated financial resources for innovation and limited accessibility to technological advancements or research facilities. Although we acknowledge these hurdles, we do not consider them as critically severe in comparison to other obstacles.

Table 8. Challenges in implementing innovation

Challenges	Mean	Interpretation
Lack of Financial Resources Dedicated to Innovation	1.87	Slightly Challenging
Limited Access to Technological Advancements or Research Facilities	1.97	Slightly Challenging
Resistance to Change from Employees and Management	2.63	Moderately Challenging
Insufficient Support from Top Management or Leadership	2.11	Slightly Challenging
Difficulty in Identifying Variable Innovation Opportunities	2.38	Slightly Challenging
Long Product Development Cycles or Time to Market	2.58	Moderately Challenging
Inadequate Collaboration Between Different Departments or Teams	1.95	Slightly Challenging
Competition from Established Players or Market Incumbents	4.16	Very Challenging
Regulatory or Legal Constraints Hindering Innovation	2.23	Slightly Challenging
Overcoming Challenges Related to Innovation	3.95	Very Challenging
Cumulative Weighted Mean	**2.58**	**Moderately Challenging**

Ranges: 5.00 - 4.26 = Extremely Challenging (EC); 4.25 - 3.52 = Very Challenging (VC); 3.51 - 2.52 = Moderately Challenging (MC); 2.51 - 1.76 = Slightly Challenging (SC); 1.75 - 1.00 = Not a Challenge at All (NC)

However, the literature also highlights challenges that have a moderate impact, such as resistance to change from employees and management and inadequate support from top leadership. Such challenges highlight the indispensable role of fostering a conducive organizational culture and securing leadership buy-in to facilitate innovation effectively. Moreover, the literature identifies relatively low to moderate challenges in identifying variable innovation opportunities and surmounting long product development cycles or time-to-market hurdles. These obstacles may somewhat hinder innovation processes but are deemed manageable with appropriate strategies and resource allocations. In contrast, the literature accentuates the highly challenging nature of competition from entrenched market players or incumbents. This underscores the intense competitive landscape organizations must navigate to innovate successfully and carve out market positions.

Furthermore, we acknowledge regulatory or legal constraints as challenges, albeit not as formidable as competition or resistance to change. Addressing these constraints necessitates meticulous attention to compliance and legal frameworks, which can significantly influence the trajectory of innovation efforts. The literature review encapsulates a comprehensive category labeled "Overcoming Challenges Related to Innovation," which signifies the multifaceted nature of organizations' hurdles. This category is highly significant, underscoring the imperative for comprehensive strategies and concerted efforts to overcome these challenges effectively. The literature review's cumulative weighted mean suggests that implementing innovation initiatives presents a moderate challenge. While organizations confront notable obstacles, they also possess opportunities to navigate these challenges and propel innovation forward through strategic planning, resource allocation, and organizational commitment.

These findings are insights shared by industry practitioners on the aspect of innovation challenges. Participant A stated that in terms of innovation, the internet connection serves as a key driver. Yet, many businesses in Dumaguete have not fully utilized this tool, particularly in adopting cloud-based systems. Despite my office being equipped with such systems, the challenge lies in the capability of third-party suppliers and customers to handle a paperless system effectively. The availability of these systems is crucial, and reliable support is paramount. Purchasing from reputable companies ensures that support is readily available in case of system failures, preventing disruptions to business operations. While costly, the investment in a reliable system with support outweighs the risks of system failures. Traditional businesses, predominantly owned by Filipino Chinese, often face challenges in transitioning to modern systems. This can lead to stagnation in growth when their existing systems fail to keep up with increasing demands. Therefore, innovation is needed, especially in sectors beyond tourism, such as trading. Participant D also stated that the challenges hindering the transition to technology-driven approaches in traditional businesses primarily revolve around financial constraints. Capital investment in innovation remains a significant hurdle, deterring businesses from embracing more modern methods.

3.2 Challenges

As shown in Table 9, most respondents (54.67%) express the view that challenges exhibit slight differences between sectors, suggesting the presence of sector-specific innovation challenges. Additionally, a significant portion (34.67%) highlights substantial variability between sectors, underscoring the necessity for tailored strategies to address innovation challenges in each sector.

Table 9. Frequent challenges across different sectors

Type of Challenges	Frequency	Percentage (%)
Challenges are similar across all sectors	16	10.66
Challenges vary slightly between sectors	82	54.67
Challenges vary significantly between sectors	52	34.67

This aligns with the literature emphasizing the contextual nature of challenges in innovation management, where sector-specific dynamics play a crucial role (Chesbrough, 2003). The findings underscore the importance of sector-focused approaches in devising effective innovation strategies. Consistent with these findings, Participant B also stated that within Dumaguete City, there is a prevalent adherence to traditional business practices, reflecting a slower pace of technological adoption compared to neighboring major cities like Bacolod, Cebu, Davao, and Metro Manila. While the city has made strides in embracing delivery services, there remains a considerable gap, particularly in sectors like construction and manufacturing, where traditional methods and machinery persist. Agricultural practices also lag, with manual labor still prevalent despite the potential for innovative technologies like drones and cultivator machines to enhance efficiency.

Table 10. Size of impact in the level of challenge faced in implementing innovation

Size of Impact	Frequency	Percentage (%)
Challenges are consistent regardless of the company size	68	45.33
Large establishments face more challenges than smaller ones	46	30.67
Smaller establishments face more challenges than larger ones	36	24

This Table delineates the perceived impact size of the challenges encountered in implementing innovation relative to the company's size. A substantial portion (45.33%) of respondents indicate that challenges remain consistent across companies of different sizes. This finding resonates with the idea that some challenges in innovation management may be independent of company size and are more related to other factors, such as industry dynamics or market conditions. In contrast, 30.67% believe that larger establishments experience more challenges, while 24.00% contend that smaller establishments encounter greater challenges in implementing innovation. This variability in perception could stem from factors such as resource availability, organizational structure, or market positioning, which may differ between large and small companies. These findings align with the literature, which acknowledges the variability in innovation challenges based on the scale and resources of enterprises (Chesbrough, 2003). The diverse perceptions underscore the complex interplay between company size and the challenges inherent in fostering innovation, emphasizing the need for tailored strategies for different-sized establishments.

3.3 The Innovation Measures

The analysis of innovation measures within the establishment reveals a consistent effort to prioritize and invest in innovation. While the establishment conducts periodic analyses to identify patterns between innovation investment and business growth, positive outcomes from innovation initiatives are reported every few years (see Table 11). This data underscores the establishment's commitment to innovation and suggests a need for a more frequent and comprehensive evaluation of its strategies. For instance, Brown and Wilson (2019) offer insights into best practices for assessing innovation metrics, aiding organizations in refining their measurement approaches. Jones and Patel (2020) also delve into the challenges and opportunities of measuring innovation impact, providing strategies for organizations to enhance their innovation measurement practices. These studies collectively contribute to a deeper understanding of innovation measurement and offer recommendations for optimizing organizational innovation practices.

Table 11. Innovation measures

Innovation Measures	Mean	Interpretation
The establishment prioritizes and invests in innovation.	2.82	Annually
The establishment measures the impact of innovation on its income and overall financial performance.	2.82	Annually
The establishment conducts analyses or reviews to identify patterns or trends between innovation investment and business growth.	1.82	Every Few Years
The establishment experienced a positive outcome due to innovation investment and income growth in the past years.	1.81	Every Few Years

Ranges: 5.00 - 4.26 = Continuously as Needed (CN); 4.25 - 3.52 = Every Few Months (EFM); 3.51 - 2.52 = Annually (A); 2.51 - 1.76 = Every Few Years (EFY); 1.75 - 1.00 = Rarely or Never (R/N)

Table 12 shows the relationship between innovation measures and challenges, with a correlation coefficient (r) of 0.66 and a p-value of 0.05. The interpretation suggests rejecting the null hypothesis due to the significant correlation at the 0.05 level. Furthermore, the correlation coefficient falls within the range of 0.60 to 0.799, which suggests a strong positive correlation between innovation measures and challenges. This means that as the level of innovation strategy increases, the challenges faced also tend to increase significantly. The findings suggest that there is indeed a significant relationship between the level of innovation strategy and the challenges encountered. It aligns with the literature review, emphasizing the importance of innovation strategies such as product innovation, process innovation, organizational innovation, and marketing innovation for business success. The role of Higher Education Institutions (HEIs) in preparing graduates to meet industry demands and foster innovation is highlighted (Smith, 2020).

Table 12. Correlation between innovation measures and challenges

Variable Tested	r	P-Value	Interpretation	Decision
Innovation Measures Vs. Challenges	0.66	0.05	Reject the Null Hypothesis	Significant

Table 13 provides information on the allocation of establishments' annual revenue. However, the presented data consisted of only one data point—three establishments allocating 1% of their annual revenue. Other establishments did not share information about allocating annual revenue for research and development or innovation activities. Future research efforts may benefit from gathering more detailed data on revenue allocation among establishments. This would provide a better understanding of the investment patterns and priorities related to innovation within the studied establishments. Such insights are crucial for formulating effective strategies to promote innovation and drive economic growth in the studied context.

Table 13. Establishment’s allocation for annual revenue

Allocation for Annual Revenue in Percentage	Frequency	Percentage (%)
1%	3	0.02

The recommendations for Higher Education Institutions (HEIs) underscore a holistic approach to education, reflecting the diverse skill set required for students to thrive in a dynamic and interconnected world (Smith & Johnson, 2022). The unanimous emphasis on communication skills highlights their pivotal role in education and professional success (Brown & Martinez, 2021). It suggests an understanding that effective communication is a foundational skill applicable across disciplines. The strong endorsement of critical thinking aligns with the need for students to navigate complexities, analyze information, and make informed decisions (Garcia & Lee, 2020). It reflects a commitment to nurturing students' analytical abilities. The significant recommendation for technical skills underscores their ongoing importance (Chen et al., 2023). This aligns with the demand for specialized expertise in various fields, emphasizing the practical application of knowledge. The recognition of digital literacy signals an acknowledgment of the evolving technological landscape (Robinson & Wang, 2020). HEIs are urged to equip students with the skills to thrive in an increasingly digital world. The emphasis on soft skills, including interpersonal and communication skills, suggests an awareness of the need for well-rounded individuals capable of collaborating and adapting in diverse settings (Lee & Garcia, 2023).

Table 14. Specific skills or knowledge for hei's to prepare students in the workplace

Recommendations for HEI's Skills for Students	Frequency	Percentage (%)
Communication Skills	150	100
Critical thinking and problem solving	122	81.33
Technical skills	119	79.33
Digital literacy	114	76
Soft skills	102	68
Perspective	76	50.67
Adaptability to rapid change	73	48.67
Self-Reflective learning	61	40.67
Data and analytics skills	59	39.33
Industry-relevant knowledge	44	29.33
Ethical and cultural awareness	39	26
Entrepreneurial mindset	36	24
Research and information literacy	35	23.33
Environmental and sustainability awareness	26	17.33
Financial literacy	23	15.33
Self-management and career planning	23	15.33
Networking and professional development	21	14
Cross-cultural competence	14	9.33
Mental health and well-being	2	1.33

Perspective and Adaptability to Rapid Change: These recommendations focus on a global perspective and the ability to navigate rapid changes (Johnson & Brown, 2022). HEIs recognize the importance of preparing students for a dynamic and interconnected world. The recommendation for self-reflective learning reflects a commitment to fostering self-awareness and metacognition among students, encouraging them to engage in their educational journey actively (Martinez & Robinson, 2021). The acknowledgment of data and analytics skills aligns with the increasing reliance on data-driven decision-making in various industries (Wang & Chen, 2023). HEIs are encouraged to equip students with the ability to analyze and interpret data.

While important, the recommendation for industry-relevant knowledge suggests a balanced approach, recognizing the need for knowledge that aligns with current industry demands (Lee et al., 2021). The emphasis on ethical and cultural awareness signifies a commitment to cultivating academic knowledge, ethical behavior, and cultural sensitivity among students (Garcia et al., 2020). The recommendation for an entrepreneurial mindset aligns with a growing recognition of the value of innovation, creativity, and an enterprising spirit in today's competitive landscape (Brown et al., 2022).

The focus on research and information literacy suggests a desire for students to develop critical thinking skills and the ability to navigate and evaluate vast amounts of information (Johnson et al., 2023). The recommendation for environmental and sustainability awareness aligns with a growing emphasis on responsible and sustainable practices (Robinson et al., 2021). HEIs are urged to instill an understanding of environmental challenges. While less frequent, the acknowledgment of financial literacy indicates a recognition of the importance of financial knowledge for students' personal and professional lives (Chen & Wang, 2020).

Self-Management, Career Planning, Networking, and Professional Development: These recommendations underline the importance of preparing students not just academically but also for their professional journey, including self-management, career planning, networking, and ongoing professional development (Martinez et al., 2022). While lower in frequency, cross-cultural competence and mental health and well-being highlight the evolving understanding of education. There's a recognition of the importance of cross-cultural competence and the growing awareness of mental health issues among students (Wang et al., 2023).

In line with these findings, Participant C shared that skill acquisition is essential and practical application is key to learning. Discipline and character are valued traits, as they are crucial for long-term success. While proficiency in English can be advantageous, particularly in call centers, for clerical roles, dedication and mindset ultimately drive skill acquisition and success. With determination and focus, individuals can learn new skill sets relatively quickly, making ongoing learning and adaptation integral to professional development in Dumaguete.

Table 15. HEI's collaboration with businesses

Recommendations for HEI's Collaboration with Businesses	Frequency	Percentage (%)
Tailored Programs	132	88.00
Identify Key Industry Needs	130	86.67
Industry Advisory Boards	104	69.33
Internship and Coop Programs	47	31.33
Research Collaborations	42	28.00
Diversity and Inclusion	42	28.00
Marketing and Visibility	40	26.67
Marketing and Visibility	39	26.00
Professional Development Workshops	36	24.00
Long-Term Partnerships	35	23.33
Cultural Understanding	28	18.67
Flexible Curriculum	27	18.00
Continuous Improvement	23	15.33
Networking Events	22	14.67
Innovation Hubs	19	12.67
Lifelong Learning Partnerships	18	12.00
Technology Transfer Offices	16	10.67
Industry-Affiliated Centers and Labs	12	8.00
Dual Degree Programs	11	7.33
Collaborative Projects	11	7.33
Cross-Disciplinary Initiatives	4	2.67
Intellectual Property Agreements	4	2.67
Guest Lecturers and Speakers	0	0.00
Evaluate and Adjust	0	0.00

The collaboration between Higher Education Institutions (HEIs) and businesses is crucial for meeting industry needs and driving innovation. Tailored programs, as emphasized by Jones and Iredale (2020), emerge as the predominant recommendation, with the highest frequency (132) and percentage (88.00%), indicating a proactive approach to customizing educational offerings to address specific industry demands. This aligns with Gibb's (2019) findings, highlighting the significance of HEIs identifying and responding to key industry needs to equip graduates with relevant skills for workforce integration. Additionally, as noted by Bertrand et al. (2021), industry advisory boards play a crucial role in providing industry insights and informing curriculum development, with a relatively common presence among HEIs (104; 69.33%). However, while internship and co-op programs are valued, their relatively lower frequency (47; 31.33%) suggests potential challenges in implementation and scaling, as discussed by Ding and Han (2022). Nevertheless, research collaborations (42; 28.00%) are recognized as vital for advancing scientific knowledge and technology transfer between academia and businesses, as Belderbos et al. (2019) emphasized. Furthermore, initiatives focusing on diversity and inclusion (42; 28.00%) underscore HEIs' commitment to fostering inclusive environments within collaborative efforts, aligning with Nakanishi et al.'s (2020) findings on the importance of diversity in enhancing creativity and problem-solving. Moreover, acknowledging the importance of marketing and visibility (40; 26.67%) reflects HEIs' recognition of the need to promote collaboration opportunities and showcase their value to businesses. Finally, the commitment to professional development workshops (36; 24.00%) underscores HEIs' dedication to enhancing the skills and capabilities of students and professionals through collaborative endeavors. These findings highlight the importance of collaborative approaches between HEIs and businesses in addressing industry needs and driving innovation.

With these findings, Participant D stated that there's a call to instill entrepreneurship among students within higher education institutions (HEIs). Entrepreneurial skills are vital catalysts for economic progress, with entrepreneurs playing a pivotal role in driving innovation and economic development. While not all students may pursue entrepreneurship, fostering an entrepreneurial mindset equips them for various roles within the workforce. Moreover, there's a need to align skills development with market demand, ensuring the workforce is equipped with relevant skills that meet industry needs. Collaboration between the education sector and the business community is essential to addressing skill gaps and fostering economic growth. Ultimately, the integration of entrepreneurship education, along with the alignment of skills development with market demand, can create a conducive environment for innovation and economic progress within Dumaguete City. By nurturing entrepreneurial talent and fostering stakeholder collaboration, the city can bridge the gap between traditional practices and modern innovation, driving sustainable economic growth and development.

4.0 Conclusions

The research highlights the diverse range of medium and large enterprises in Dumaguete City, focusing on the technology and services sectors. These businesses have been operational for over two decades, indicating their stability and strategic planning. These companies show a strong commitment to innovation, especially in product and technology advancements, but need improvements in updating innovation vision and regular assessments. Innovation challenges include resistance from employees and management, limited top leadership support, competition, and sector-specific regulatory constraints.

Although businesses recognize the importance of innovation, the study must establish a clear link between the degree of innovation strategy implemented and the difficulties faced, suggesting other factors influence innovation implementation. Further investigation is needed to uncover these factors for more effective innovation strategies. The study emphasizes that NOCCI acknowledges these enterprises' strategic advantage and resilience. Despite commendable innovation efforts, the identified challenges align with NOCCI's observations. To promote innovation-driven development in Negros Oriental, businesses and higher education institutions must collaborate and develop customized strategies in line with NOCCI's dedication to bolstering the local economy.

5.0 Contributions of Authors

The first author was responsible for conceptualizing the research, designing the methodology, collecting and analyzing the data, and drafting the initial manuscript. The second author, the advisor, provided invaluable guidance throughout the research process, offering expertise in research design, data processing, data interpretation, and manuscript revision. Their collaborative efforts were instrumental in the successful completion of this research.

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7.0 Conflict of Interests

None

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Research Productivity Profile of the Selected Implementing Unit Schools in Soccsksargen Region, Philippines

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Abstract. This study assessed the action research outputs of teachers from Implementing Unit (IU) schools in selected divisions of the SOCCSKSARGEN Region, Philippines. The completed researches were categorized according to the Basic Education Research Agenda (BERA) themes: Teaching and Learning, Child Protection, Human Resource Development, and Governance. Employing a descriptive research design, the study analyzed research productivity from the school years 2020 to 2023. Findings revealed that the Teaching and Learning theme dominated, comprising 62.37% of the total research outputs, reflecting a strong focus on teaching methods, curriculum development, assessment, and educational practices. In contrast, Child Protection accounted for the lowest share at 7.53%, while Human Resource Development and Governance themes each contributed 15.05%. These variations suggest disparities in research productivity across different areas and academic years. Additionally, the overall low research output and limited teacher engagement in research indicate the need for enhanced support and resources. Addressing these disparities will foster a more balanced and equitable research environment across all thematic areas.

Keywords: Basic education research agenda; Implementing unit schools; Research productivity.

1.0 Introduction

Teachers are encouraged to engage in educational research to develop innovations and solutions that enhance teaching and learning outcomes in the academe. These research efforts are aligned with the Department of Education's (DepEd) Basic Education Research Agenda. They are intended to inform planning, policy-making, and program development, supporting teachers as 21st-century learning facilitators (Capulso, 2020). However, despite DepEd's continuous efforts to promote teacher participation in research, the recorded output remains minimal. The study by Villarino (2022) uncovered that only 22.81 percent of teachers nationwide engaged in research. In the regional context of the Philippines, the performance of the South Cotabato, Sarangani, and General Santos City Divisions in the Regional Research Congress still needs to be improved. The study by Mapa (2017) revealed that despite the DepEd mandates, initiatives, and programs, the teachers' research productivity in the Philippines' basic education remains low.

Likewise, there has been no profiling of the completed research recorded for the Implementing Unit Schools in the region. Hence, the researcher wanted to know the research productivity profile in the SOCCSKSARGEN Region by collecting and analyzing the profiles of completed research conducted by teachers specifically in Implementing Unit (IU) schools, categorized by school size and Basic Education Research Agenda (BERA) themes, drawn from the past three school years 2020-2021, 2021-2022, and 2022-2023. The significance of this study lies in its potential to provide valuable insights into the research productivity of teachers in the SOCCSKSARGEN Region, which could inform policy adjustments and capacity-building initiatives. By identifying trends, challenges, and factors influencing research engagement, the study will improve the research culture among teachers in the region. Moreover, this research will help the Department of Education better align support mechanisms and interventions to enhance teacher participation in research, ultimately leading to innovative educational practices that can improve learning outcomes.

2.0 Methodology

2.1 Research Design

The study utilized the descriptive design. Specifically, the researcher described the data the school administrators or research coordinators provided. Using a researcher-designed template to profile and analyze the research work, the researcher conducted a descriptive inquiry to summarize the patterns, trends, and characteristics of the research conducted over the past three years.

2.2 Research Locale

The study was conducted in the selected IU schools in the SOCCSKSARGEN Region, Philippines, specifically within its three Divisions: South Cotabato, Sarangani, and General Santos City.

2.3 Research Participants

The 219 respondents were the school administrators or research coordinators of the IU schools. They were selected based on DepEd Order No. 48, known as "2021 Brigada Eskwela Implementing Guidelines," which presents four (4) school categories based on the number of teachers employed in a particular school. The categories are Small School (40 and below), Medium School (41-80), Large School (81-120), and Mega School (121 and above). Since the respondents were delimited into IU schools, this study randomly selected one IU school to represent each category from the divisions of South Cotabato, Sarangani, and General Santos City. The sample of respondents was computed using the Raosoft online calculator (which utilizes a Cochran formula) with a 10% margin of error, a 90% confidence level, and a 50% response distribution. After establishing the suggested sample size, a systematic sampling based on the lists of plantilla positions extracted from School Forms 4 and 7 was used to extract the precise number of respondents per school.

2.4 Research Instrument

This study used a researcher-designed template in both printed copies and digital copies through Google Forms to provide options to the respondents and participants, whichever is more convenient to them. The instrument asked for essential details about the profile of the completed research in terms of the Basic Education Research Agenda (BERA) themes. Specifically, the first part asked about the demographic profile of the respondent. In contrast, the second part asked for essential details about the profile of the completed research of the respondent school, categorized per BERA theme and school category. This includes filling out the completed research title, category, level of dissemination and utilization, funding sources, and the year when it was completed. The school administrator or the school research coordinator filled out this instrument.

Furthermore, the identified experts in the Department of Education tested the instrument for content validity to ensure that it covered all aspects of the measured construct. Modifications were likewise made based on their feedback. Second, face validity was made by testing the instrument with a small sample from the target population to ensure that the questions were understandable and appeared to measure the intended concepts. Lastly, a reliability test was performed to test the instrument's internal consistency. It was assessed using Cronbach's Alpha to measure how well the items in the instrument correlate with each other.

2.5 Data Gathering Procedure

This study used specific steps to collect the data. The study's first phase was to write formal letters requesting authorization to conduct the research. Initially, the researcher dispatched formal letters of request to the DepEd Regional Office XII, the School's Division Superintendents of South Cotabato, Sarangani, and General Santos City, as well as the school heads of the selected schools, seeking authorization to undertake the study. Upon obtaining consent, the administrators of the involved institutions were personally informed and presented with the authorized correspondence from the Division Office, subsequently coordinating a mutually agreeable timetable for the survey distribution.

In the second phase, the researcher personally administered the survey questionnaires to the participants at the designated date and time. Before distributing the questionnaire, the researcher comprehensively explained the aspects of the study to the respondents while elucidating the rationale behind the research implementation. The researcher requested that the respondents answer candidly and ensure their identities remain confidential. For respondents identified as facing accessibility challenges, whether due to geographical distance or personal preference, a questionnaire was crafted using Google Forms and distributed to facilitate the collection of their responses. Upon completing the answered questionnaire, the researcher automatically collected and tallied the data using Microsoft Excel and Microsoft Word.

2.6 Ethical Considerations

This research study followed ethical guidelines. The respondents and participants were aware that participation was entirely voluntary and that they were not obligated to respond to questions that made them uneasy or unpleasant. The respondents and participants were allowed to stop participating in the study at any time without repercussions or fines. The researcher abided by Republic Act 10173, often known as the Data Privacy Act 2012. As a result, personal data were protected and secured. The researcher obtained informed consent after clearly explaining the complete goal, the methodology, and any potential advantages to the subjects.

Since the school administrators and teachers of legal age are the study participants, they were considered mature enough and able to decide whether to participate; hence, they are not vulnerable. The utmost care and respect were required to protect their well-being and address their vulnerability. The researcher encouraged disclosure of the study findings to the districts and schools where the research was conducted and to the institution with which the researcher was affiliated. After gathering and analyzing the necessary data, the researcher returned to the chosen schools to perform the research. The ethics of plagiarism was also taken into account in this investigation. The researcher acknowledged, credited, and credited the author's earlier publications. Furthermore, accurate citations and quotations were used. Before the final version of this study was published, the work was subjected to a plagiarism check utilizing specific methodologies. The researcher only permitted a 1% similarity index of tolerance while using an online plagiarism detector for this work. The interpretation of their responses was accurate.

3.0 Results and Discussion

3.1 Research Productivity Profile

The results of the profile of completed research per theme, as well as a summary across themes, school categories, and divisions, are discussed as follows.

Teaching and Learning Theme

This theme responds to the needs of students and teachers. It focuses on the teaching-learning process's developmental, social, and behavioral effects on learners, including research projects related to assessment, instruction, and curriculum (DO 39, s. 2016). Table 1 depicts the profile of the completed research papers in the IU schools regarding the Teaching and Learning theme. It can be gleaned that for the past three years, only 57 research projects were completed by schools categorized into small, medium, large, and mega schools. During the past three school years, the data shows a higher quantity of research output in the SY 2021-2022, accounting for 23 research papers (40.36%), compared to SY 2020-2021 with 17 research outputs (29.82%) and SY 2022-2023 with 17 completed research (29.82%). This variation indicated fluctuations in research productivity across different academic years.

Among the three respondent divisions of SOCCSKSARGEN, the South Cotabato Division stood out as the most prolific in research output in the Teaching and Learning theme, producing 30 research papers, 52.63% of the total. Sarangani Division followed with 22 research papers (38.60%), and General Santos City Division had the lowest research output, contributing only five research papers. The data highlighted disparities in research productivity among the three respondent divisions in SOCCSKSARGEN, with South Cotabato leading, Sarangani making a substantial contribution, and General Santos City having the least research output.

Table 1. Profile of completed research in IU schools in terms of teaching and learning theme

Division & School Category	School Year Completed						Total	Percentage (%)
	2020-2021		2021-2022		2022-2023			
South Cotabato	**f**	**%**	**f**	**%**	**f**	**%**		
Small	3	17.65	0	0	3	17.65	6	10.52
Medium	0	0	5	21.74	2	11.76	7	12.28
Large	1	5.88	4	17.39	4	23.53	9	15.79
Mega	1	5.88	1	4.35	6	35.30	8	11.03
Total	*5*	*29.41*	*10*	*43.48*	*15*	*88.24*	*30*	*52.63*
Sarangani								
Small	2	11.76	0	0	0	0	2	3.51
Medium	1	5.88	5	21.74	1	5.88	7	12.28
Large	4	23.53	3	13.04	1	5.88	8	11.03
Mega	2	11.76	3	13.04	0	0	5	8.77
Total	*9*	*52.94*	*11*	*47.82*	*2*	*11.76*	*22*	*38.59*
General Santos								
Small	2	11.76	1	4.35	0	0	3	5.26
Medium	0	0	0	0	0	0	0	0
Large	0	0	1	4.35	0	0	1	1.76
Mega	1	5.88	0	0	0	0	1	1.76
Total	*3*	*17.65*	*2*	*8.70*	*0*	*0*	*5*	*8.78*
Grand Total	*17*	*100*	*23*	*100*	*17*	*100*	*57*	
Percentage (%)	**29.82**		**40.36**		**29.82**			**100**

It can be inferred that the South Cotabato Division has an established research culture, particularly in teaching and learning, which indicates a strong focus on research and innovation in this area. Although less productive, the Sarangani Division is still actively engaged in research, suggesting a commitment to scholarly endeavors. In contrast, the relatively low output from the General Santos City Division might imply potential areas for growth or challenges that need to be addressed to enhance their research capabilities.

Heaton-Shrestha et al. (2023) stated that barriers to research outputs fall into three broad categories: resource constraints, lack of priority for research, and barriers related to attitudes, knowledge, and skills. Hence, Niyazova (2021) suggested that a balance of interests in academic research can be achieved through a combination of simple and qualitative indicators and professional expertise, promoting long-term cooperation and individual academic productivity. To further improve research outputs, Jamali et al. (2023) recommended the implementation of new research incentive schemes and excellence initiatives that recognize and reward high-quality research.

Child Protection Theme

This theme aims for in-depth studies on the prevalence and effects of child protection-related cases in schools. It emphasizes the need to assess the effectiveness of previous interventions and the potential of new approaches to protect learners in schools better (DO No. 39, s. 2016). Table 2 presents the profile of the completed research in the IU schools regarding the Child Protection theme. Only seven research projects were completed by the 12 respondent schools from 2020 to 2023. Among the three divisions, South Cotabato produced the highest number of research papers, with four, while General Santos City had the lowest output in this category, with only one research paper completed. The total number of completed research papers over the past three years suggested that research activities related to the Child Protection theme have been limited during this period.

When analyzed according to school category, small and medium-sized schools in South Cotabato and Sarangani did not complete research, indicating a potential gap in research activities related to Child Protection in these school categories. This lack of research could imply several things. Firstly, these schools might not have sufficient resources, such as funding or personnel, to research child protection. Alternatively, it indicates that child protection may not be a priority research area for these divisions.

Table 2. Profile of completed research in IU schools in terms of child protection theme

Division/School Category	School Year Completed						Total	Percentage (%)
	2020-2021		2021-2022		2022-2023			
South Cotabato	**f**	**%**	**f**	**%**	**f**	**%**		
Small	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Large	0	0	0	0	2	33.33	2	28.57
Mega	0	0	0	0	2	33.33	2	28.57
Total	*0*	*0*	*0*	*0*	*4*	*66.66*	*4*	*57.14*
Sarangani								
Small	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Large	1	100	0	0	1	16.67	2	28.57
Mega	0	0	0	0	0	0	0	0
Total	*1*	*100*	*0*	*0*	*1*	*16.67*	*2*	*28.57*
General Santos								
Small	0	0	0	0	0	0	0	0
Medium	0	0	0	0	1	16.67	1	14.28
Large	0	0	0	0	0	0	0	0
Mega	0	0	0	0	0	0	0	0
Total	*0*	*0*	*0*	*0*	*1*	*16.67*	*1*	*14.29*
Grand Total	*1*	*100*	*0*	*0*	*6*	*100*	*7*	
Percentage (%)	**14.29**		**0**		**85.71**			**100**

The low overall research output and the absence of research in certain school categories highlight potential areas for improvement. Educational institutions and policymakers can use this information to identify specific gaps in research related to child protection and implement strategies to address these gaps. The data suggested an overall low engagement with the Child Protection theme in the respondent IU schools, with variations among divisions and specific school categories.

Consequently, Dulog (2024) stated that poor research facilities and a lack of incentives for research contribute to low-quality research output. Addressing these challenges requires investments in faculty development, research infrastructure, and financial support, as well as the establishment of legal regulations and ethical standards. Similarly, Ulla et al. (2017) support this finding. They revealed in their study that teacher respondents had a positive perception of doing research and its benefits to their teaching practices and students' learning processes. Nevertheless, several issues prevented them from conducting research, including a lack of research knowledge and skills, a heavy workload, and a lack of school funding.

Human Resource and Development Theme

This theme focuses on the career development concerns of the school's teaching and non-teaching staff, surfacing and addressing their capacity-building needs and examining various dimensions and determinants of their professional growth (DO No. 39, s. 20.16). Table 3 illustrates the profile of the completed research in the IU schools regarding the Human Resource Development theme. As depicted, only 14 research papers were completed by the 12 respondent schools from 2020 to 2023. Among the three Divisions, Sarangani produced seven papers, considered the highest number of papers. In contrast, South Cotabato and General Santos produced only four (28.57%) and three (21.43%) research papers, respectively.

When analyzed according to school category, no research output was recorded for small and medium-sized schools in South Cotabato, including small, medium, and large schools in General Santos City. Only Sarangani completed research papers in each category and produced seven papers, accounting for 50% of the total completed research of the three Divisions in the past three years. The data imply a relatively low overall research output during this period. Sarangani Division is the most productive in the Human Research Development theme, the highest among the three divisions. This Division emerged as the most active in research, contributing significantly to the overall output, while South Cotabato and General Santos show lower research activity, particularly in certain school categories. The data points to a need to encourage and enhance research efforts in the divisions showing lower productivity, such as South Cotabato and General Santos. It might be beneficial to study the approach of the Sarangani Division towards human research development, as they seem to have found a successful model and considered implementing similar strategies in other divisions.

Table 3. Profile of completed research in IU schools in terms of human resource development theme

Division/School Category	School Year Completed						Total	Percentage (%)
	2020-2021		2021-2022		2022-2023			
South Cotabato	f	%	f	%	f	%		
Small	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Large	0	0	1	12.5	0	0	1	7.14
Mega	0	0	1	12.5	2	66.67	3	21.43
Total	*0*	*0*	*2*	*25.0*	*2*	*66.67*	*4*	*28.57*
Sarangani								
Small	1	50	0	0	0	0	1	7.14
Medium	0	0	1	12.5	0	0	1	7.14
Large	1	50	2	25.0	0	0	3	21.43
Mega	0	0	2	25.0	0	0	2	14.23
Total	*2*	*100*	*5*	*62.5*	*0*	*0*	*7*	*50.0*
General Santos								
Small	0	0	0	0	0	0	0	0
Medium	0	0	0	0	1	25.0	0	0
Large	0	0	0	0	0	0	0	0
Mega	0	0	1	12.5	1	25.0	2	14.23
Total	*0*	*0*	*1*	*12.5*	*2*	*50.0*	*3*	*21.43*
Grand Total	**2**	**100**	**8**	**100**	**4**	**100**	**14**	
Percentage (%)	**21.43**		**57.14**		**21.43**			**100**

Additionally, the disparities in research output across different school categories might indicate the necessity for a more equitable distribution of resources and support, ensuring all schools have the opportunity to contribute to research. The results imply that these divisions or school categories may need to reevaluate their approach to research by allocating more resources or encouraging more research activity. According to Cochran-Smith and Villegas (2015), the limited research on Philippine public school teachers is due to divergent research practices, different economic, intellectual, and demographic developments, and different positions within and outside teacher education. Likewise, there are several reasons why teachers need help in doing research. Public school teachers' most frequent barriers to research production are time constraints, disinterest, lack of research experience, conflicting obligations, a full teaching schedule, and inadequate funding (Gomez & Catan, 2021).

Governance Theme

This theme covers planning, finance, program management, transparency, accountability, and evaluation, underscoring DepEd's commitment to ensuring that its structure, systems, and processes contribute to achieving basic education outcomes. It may also include concerns in Disaster Risk Reduction and Management, Inclusive Education, and Gender and Development (DO No. 39, s. 20.16).

Table 4. Profile of completed research in IU schools in terms of governance

Division/School Category	School Year Completed						Total	Percentage (%)
	2020-2021		2021-2022		2022-2023			
South Cotabato	f	%	f	%	f	%		
Small	1	16.67	1	33.33	0	0	2	14.28
Medium	0	0	0	0	0	0	0	0
Large	0	0	0	0	2	40.0	2	14.28
Mega	1	16.67	1	33.33	3	60.0	5	35.73
Total	*2*	*33.34*	*2*	*66.66*	*5*	*100*	*9*	*64.29*
Sarangani								
Small	0	0	0	0	0	0	0	0
Medium	1	16.67	1	33.34	0	0	2	14.28
Large	2	33.32	0	0	0	0	2	14.28
Mega	0	0	0	0	0	0	0	0
Total	*3*	*49.99*	*1*	*33.34*	*0*	*0*	*4*	*28.56*
General Santos								
Small	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Large	1	16.67	0	0	0	0	1	7.15
Mega	0	0	0	0	0	0	0	0
Total	*1*	*16.67*	*0*	*0*	*0*	*0*	*1*	*7.15*
Grand Total	*6*	*100*	*3*	*100*	*5*	*100*	*14*	
Percentage (%)	**42.86**		**21.43**		**35.71**			**100**

Table 4 displays the profile of the completed research in the IU schools regarding governance themes. As shown, only 14 research studies in the past three years were completed. South Cotabato Division had the highest research productivity, contributing nine research papers. It constituted a substantial portion, accounting for 64.29% of the total research output, while General Santos City had the lowest research completed, producing only one research paper. It accounted for 7.14% of the total research output, indicating a relatively limited research activity in General Santos City compared to the other divisions. On the other hand, Sarangani Division produced four research papers, representing a moderate contribution to the overall research output; however, it is lower than the contribution of South Cotabato.

The data suggest that the overall research output in the specified period is relatively **low** under the Governance theme. They highlight regional disparities in research productivity among the divisions, with South Cotabato being the most active, Sarangani making a moderate contribution, and General Santos City having the least research output. The results suggest that there might be a need for increased research undertakings in these areas. While there are some reports of research breakthroughs in the Philippines, other reports show that the country is moving slowly compared to developed Asian countries. Among the contributing factors to this slow pace is the Philippines' dismal 0.11% gross domestic product (GDP) allocation, which pales in comparison to the world average of 2.228% and Japan's allocation of 3.28% (World Bank, 2015). It is evident that meager funding results in fewer quality research outputs, thus fewer outputs to disseminate and even fewer to utilize by adopters (Clores, 2021).

3.2 Summary of Completed Research Profile

Table 5 depicts the profile of the completed research in the last three years in the Implementing Unit (IU) schools regarding the Basic Education Research Agenda (BERA) per category. Data showed that 92 completed research studies were recorded by the respondents in IU schools in SOCCSKSARGEN over the past three years.

Table 5. Summary of completed research in selected IU schools in SOCCSKSARGEN in the last three years

School Category	BERA Theme				Total	Percentage (%)
	Teaching & Learning	Child Protection	Human Resource Development	Governance		
Small	11	0	1	2	**14**	**15.22**
Medium	14	1	2	2	**19**	**20.65**
Large	18	4	4	5	**31**	**33.70**
Mega	14	2	7	5	**28**	**30.43**
Total	**57**	**7**	**14**	**14**	**92**	**100**
Percentage (%)	**61.96**	**7.60**	**15.22**	**15.22**	**100**	

Besides, it can be noticed that in the school year 2020 to 2023, the Teaching and Learning theme came out as the most researched area, constituting 62.37% of the total completed research. It indicates a strong emphasis on issues related to teaching methods, curriculum development and assessment, and educational practices. Meanwhile, the theme of Child Protection recorded the lowest number of produced research papers, accounting for only 7.53% of the total. Both Human Resource Development and Governance themes contributed equally, each catalyzing a rate of 15.05% for the past three school years.

4.0 Conclusion

The teaching and Learning theme stands out as the most researched area. It indicates a strong emphasis on issues related to teaching methods, curriculum development and assessment, and educational practices. At the same time, the theme of child protection was recorded as the lowest number of research papers produced. Both human resource development and governance themes have contributed equally for the past three school years. This variation suggests fluctuations in research productivity across different academic years. The overall low research output and the limited research engagement highlight potential areas for improvement. The disparities in research output across different school categories have indicated the need for a more equitable distribution of resources and support to encourage more research undertakings.

5.0 Contributions of Authors

AA – editing, writing, encoding, and data analysis; BA – supervising, reviewing, advising

6.0 Funding

Personal Fund was used to complete this research.

7.0 Conflict of Interests

No conflict of interest.

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Research Competence and Attitude toward Research of Faculty in State Universities and Colleges in Iloilo

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Abstract. The research competence of Faculty in State Universities and Colleges (SUCs) is crucial in advancing research progress. A positive attitude toward research encourages faculty to engage in research activities and professional development actively, fostering a research-driven academic environment. Research competence and attitude toward research are influenced by years of experience and access to research training, which can either enhance or limit faculty's ability to contribute effectively to institutional research goals. This descriptive-correlational study examined the relationship between research competence and attitude toward research of 256 faculty in State Universities and Colleges (SUCs) in Iloilo. Using a researcher-made questionnaire, results revealed that the Faculty of SUCs were "Competent" in research and exhibited a "Positive attitude" toward research. The research competence of faculty in SUCs was not statistically different when classified as years of teaching experience and significantly different when classified as research-related training. The attitude toward research was not significantly different when classified as to years of teaching experience and significantly different when classified as to the number of research-related training. There was no significant relationship between research competence and attitude toward research of faculty in SUCs.

Keywords: Attitude toward research; Descriptive correlational; Faculty; Research competence; State universities and colleges.

1.0 Introduction

Research competence is essential for conducting research, as it is a means of acquiring new knowledge and making novel discoveries. Research competency is the foundation for developing a faculty's intellectual, linguistic, and design skills and their critical thinking and creative ability (Whitman & Kelleher, 2017). It is very important to all Faculty, both inexperienced and experienced, as it forms the basis of progress in a university. Higher education institutions around the world consider research as one of the criteria for success because it entails the transfer of teaching skills and the output of research. In the Philippines, for instance, research is deemed an essential function alongside instruction and community extension (CHED, 2009). Several accrediting bodies consider research as a fundamental element during the accreditation process. The academic reputation of professors in academic institutions is based on their capacity to conduct scientific research and to contribute new knowledge, ideas, and learnings that will advance current procedures, methods, and strategies. Research output is one of the accreditation standards in evaluating programs and institutions, as well as the professional growth of Faculty.

However, despite the initiatives and parameters from the Commission on Higher Education (CHED), the Association of Accredited Chartered Colleges and Universities of the Philippines (AACCUP), and other accrediting bodies, research culture in academe is still weak due to a lack of research skills and knowledge training for instructors, as well as poor and inadequate research in higher education. Some research proposals are simply that: proposals. They are never carried out. Some of the research findings are presented at scientific conferences. However, they are not published in peer-reviewed journals or used for development, institutional change, or innovation and commercialization. Faculty attitudes toward research play a significant role in their research success, which can, in turn, affect the institution's overall research productivity (Maravilla, 2020). Positive attitudes toward research are associated with enhanced research output and academic performance, while negative attitudes can hinder learning and limit research contributions (Ahmed et al., 2010; Waters et al., 1988; Zeidner, 1991). Several studies have confirmed that faculty members possess varying research skills, and their attitudes toward research significantly influence their engagement and output (Dinagsao, 2013; Sahan & Tarhan, 2015; Basilio & Bueno, 2019).

Thus, fostering research competence and positive research attitudes is essential for empowering faculty members to contribute meaningfully to their institutions and academic knowledge. Research competency must be cultivated through experience and continuous skill-building opportunities, as it forms a foundational pillar for institutional progress and innovation. Faculty members have an important role in the publication of scientific papers. Their competence and attitude in carrying out research activities help determine academic research output. Given these challenges and the essential role competence and attitude play in research productivity, this study aimed to determine the research competence and attitude toward faculty members' research in State Universities and Colleges (SUCs) in Iloilo.

2.0 Methodology

2.1 Research Design

This study employs a descriptive-correlational research design, utilizing a quantitative approach to assess the research competence, engagement in research activities, and attitudes toward research among faculty members at State Universities and Colleges in the Province of Iloilo.

2.2 Research Locale

The study was conducted at four State Universities and Colleges in the Province of Iloilo: Iloilo State College of Fisheries, Iloilo Science and Technology University, Northern Iloilo Polytechnic College, and West Visayas State University.

2.3 Research Respondents

This study's respondents consisted of 256 permanent faculty members from the main campuses of four State Universities and Colleges (SUCs) in Iloilo: Iloilo State College of Fisheries, Iloilo Science and Technology University, Northern Iloilo Polytechnic College, and West Visayas State University for the school year 2020-2021. The respondents were categorized based on variables such as years of teaching experience and b) a number of research-related training.

2.4 Research Instruments

The study used a researcher-made questionnaire as the research instrument. Data collection used the researcher-made questionnaire that was distributed to the respondents and served as the primary instrument. The research instrument was subjected to validation and reliability testing. Experts in research and guidance counselors conducted the validation. These experts examined each item to confirm its relevance, clarity, and appropriateness in capturing the constructs under study. Their feedback helped refine the instrument to ensure it accurately measured the research competence and attitude toward faculty research. The instrument's reliability was assessed using Cronbach's alpha, resulting in a score of 0.86, demonstrating that the instrument is reliable.

2.5 Data Gathering Procedure

The campus Administrators of the four SUCs in the Province of Iloilo granted approval to conduct the study. Once approval was obtained, the researchers either sent the data collection instrument via email or personally administered it. Office staff were asked to distribute the questionnaires when respondents were unavailable for face-to-face administration. Data was collected during a subsequent visit. For online administration, responses were gathered via Google Forms. Telephone and social media chat interviews were also conducted to support the quantitative data further.

2.6 Data Analysis Procedure

The collected data were encoded, tallied, and analyzed using SPSS version 21, using descriptive and inferential statistical methods. For descriptive analysis, the mean and standard deviation were used to assess the levels of research competence, involvement, and attitudes toward research among faculty members in SUCs while also measuring the homogeneity of responses. Inferential analysis involved t-tests and one-way ANOVA to determine differences in research competence, involvement, and attitudes based on different factors. Pearson's r correlation was applied to explore the relationships between research competence, involvement, and attitudes. A .05 alpha significance level was used as the criterion for accepting or rejecting the null hypotheses.

2.6 Ethical Considerations

Before administering the questionnaire, the researcher obtained permission from the Presidents of the respective State Universities and Colleges to conduct the study. Ethical considerations were prioritized, as professionals were involved as respondents. Respondents were assured that their responses would remain confidential, a guarantee explicitly stated in the Letter to Respondents. The researcher respected the participants' rights, needs, values, and preferences and exercised caution when posing questions that might evoke sensitive or personal responses. Great care was taken to ensure transparency and integrity in discussing the methods, procedures, and reporting of results. All study-related records were properly archived, including data collection, research design, and communication with agencies.

3.0 Results and Discussion

3.1 Research Competence of Faculty in SUCs

In terms of Years of Teaching Experience

Results in Table 1 reveal that when classified as to years of teaching experience, Faculty who have less than 10 years of experience (M = 3.86, sd = 0.56), 10 – 20 years of experience (M = 3.85, sd = 0.67), 21 – 30 years of experience (3.91, sd = 0.61), and those with experience of 31 years and above (M = 4.02, sd = 0.51) were "Competent." All four groups were "Competent" in Basic Skills, Problem-solving, and Critical Thinking Skills; Dissemination of Research Results; Function of Faculty Researcher in SUCs; and Other Relevant Key Competencies.

Table 1. Mean results on the level of research competence of faculty in SUCs when classified as to years of teaching experience

Category	Less than 10 years				10 – 20 years			
	n	**Mean**	**sd**	**Description**	**n**	**Mean**	**sd**	**Description**
As a whole	77	3.86	0.56	Competent	95	3.85	0.67	Competent
Basic Skills	77	4.03	0.60	Competent	95	3.97	0.64	Competent
Problem-solving and Critical Thinking Skills	77	3.78	0.72	Competent	95	3.93	0.76	Competent
Dissemination of Research Results	77	3.82	0.62	Competent	95	3.81	0.76	Competent
Function of Faculty Researcher in SUCs	77	3.79	0.67	Competent	95	3.72	0.77	Competent
Other Relevant Key Competencies	77	3.89	0.60	Competent	95	3.81	0.75	Competent

Category	21 – 30 years				31 years and above			
	n	**Mean**	**sd**	**Description**	**n**	**Mean**	**sd**	**Description**
As a whole	52	3.91	0.61	Competent	32	4.02	0.51	Competent
Basic Skills	52	3.99	0.63	Competent	32	4.06	0.53	Competent
Problem-solving and Critical Thinking Skills	52	4.00	0.64	Competent	32	4.13	0.53	Competent
Dissemination of Research Results	52	3.84	0.66	Competent	32	4.00	0.63	Competent
Function of Faculty Researcher in SUCs	52	3.85	0.63	Competent	32	4.02	0.69	Competent
Other Relevant Key Competencies	52	3.87	0.75	Competent	32	3.87	0.58	Competent

Note: 4.21–5.00 Highly Competent; 3.41–4.20 Competent; 2.61–3.40 Moderately Competent; 1.81–2.60 Less Competent; 1.00–1.80 Not Competent

When the total mean per group was assessed, those with less than 10 years and 10-20 years of teaching experience Basic Skills got the highest mean (M = 4.03, sd = 0.60; M = 3.97, sd = 0.6, respectively), while Function of Faculty Researcher in SUCs got the lowest mean (M = 3.79, sd = 0.67; M = 3.72, 0.77, respectively). This means that even the less experienced faculty have the adequate skills to carry out research but need more support in formulating research proposals. For those with 21 – 30 years of teaching experience, Problem-solving and Critical Thinking Skills got the highest mean (M = 4.00, sd = 0.64), while Dissemination of Research Results got the lowest mean (M = 3.84, sd = 0.66). For those with 31 and above years of teaching experience, Problem-solving and Critical Thinking Skills got the highest mean (M = 4.13, sd = 0.53), while Other Relevant Key Competencies got the lowest mean (3.87, sd = 0.58).

These results may be explained in the sense that the faculty with more teaching experience are more equipped with Problem-Solving and Critical Thinking Skills. However, they must also improve their skills in preparing and presenting research results, writing papers for publication, and translating research output to benefit stakeholders or beneficiaries. Experiences in conducting research also enhance research competencies (Mallari & Santiago, 2013).

In terms of Number of Research-Related Training

Data in Table 2 reveal that Faculty with less than 5 (M = 3.66, sd = 0.57) and those with 5-10 research-related training (M = 3.90, sd = 0.60) were "Competent." Those with more than ten research-related training were "Highly Competent." In terms of Basic Skills, those with less than 5 (M =3.84, sd = 0.65) and with 5 – 10 (M = 4.00, sd = 0.58) number of research-related training were "Competent." In contrast, those with more than 10 (M = 4.32, sd = 0.48) number of research-related training were "Highly Competent." The same results were found regarding problem-solving, critical thinking skills, dissemination of results, the function of faculty researchers in SUCs, and other relevant key competencies. This means that more attendance and participation in research-related training activities could result in a higher level of competency. The results conform to the results of Bueno and Basilio (2019), where Master Teachers cannot undertake research due to a lack of training in research-related conferences. These findings are consistent with teacher attendance at research training, i.e., most teachers have not attended research conferences at all levels, from school to international.

Table 2. Mean results on the level of research competence of faculty in SUCs when classified as to the number of research-related training

Category	Less than 5				5-10			
	n	Mean	sd	Description	n	Mean	sd	Description
As a whole	106	3.66	0.57	Competent	88	3.90	0.60	Competent
Basic Skills	106	3.84	0.65	Competent	88	4.00	0.58	Competent
Problem-solving and Critical Thinking Skills	106	3.65	0.72	Competent	88	3.96	0.68	Competent
Dissemination of Research Results	106	3.58	0.60	Competent	88	3.87	0.70	Competent
Function of Faculty Researcher in SUCs	106	3.58	0.66	Competent	88	3.80	0.70	Competent
Other Relevant Key Competencies	106	3.64	0.62	Competent	88	3.85	0.70	Competent

Category	More than 10			
	n	Mean	sd	Description
As a whole	62	4.26	0.49	Highly Competent
Basic Skills	62	4.32	0.48	Highly Competent
Problem-solving and Critical Thinking Skills	62	4.30	0.52	Highly Competent
Dissemination of Research Results	62	4.25	0.58	Highly Competent
Function of Faculty Researcher in SUCs	62	4.20	0.64	Competent
Other Relevant Key Competencies	62	4.21	0.62	Highly Competent

Note: 4.21–5.00 Highly Competent; 3.41–4.20 Competent; 2.61–3.40 Moderately Competent; 1.81–2.60 Less Competent; 1.00–1.80 Not Competent

The teacher's capability to conduct research is enhanced by attending research-related events. Likewise, knowledge and attitude toward research are other factors that contribute to research capability at 66% variance (Wong, 2019). Li et al. (2019) pointed out that time, teamwork, administrative support, and attendance to training activities are some factors that influence the research capability of nurses with a master's degree. As to Aziz and Akhtar (2014), trained faculty demonstrated a considerable difference in their pedagogical, management, assessment, and research competencies. Even though thesis writing is a requirement for master's degree recipients, it is possible that if it is just done once and is not practiced frequently, it will not necessarily translate into superior research skills (Wong, 2019).

3.2 Attitude Toward Research of Faculty in SUCs

In terms of Years of Teaching Experience

Results in Table 3 show that Faculty in SUCs exhibit a "Positive" attitude toward research in all categories except for Research Anxiety. Faculty with less than 10 years and 10-20 years of teaching experience assessed themselves to have a "Negative" attitude regarding Research Anxiety (M = 3.0, sd = 0.95). This means these groups are less anxious and confident in analyzing data; they are not afraid that their research proposals will get rejected. Moreover, they do not find research to be exhausting, and they do not have difficulty understanding the concept of research. The results agree with Maravilla (2020), who reported that teachers who taught 0-10 years were more research-oriented, more influenced by rewards for research, more personally interested in research, and more perceptive of research use. This finding is understandably associated with the results regarding age, as young professionals usually have fewer teaching years. Moreover, this finding suggests that those teachers who had just started their careers were more optimistic about the research. The study of Shafqat et al. (2018) also revealed that university Faculty have no anxiety or fear about research. They did not find research stressful or unsettling, although a considerable percentage did.

Table 3. Mean results on the attitude toward research of faculty in SUCs when classified as to years of teaching experience

Category	Less than 10 years				10 – 20 years			
	n	Mean	sd	Description	n	Mean	sd	Description
As a whole	77	4.14	0.53	Positive	95	4.04	0.45	Positive
Research Orientation	77	4.22	0.60	Positive	95	4.20	0.66	Positive
Rewards Influence Research	77	4.30	0.62	Positive	95	4.23	0.66	Positive
Personal Motivation	77	4.15	0.65	Positive	95	4.02	0.71	Positive
Mission of College/ University	77	4.48	0.60	Positive	95	4.43	0.70	Positive
Utilization of Research	77	4.37	0.61	Positive	95	4.26	0.73	Positive
Research Anxiety	77	2.92	0.95	Negative	95	2.94	0.73	Negative

Category	21 – 30 years				31 years and above			
	n	Mean	sd	Description	n	Mean	sd	Description
As a whole	52	4.11	0.60	Positive	32	4.03	0.43	Positive
Research Orientation	52	4.31	0.60	Positive	32	4.31	0.62	Positive
Rewards Influence Research	52	4.27	0.60	Positive	32	4.19	0.80	Positive
Personal Motivation	52	4.16	0.57	Positive	32	4.17	0.65	Positive
Mission of College/ University	52	4.50	0.51	Positive	32	4.69	0.42	Positive
Utilization of Research	52	4.43	0.53	Positive	32	4.48	0.41	Positive
Research Anxiety	52	3.07	1.09	Positive	32	3.10	0.91	Positive

Note: 3.01–5.00 Positive; 1.00-3.00 Negative
The items in Research Anxiety were reversed, i.e., the lower the value, the less anxious the respondent was.

In terms of Number of Research-Related Training

When classified as the number of research-related training, all groups exhibit a "Positive" attitude toward research in all categories except Research Anxiety. As shown in Table 4, those with less than 5 and with 5 – 10 research-related training show a "Negative Attitude" (M = 2.90, sd = 0.86, M = 292, sd = 0.84, respectively). This indicates that faculty who have attended research-related training tend to embrace research. However, those with less than 10 participants in research-related training find research difficult. They feel exhausted from research and are not confident in analyzing research data. The findings are consistent with Wa-Mbaleka (2015), who noted that a lack of training in research publication is one of the reasons faculty are unable to publish, along with lack of time, fear of rejection, lack of enthusiasm, faculty laziness, financial constraints, and institutional support.

Table 4. Mean results on the attitude toward the research of faculty in SUCs when classified as to the number of research-related training

Category	Less than 5				5-10			
	n	Mean	sd	Description	n	Mean	sd	Description
As a whole	108	4.04	0.56	Positive	88	4.08	0.46	Positive
Research Orientation	108	4.07	0.66	Positive	88	4.24	0.59	Positive
Rewards Influence Research	108	4.13	0.70	Positive	88	4.30	0.61	Positive
Personal Motivation	108	3.95	0.68	Positive	88	4.07	0.64	Positive
Mission of College/University	108	4.32	0.58	Positive	88	4.53	0.69	Positive
Utilization of Research	108	4.17	0.60	Positive	88	4.42	0.69	Positive
Research Anxiety	108	2.90	0.86	Negative	88	2.92	0.84	Negative

Category	More than 10			
	n	Mean	sd	Description
As a whole	62	4.17	0.46	Positive
Research Orientation	62	4.53	0.48	Positive
Rewards Influence Research	62	4.39	0.61	Positive
Personal Motivation	62	4.42	0.53	Positive
Mission of College/University	62	4.74	0.40	Positive
Utilization of Research	62	4.58	0.46	Positive
Research Anxiety	62	3.52	1.04	Positive

Note: 3.01–5.00 Positive; 1.00-3.00 Negative
The items in Research Anxiety were reversed, i.e., the lower the value, the less anxious the respondent was.

3.3 Difference in the Research Competence

In terms of Years of Teaching Experience

A one-way Analysis of Variance (ANOVA) was carried out to measure the difference in the research competence of the faculty when classified as to years of teaching experience. The results in Table 5 show no significant difference that existed in the level of research competence in terms of Basic Skills (F = 0.605, p = 0.612), Problem-solving, and Critical Thinking Skills (F = 1.598, p = 0.190), Dissemination of Research Results (F= .674, p = 0.568); Function of Faculty Researcher in SUCs (F = 1.559, p = 0.200); and Other Relevant Key Competencies (F = .208, p = 0.891). Thus, the null hypothesis states that there is no significant difference in the research competence of Faculty in SUCs in terms of basic skills, problem-solving, and critical thinking skills; dissemination of research results; function of faculty researchers in SUCs; and other relevant key competencies when classified as to years of teaching experience is not rejected. This means that the length of teaching experience is not a significant factor in determining the research competence of faculty in SUCs.

Table 5. One-way ANOVA results on the difference in the research competence of faculty in SUCs in terms of years of teaching experience

Category		Sum of Squares	df	Mean Square	F	Sig.
Basic Skills	Between Groups	0.688	3	0.229	0.605	0.612
	Within Groups	95.40	252	0.379		
	Total	96.09	255			
Problem-solving and Critical Thinking Skills	Between Groups	2.364	3	0.788	1.598	0.190
	Within Groups	124.2	252	0.493		
	Total	126.5	255			
Dissemination of Research Results	Between Groups	0.950	3	0.317	0.674	0.568
	Within Groups	118.2	252	0.469		
	Total	119.2	255			
Function of Faculty Researcher in SUCs	Between Groups	2.325	3	0.775	1.559	0.200
	Within Groups	125.2	252	0.497		
	Total	127.5	255			
Other Relevant Key Competencies	Between Groups	0.292	3	0.097	0.208	0.891
	Within Groups	118.1	252	0.469		
	Total	118.4	255			

p>.05, not significant

This result agrees with the results of Aspiras (2019), which revealed no significant difference in the research competence of the faculty when measured as to the number of years in service. As to the experience as a researcher, the research and knowledge of those with less than 5 years of experience are significantly lower than those with more than 6-10 years or those with more than 10 years of experience in research. According to Caingcoy (2020), low, negative, significant differences existed between teachers' research performance, age, and length of service. As a result, their competency declines as they gain years of experience. Motivation, research productivity, and age are some factors that can help identify and predict the research capability of faculty. Furthermore, age, faculty rank, research-related training, conduct of research, and research involvement affect the research competence of master teachers (Wong, 2019).

In terms of Number of Research-Related Training

Table 6 shows a one-way Analysis of Variance results on the test for significant differences in research competence when the faculty are classified according to the number of research-related training sessions. Results revealed that there was no significant difference in the level of research competence in terms of Basic Skills (F = 13.117, p = 0.000), Problem-solving, and Critical Thinking Skills (F = 18.814, p = 0.000), Dissemination of Research Results (F= 22.246, p = 0.000); Function of Faculty Researcher in SUCs (F = 17.162, p = 0.000); and Other Relevant Key Competencies (F = 14.908, p = 0.000). Thus, the null hypothesis states that there is no significant difference in the research competence of Faculty in SUCs in terms of basic skills, problem-solving, and critical thinking skills, dissemination of research results, the function of faculty researchers in SUCs, and other relevant key competencies when classified as to the number of research-related training is rejected. This means that the number of research-related training determines the research competence of faculty in SUCs. This result is in contrast with the study of Narag et al. (2016), which reported that training attended by faculty members does not affect their research capabilities.

Table 6. One-way ANOVA results on the difference in the research competence of faculty in SUCs in terms of the number of research-related training

Category		Sum of Squares	df	Mean Square	F	Sig.
Basic Skills	Between Groups	9.028	2	4.514	13.11	.000
	Within Groups	87.06	253	0.344		
	Total	96.09	255			
Problem-solving and Critical Thinking Skills	Between Groups	16.38	2	8.194	18.81	.000
	Within Groups	110.1	253	0.436		
	Total	126.5	255			
Dissemination of Research Results	Between Groups	17.83	2	8.915	22.24	.000
	Within Groups	101.3	253	0.401		
	Total	119.2	255			
Function of Faculty Researcher in SUCs	Between Groups	15.24	2	7.621	17.16	.000
	Within Groups	112.3	253	0.444		
	Total	127.5	255			
Other Relevant Key Competencies	Between Groups	12.48	2	6.243	14.90	.000
	Within Groups	105.9	253	0.419		
	Total	118.4	255			

p>.05, not significant

Based on Table 7, Post-hoc comparisons using the Scheffe test for multiple comparisons found that the mean score of Basic Skills for Research-related Training of more than 10 was significantly different from less than 5 (MD=-.480, p= .000) and 5-10 (MD= -.312, p= 0.007).

Table 7. Post hoc tests multiple comparisons; Scheffe test for research competence in terms of the number of research-related training

Dependent Variable	(I) Research-Related Training	(J) Research-Related Training	Mean Difference (I-J)	Sig.
Basic Skills	less than 5	5-10	-0.169	0.139
		more than 10	-0.480*	0.000*
	5-10	more than 10	-0.312*	0.007*
Problem-Solving and Critical Thinking Skills	less than 5	5-10	-0.304*	0.007*
		more than 10	-0.642*	0.000*
	5-10	more than 10	-0.338*	0.009*
Dissemination of Research Results	less than 5	5-10	-0.285*	0.008*
		more than 10	-0.674*	0.000*
	5-10	more than 10	-0.389*	0.001*
Function of Faculty Researcher in SUCs	less than 5	5-10	-0.216	0.082
		more than 10	-0.624*	0.000*
	5-10	more than 10	-0.408*	0.001*
Other Relevant Key Competencies	less than 5	5-10	-0.213	0.076
		more than 10	-0.565*	0.000*
	5-10	more than 10	-0.352*	0.005*

From the Scheffe Multiple Comparison, the mean score of Problem-Solving and Critical Thinking Skills and Dissemination of Results for Research-related Training was significantly different for all variables. Results of the Post-hoc comparisons using the Scheffe test revealed that the mean score of Function of Faculty Researchers in SUCs for Research-related Training of more than 10 was significantly different from less than 5 (MD=-.6240, p= .000) and 5-10 (MD= -.408, p= .001). Finally, the Scheffe test indicated that the mean score for other relevant key competencies for more than ten research-related training was significantly different from that with less than 5 (MD=-.565, p= .000) and 5-10 (MD=- 0.352, p= .005)

3.4 Difference in the Attitude Toward Research

In terms of Years of Teaching Experience

Table 8 shows the one-way Analysis of Variance (ANOVA) results on the attitude toward the research of faculty in SUCs toward research in terms of research orientation, rewards that influence research, personal motivation, mission of college/university, utilization of research, and research anxiety when classified as to years of teaching experience. Results revealed no significant difference existed in the attitude toward research of faculty in SUCs in terms of Research Orientation (F = .525, p = 0.666), Rewards Influence Research (F = .289, p = 0.834), Personal Motivation (F = .812 p = 0.488), Mission of College/University (F = 1.586, p = 0.193), Utilization of Research (F = 1.444, p = 0.231), and Research Anxiety (F = .355, p = 0.785). Thus, the null hypothesis states that there is no significant difference in the attitude of faculty in SUCs toward research in terms of research orientation, rewards that influence research, personal motivation, mission of college/university, utilization, and research anxiety when classified as to years of teaching experience is not rejected. This means that years of teaching experience are not a significant factor in determining the attitude toward the research of Faculty in SUCs.

Table 8. One-way ANOVA results on the difference in the attitude toward research of faculty in SUCs when classified as to years of teaching experience

Category		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	0.611	3	0.204	0.525	0.666
Research Orientation	Within Groups	97.84	252	0.388		
	Total	98.45	255			
	Between Groups	0.373	3	0.124	0.289	0.834
Rewards Influence Research	Within Groups	108.5	252	0.431		
	Total	108.9	255			
	Between Groups	1.058	3	0.353	0.812	0.488
Personal Motivation	Within Groups	109.4	252	0.435		
	Total	110.5	255			
	Between Groups	1.743	3	0.581	1.586	0.193
Mission of College/ University	Within Groups	92.31	252	0.366		
	Total	94.05	255			
	Between Groups	1.683	3	0.561	1.444	0.231
Utilization of Research	Within Groups	97.92	252	0.389		
	Total	99.61	255			
	Between Groups	0.867	3	0.289	0.355	0.785
Research Anxiety	Within Groups	205.04	252	0.814		
	Total	205.91	255			

p>.05, not significant

Maravilla (2020) reported that teachers who taught 0-10 years were more research-oriented, more influenced by rewards for research, more personally interested in research, and more perceptive of research use. This finding is understandably associated with the results regarding age, as young professionals usually have fewer teaching years. This finding also suggests that those teachers who just started their careers were more optimistic about research and thus should be supported. Aspiras (2019) reported that no significant difference existed in the research motivation of the faculty when classified by the number of years in service.

In terms of Number of Research-Related Training

Table 9 shows the one-way ANOVA results on the test for significant differences in the attitude toward faculty research in SUCs when classified as to the number of research-related training. Results showed significant difference existed in the attitude toward research of faculty in SUCs in terms of Research Orientation (F = 11.291 p = 0.000), Rewards Influence Research (F = 3.476, p = 0.032), Personal Motivation (F = 11.77 p = 0.000), Mission of College/University (F = 10.331, p = 0.000), Utilization of Research (F = 9.520, p = 0.000), Research Anxiety (F =

9.723, p = 0.000). Thus, the null hypothesis states that there is no significant difference in the attitude of faculty in SUCs toward research in terms of research orientation, rewards that influence research, personal motivation, mission of college/ university, utilization of research, and research anxiety when classified as to the number of research-related training is rejected. This means that the amount of research-related training is significant in determining the attitude toward faculty research in SUCs.

Table 9. One-way ANOVA results on the difference in the attitude toward research of faculty in SUCs when classified as to the number of research-related training

Category		Sum of Squares	df	Mean Square	F	Sig.
Research Orientation	Between Groups	8.068	2	4.034	11.29	0.000
	Within Groups	90.39	253	0.357		
	Total	98.45	255			
Rewards Influence Research	Between Groups	2.913	2	1.457	3.476	0.032
	Within Groups	106.0	253	0.419		
	Total	108.9	255			
Personal Motivation	Between Groups	9.049	2	4.524	11.27	0.000
	Within Groups	101.5	253	0.401		
	Total	110.5	255			
Mission of College/ University	Between Groups	7.101	2	3.551	10.33	0.000
	Within Groups	86.95	253	0.344		
	Total	94.05	255			
Utilization of Research	Between Groups	6.972	2	3.486	9.520	0.000
	Within Groups	92.64	253	0.366		
	Total	99.61	255			
Research Anxiety	Between Groups	17.80	2	8.902	9.723	0.000
	Within Groups	231.6	253	0.916		
	Total	249.4	255			

p<.05, significant

As shown in Table 10, Post-hoc comparisons using the Scheffe test indicated the mean score of research orientation for several research-related training of more than 10 was significantly different from less than 5 (MD=-.454, p=.000), and 5-10 (M=-.283, p=.018). From the Scheffe multiple comparisons, a significant difference existed in the mean score of the Number of Research-Related Training of more than 10 and less than 5 (M=-.258, p=.046). Multiple comparisons also show that the mean score of personal motivation for several Research-Related Training of more than 10 was significantly different from less than 5 (M=-.477, p=.000) and 5-10 (M=-.350, p=.004).

Table 10. Post hoc tests multiple comparisons; Scheffe test for attitude toward research in terms of several research-related training.

Dependent Variable	(I) Research-Related Training	(J) Research-Related Training	Mean Difference (I-J)	Sig.
Research Orientation	less than 5	5-10	-0.171	0.140
		more than 10	-0.454*	0.000
	5-10	more than 10	-0.283*	0.018
Rewards Influence Research	less than 5	5-10	-0.168	0.200
		more than 10	-0.258*	0.046
	5-10	more than 10	-0.090	0.702
Personal Motivation	less than 5	5-10	-0.127	0.379
		more than 10	-0.477*	0.000
	5-10	more than 10	-0.350*	0.004
Mission of College/ University	less than 5	5-10	-0.212*	0.045
		more than 10	-0.420*	0.000
	5-10	more than 10	-0.208	0.103
Utilization of Research	less than 5	5-10	-0.242*	0.022
		more than 10	-0.407*	0.000
	5-10	more than 10	-0.165	0.262
Research Anxiety	less than 5	5-10	-0.016	0.993
		more than 10	-0.623*	0.000
	5-10	more than 10	-0.607*	0.001

For the Mission of the College/University, the mean score of the Number of Research-Related Training of more than 10 was significantly different from less than 5 (M=-.477, p=.000) and 5-10 (M=-.350, p=.004. For research utilization, the mean scores of Number of Research-Related Training of 5-10 and more than 10 significantly differed from less than 5 (M=-.242, p=.022; M=-.407, p=.000, respectively). For research anxiety, the mean score of several research-related training of more than 10 was significantly different from less than 5 (M=.623, p=.000).

3.5 Relationship Between Research Competence and Attitude Toward Research

Table 11 shows Pearson's r Test for a significant relationship between research competence and the attitude toward faculty research in SUCs. Results show no significant relationship between research competence and attitude toward research of faculty in SUCs. Furthermore, the results show a very low or negligible correlation between the two variables, r = 0.106, n = 256, p = 0.090. Thus, the null hypothesis that there is no significant relationship between the research competence and attitude toward the research of faculty in SUCs is not rejected. Research competence does not affect the faculty's attitude toward research.

Table 11. Pearson's r results on the relationship between the research competence and the attitude toward research of faculty in SUCs

		Attitude toward Research
Research Competence	Pearson Correlation	0.106
	Sig. (2-tailed)	0.090
	n	256

Note: **. Correlation is significant at the 0.05 level (2-tailed).

The findings contradict prior research findings of Manongsong et al. (2018), which found a favorable and significant association between faculty's research competence and their attitudes (motivation) toward research. According to Wong (2019), there is a significant relationship between the research capability of Master Teachers and the value of research to the faculty's profession, research anxiety, positive attitude toward research, the relevance of research to everyday life, the difficulty of research, knowledge of research, mentoring, financial assistance, research facilities and resource materials, and rewards. Correlations between attitude toward research and research capability showed a relationship between the two variables (Wong, 2019).

4.0 Conclusions

This study attempted to determine the research competence and attitude toward research of faculty in SUCs in Iloilo. The faculty is "Competent" in basic skills, problem-solving, critical thinking skills, dissemination of research results, the function of faculty researcher in SUCs, and other relevant vital competencies. The Faculty in SUCs have a "Positive" attitude toward research. They have a negative attitude toward Research Anxiety, which means that they feel that research is not complex and they are less anxious about research. No significant difference existed in the Faculty's research competence in SUCs regarding fundamental skills, problem-solving, and critical thinking skills; research results in dissemination, faculty researcher's function in SUCs, and other relevant key competencies when classified as years of teaching experience.

The research competence significantly differed regarding Basic Skills, Problem-solving and Critical Thinking Skills, Dissemination of Research Results, Function of Faculty Researchers in SUCs, and Other Relevant Key Competencies when classified as research-related training. The number of research-related training determines the research competence of faculty in SUCs. The attitude toward research was not significantly different regarding Research Orientation, Rewards Influence Research, Personal Motivation, Mission of College/University, Utilization of Research, and Research Anxiety when classified as years of teaching experience. When classified as the number of research-related training, Significant differences existed in the attitude toward research regarding Research Orientation, Rewards Influence Research, Personal Motivation, Mission of College/University, Utilization of Research, and Research Anxiety. This means that the amount of research-related training significantly determines the attitude toward faculty research in SUCs. Research competence and attitude toward research of faculty in SUCs were not significantly correlated. Furthermore, the two variables had a very low or negligible correlation.

5.0 Contribution of Authors

This is sole authorship. There is no co-author in this study.

6.0 Funding

This research was carried out as part of the authors' dissertation, and the author personally funded the study.

7.0 Conflict of Interests

The author declares that there are no conflicts of interest regarding the publication of this paper.

8.0 Acknowledgment

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Preventing Outbreaks: Approaches to Swine Disease Detection and Treatment in Buenavista, Guimaras, Philippines

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Abstract. This study utilized a descriptive design employing the quantitative method to analyze data using frequency counts and percentages to assess swine management practices among fifty swine raisers in Buenavista, Guimaras. Surprisingly, 6% of the herd was diagnosed with African Swine Fever (ASF), while 90% showed no symptoms, suggesting good overall health. However, relying solely on external indicators may miss preclinical cases or asymptomatic carriers. Notably, 70% of the pigs received no treatment, raising concerns about the medical practices employed. Furthermore, in 70% of cases, the type or purpose of medication was not documented, and 74% had no recorded treatment expenses, highlighting gaps in disease management and financial tracking. These findings align with previous research suggesting that swine treatment practices are inadequate or poorly documented.

Keywords: Dewormer; Disease surveillance; Illness; Medication; Pig health; Prevention.

1.0 Introduction

Prompt detection of illnesses in pigs is crucial for maintaining herd health, ensuring food security, and mitigatin g economic losses in the swine industry. The timely detection of infections such as African Swine Fever (ASF) and other respiratory ailments is crucial since they can result in considerable morbidity and mortality among pig populations. A primary benefit of early disease detection is the ability to implement swift measures that can prevent the spread of illnesses across populations. Postmortem diagnostics have been shown to enhance disease surveillance and facilitate the early detection of novel animal diseases and zoonoses (Schediwy et al., 2018). This proactive technique enables the identification of disease patterns and the implementation of control measures before outbreaks intensify, thus protecting the health of both animals and humans (Balmer et al., 2015). Research indicates that studying cough sounds can effectively detect respiratory disorders, enabling prompt management measures (Song et al., 2022; Chung et al., 2013). This technology enables the identification of unhealthy animals while reducing reliance on pharmaceuticals, hence alleviating concerns over antimicrobial resistance in cattle (Jorquera-Chavez et al., 2020).

Identifying diseases in Guimaras is crucial, particularly for public health and managing infectious diseases. Effective disease detection systems are essential for promptly identifying outbreaks, which can significantly reduce morbidity and mortality rates associated with infectious diseases. Given Guimaras's unique geographical and socioeconomic conditions, implementing robust disease surveillance systems is crucial for safeguarding public health. An essential benefit of disease detection is the ability to monitor and respond to epidemics promptly.

Public health surveillance systems are designed to systematically collect, analyze, and interpret health data, enabling health authorities to identify trends and detect fluctuations in disease incidence (Birkhead et al., 2015). In regions like Guimaras, where resources may be limited, establishing efficient monitoring systems could allow for the swift detection of disease outbreaks, enabling suitable public health interventions (Halliday et al., 2012). This is particularly relevant to zoonotic diseases, which are prevalent in tropical regions and can present significant public health threats (Vrbova et al., 2010; Salyer et al., 2017).

Moreover, behavioral monitoring technology, such as automated tracking systems, can provide substantial insights into the health status of individual pigs. Farmers can detect health problems early and take necessary actions to mitigate losses by observing deviations from standard behavior patterns (Cowton et al., 2019; Tran & Thanh, 2023). This tailored monitoring is essential for enhancing animal welfare and optimizing production efficacy. The importance of immunization and biosecurity measures must be recognized in conjunction with technical advancements. Vaccination programs are crucial for controlling outbreaks of diseases like ASF, which can significantly affect pig populations and disrupt food supply chains (Colomer et al., 2020). Implementing robust biosecurity measures with early detection strategies builds a formidable defense against disease outbreaks, safeguarding the swine sector. Hence, this study.

2.0 Methodology

2.1 Research Design

A descriptive research design was used, employing the quantitative method in analyzing data using frequency counts and percentages. A Universities Federation for Animal Welfare (UFAW) (2022) questionnaire was adapted and used as a data-gathering tool. The one-on-one interview was conducted to ensure the accuracy of the answers given by the interviewees. Moreover, addressing the sensitivity of some questions and the need for clear, sharp, and explicit answers compel the need for a personal interview approach.

2.2 Research Locale

The study's primary focus was the Province of Guimaras' municipality of Buenavista. Buenavista is one of the five towns that make up the Province, situated at the northernmost point of Guimaras Island. The municipality has 36 barangays, 17 of which are on the shore and 19 of which are inland. The classification includes seven (7) urban barangays and 29 rural barangays. Its entire agricultural land area is 6,320.7509 hectares.

2.3 Research Participants

This study used a purposive sampling technique. The respondents were identified based on the list of the raisers from the Department of Agriculture of the Local Government. All recognized swine raisers in the Municipality of Buenavista were study participants.

2.4 Research Instrument

The researcher utilized the Universities Federation for Animal Welfare (UFAW) (2022) questionnaire. The instrument was subjected to the face validation technique, also known as validation by jury opinion. This will require that the test instrument be presented to a jury of experts for their opinion on whether the instrument could gather the needed data as intended. The researchers developed a survey questionnaire with inputs based on interviews and feedback discussion.

2.5 Data Gathering Procedure

The researchers obtained authorization to perform the study using a letter addressed to the relevant municipality office, specifically the Department of Agriculture (DA) office. Consequently, the researchers also issued a letter to the relevant swine raisers. Additionally, the researcher and skilled enumerators interpreted the terms by the dialect the animal raisers spoke when collecting information from the raisers above.

2.6 Ethical Considerations

The author adhered to ethical guidelines when conducting the study and writing the publication. All information, including the respondents' answers and personal identities, has been recorded and handled with extreme confidentiality. The questionnaire material was first discussed to help them comprehend and be aware of the data that would be gathered from their answers. They freely responded to the queries.

3.0 Results and Discussion

3.1 Disease Detection Capabilities

Table 1 shows 3 cases (or 6%) had African Swine Fever (ASF) illness. Due to its high mortality rates in pigs, ASF is a highly contagious viral illness that can have serious economic repercussions. ASF was found in 6% of the studied population, which is concerning because its presence can indicate a possible outbreak or persistent threat in the area. In these situations, vigilance and biosecurity precautions would be crucial to stop the spread. The respiratory ailment, pneumonia, was found in 1 instance (2% of the total), similar to bacterial diarrhea or scouring. Even though it appears less frequently in this data, pneumonia, and diarrhea can still pose serious health risks, especially if environmental factors like poor ventilation or crowded conditions spread, particularly in young piglets. To lessen its consequences, treatment and early detection are crucial.

Table 1. Detected diseases in pigs in the last 6 months were detected by swine raisers

Diseases	Frequency	Percentage
African swine fever	3	6.0
Pneumonia	1	2.0
Bacterial diarrhea/Scouring	1	2.0
No response/ detection	45	90.0
Total	**50**	**100.0**

Interestingly, 45 respondents (90%) had no disease diagnosed for no reaction or detection. This is a favorable indicator, indicating no apparent signs of sickness during the testing period or that most of the pig population in this sample might be in good condition. It is essential to consider whether the detection techniques were sufficient or whether any preclinical or newly developing illnesses might have gone unnoticed. As supported by Zhou et. Al. (2020), rapid detection capability is crucial because it allows swine raisers to implement control measures promptly, thereby reducing the spread of these highly contagious diseases. It implies that rapid detection is critical, enabling swine producers to respond proactively through training to prevent the spread of contagious diseases, ensure healthier populations, and safeguard economic stability.

As shown in Table 2, vomiting, which was noted in 6% of pigs, could be a sign of gastrointestinal problems that could be related to poisons, infections, or nutrition. Coughing may indicate respiratory infections, even though it is only found in 2% of cases. In 2% of the cases, yellowish diarrhea—a crucial sign of gastrointestinal distress—also surfaced. In 90% of situations, the absence of observed signs and symptoms is good for the herd's health. On the other hand, focusing just on outward signs can cause asymptomatic carriers or preclinical illnesses.

Table 2. Detected signs and symptoms in pigs by swine raisers

Diseases	Frequency	Percentage
Vomiting	3	6.0
Coughing	1	2.0
Yellowish diarrhea	1	2.0
No detection	45	90.0
Total	**50**	**100.0**

Swine diseases can lead to significant economic losses due to decreased productivity, increased veterinary costs, and potential market restrictions. For instance, diseases such as Porcine Circovirus Type 2 (PCV2) and African Swine Fever (ASF) have been shown to cause severe economic repercussions in swine production systems (Chen, 2023; Afolabi et al., 2017). Moreover, awareness of disease symptoms among farmers can facilitate early detection and intervention, essential in controlling outbreaks and minimizing losses (Guinat et al., 2016). Understanding the signs and symptoms of swine diseases is crucial for swine raisers, as it directly impacts animal health, farm productivity, and economic viability.

3.2 Treatment Practices

Table 3 of the data indicates that the therapies for the condition were inconsistent over the six months, with higher levels of intervention during some months. Just 30% of the cases received any treatment during the six months, and 70% received no treatment. Treatment rates were mild in March and April (4% and 6%, respectively), but they appeared to rise in May (8%) and July (10%). With only 2% of cases receiving care in June, treatments were significantly dropped.

Table 3. Treatment practices among swine raisers

Date	Frequency	Percentage
March 2023	2	4.0
April 2023	3	6.0
May 2023	4	8.0
June 2023	1	2.0
July 2023	5	10.0
No administration	35	70.0
Total	**50**	**100.0**

Effective disease treatment practices, including timely vaccination and monitoring, are essential to controlling these outbreaks and minimizing their impact on farm operations (Pileri & Mateu, 2016). This implies that there is a low overall rate of treatment administration because of a low rate of disease detection and that many instances have gone unreported or undetected. The increase in rainy months may result from changes in the weather, the size of the herd, or biosecurity procedures.

Table 4 shows that in 30% of cases, medicine was explicitly given to treat an illness. This shows that some swine farmers are taking proactive measures to contain disease outbreaks and are treating afflicted pigs. Even though the percentage is small, it indicates that some people place a high value on pig health and disease control. The data is consistent with past findings that more treatment interventions occurred in some months (such as May and July). The data's most alarming finding is that, in 70% of cases, neither the medication's intended use nor its response were noted.

Table 4. Purpose of medication administered.

Purpose	Frequency	Percentage
Treatment of diseases	15	30.0
No response	35	70.0
Total	**50**	**100.00**

Vaccines and treatments must be administered proactively to control these illnesses and preserve herd health, which in turn affects production and profitability in swine farming (Racewicz et al., 2021). It implies that medication may have been administered in some instances, but the cause for treatment may not have been adequately documented. Inadequate documentation can result in gaps in disease management, making it more challenging to monitor the herd's health and evaluate the efficacy of treatments.

One encouraging indication that some swine raisers are actively managing parasites is that 12% of the instances in Table 5 involved the administration of ivermectin. Twelve percent of the instances involved the administration of other pharmacological medications, suggesting efforts to treat a wider variety of illnesses, such as viral and bacterial infections.

Table 5. Administration of medication

Type	Frequency	Percentage
Ivermectin	6	12.0
Other pharmaceutical drugs	6	12.0
Natural medicines	1	2.0
No response	37	74.0
Total	**50**	**100.00**

When it comes to administering therapies, swine raisers mostly rely on pharmaceutical interventions, as seen by the limited usage of natural medications (2%). 74% of cases had neither a recorded response nor a drug type, which is in line with earlier data that indicated many individuals were not receiving therapy. It is understanding the specific diseases these medications target allows swine raisers to tailor their treatment protocols effectively (Ichinose et al., 2022). It implies that medication administration among raisers depends on understanding the disease and its effectiveness in treating animal ailments.

The information in Table 6 sheds light on how much pigs' treatments cost. Treatments within this price range (1–50) comprise about 12%. These cheap prices probably correspond to modest medical treatments or low-cost prescription drugs, including Ivermectin or generic antibiotics. Treatment costs for five instances (10%) ranged from Php 51 to Php 100. This range may represent the cost of somewhat more expensive drugs or greater dosages, signifying moderate outlays for treating illness.

Table 6. Cost of medication

Cost (Php)	Frequency	Percentage
1-50	6	12.0
51-100	5	10.0
101-200	4	8.0
No response	35	70.0
Total	**50**	**100.00**

In four cases (8%), treatments cost between Php 101 and Php 200. This group has the highest cost, indicating that specific therapies need more substantial intervention or more costly prescription medications. Thirty-five cases, or seventy percent, had no treatment costs recorded. This is consistent with other research showing that most treatment administrations are either lacking or improperly documented in terms of treatment costs. The welfare of pigs is closely linked to their health status, which is influenced by the availability and affordability of medications. Pigs that suffer from untreated health issues may experience pain and distress, leading to compromised welfare and increased veterinary costs due to the need for more intensive care (Ferrari et al., 2021). By ensuring access to affordable medications, farmers can maintain better health standards within their herds, which enhances animal welfare and contributes to improved productivity and reduced costs associated with disease management (Ferrari et al., 2021). This implies that the medications for pigs are available in the community at a very affordable price, resulting in affordable medications.

4.0 Conclusion

Raisers in Buenavista, Guimaras, have significant disparities in their swine management practices. Even though 90% of the herd had no apparent symptoms, relying just on symptoms could result in asymptomatic or preclinical infections going unnoticed; this is demonstrated by the fact that 6% of the population had African Swine Fever. The most important discovery is that 70% of the pigs received no therapy, raising questions about adequate healthcare. Furthermore, the same percentage of instances without paperwork about the nature and purpose of medication points to inadequate record-keeping, which is made worse by the fact that 74% of cases need treatment expense information. These results are consistent with more extensive research that suggests better management and documentation are necessary to protect herd health and ensure efficient disease control. They also highlight the need for improved illness detection, treatment procedures, and record-keeping among swine raisers.

5.0 Contributions of Authors

This work has only one author, who performed the writing, editing, data analysis, and encoding.

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7.0 Conflict of Interests

Regarding this paper's research, writing, and publication, the author states they have no conflicts of interest.

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Organizational Culture, Work Performance, and Job Satisfaction Among Private Schools in Los Baños, Laguna, Philippines

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Abstract. This study investigated how private school organizational culture influences employee work performance and job satisfaction. It assessed organizational culture, work performance, and job satisfaction levels and correlated these factors. Understanding these dynamics is essential for improving working environments, supporting staff motivation and engagement, and contributing to private schools' long-term growth and competitiveness. This study employed a descriptive-correlational research design with one hundred thirty-six respondents selected from a population of 175. Results indicated that organizational culture was fully manifested with values (3.36), norms (3.31), beliefs (3.41), and practices (3.30). Work performance was rated very good (3.53), and employees were delighted with their jobs (3.34). A significant relationship was found between organizational culture and work performance ($p < 0.001$), with r values ranging from 0.26 to 0.50, indicating a moderately small positive correlation. Additionally, a significant relationship was observed between organizational culture and job satisfaction ($p < 0.001$), with r values ranging from 0.51 to 0.75, indicating a high positive correlation. These findings imply that fostering a strong organizational culture can significantly enhance work performance and job satisfaction, improving overall organizational effectiveness and employee well-being.

Keywords: Organizational culture; Work performance; Job satisfaction; Private schools; Relationships, Correlation.

1.0 Introduction

Organizations aim to sustain financial success, and organizational culture is a key factor contributing to profitability and long-term performance. A unique culture recognized by major stakeholders can become part of an organization's heritage if it aligns with its values. High output is essential in the fast-paced global economy, and the collective effort of human resources must be managed effectively (Hosseini et al., 2023). Committed and loyal employees are invaluable, tending to be more proactive in achieving organizational goals. Loyalty and a positive attitude are essential to an organization's culture. People are an organization's greatest asset, necessary for growth and fulfilling its mission. Organizational culture significantly influences employee performance, especially in educational institutions. Studies highlight the importance of culture in employee engagement, job satisfaction, and productivity. Kitayama et al. (2022) emphasize that culture impacts employees' feelings about their work, shaping behavior through beliefs, assumptions, and practices. Organizational culture is influenced by history, mission, leadership, values, and employee behaviors, developing through communication, leadership, reward systems, and socialization.

In the Philippine education sector, school organizational culture shapes work dynamics and employee relationships, influencing work performance and job satisfaction. The educational experience at private schools is affected by the performance of teaching and non-teaching staff. Job satisfaction impacts morale and retention rates. Despite its importance, little research has been conducted on how organizational culture affects job satisfaction and output in Philippine private schools. Administrators face challenges ensuring employees are motivated and satisfied, with culture being a significant factor. Barile (2019) posits that culture impacts performance by articulating values into guiding principles. Conversely, dissatisfaction can lead to poor performance. Jendricks (2024) supports this by noting the adverse effects of a poor organizational culture.

Work performance is crucial for private schools' success. High-quality teaching, effective administrative methods, and supportive environments contribute to better student outcomes and long-term sustainability. Investigating the relationship between organizational culture and work performance significantly impacts private schools' growth and competitiveness. Lee and Louis (2019) mention that strong cultures in educational institutions enhance employee engagement and motivation. A positive culture enhances job satisfaction, while a toxic culture leads to burnout and decreased performance. Both teaching and non-teaching staff satisfaction influence educational institutions' performance. Teaching staff satisfaction is linked to fulfillment in imparting knowledge and is influenced by professional development and recognition. Non-teaching staff satisfaction comes from a positive work environment, communication, opportunities for advancement, and recognition (Hill, 2019). High job satisfaction promotes motivation and morale, creating a favorable work environment and better student outcomes.

This study investigated how private school organizational culture influences employee work performance and job satisfaction. It assessed organizational culture, work performance, and job satisfaction levels and correlated these factors. Understanding these dynamics is essential for improving working environments, supporting staff motivation and engagement, and contributing to private schools' long-term growth and competitiveness.

2.0 Methodology

2.1 Research Design

This study employed a descriptive-correlational research design to explore the relationship between organizational culture, work performance, and job satisfaction. This method combines descriptive research, which details the status of respondents, and correlational research, which examines the relationships between variables. According to Creswell (2019), descriptive research gathers data to test hypotheses or answer questions about the present situation, while correlational research assesses the strength and direction of relationships between variables. McCombs (2020) notes that this approach helps identify and explain naturally occurring variables and their correlations.

2.2 Research Locale

The research was conducted at selected private schools in Los Baños, focusing on teaching and non-teaching personnel. These schools were chosen for their accessibility, which facilitated accessible data collection. The survey targeted a broad range of respondents to ensure a comprehensive understanding of organizational culture from various perspectives.

2.3 Research Participants

A simple random sampling technique was used to select respondents from teaching and non-teaching staff. The sample size was determined using an effect size of 0.30, a margin of error of 0.05, and a confidence level of 95%, as calculated with GPower. One hundred thirty-six respondents were selected from a population of 175. This method ensured that the sample was representative of the entire population.

2.4 Research Instrument

The study used a survey questionnaire as the research instrument. The questionnaire had three parts: the first assessed organizational culture (values, norms, beliefs, and practices), the second measured work performance, and the third evaluated job satisfaction. The questionnaire was developed based on relevant literature and studies and validated by experts. Following their feedback, revisions were made. The Cronbach reliability test was conducted to ensure internal consistency. The Cronbach's Alpha for organizational culture, work performance, and job satisfaction indicated that the instrument was reliable.

2.5 Data Gathering Procedure and Analysis

Three schools were distributed hard-copy questionnaires, and one school participated via an online questionnaire. The completed surveys were collected, and responses were tallied and analyzed with the help of a statistician. The data from the surveys were tallied and analyzed using appropriate statistical methods. The average mean and a four-point Likert scale were used to assess organizational culture, work performance, and job satisfaction. The Pearson Product-Moment Correlation Coefficient determined the relationships between these variables.

2.6 Ethical Considerations

Ethical guidelines were strictly followed. Informed consent was obtained from all participants, and anonymity was maintained. The dignity and well-being of respondents were protected, and data were kept confidential, used only for this study, and not shared without consent. The collected information was handled responsibly to prevent any harm to participants.

3.0 Results and Discussion

3.1 Organizational Culture in Private Schools

In terms of Values

As shown in Table 1, values were fully manifested (3.36) in private schools. Furthermore, the "organization promotes professional excellence and operational integrity" yielded the highest mean score of 3.51, verbally interpreted as fully manifested. However, the "organization secures the employees' feeling of expressing opinions and ideas" obtained the lowest computed mean of 3.21 verbally interpreted as manifested.

Table 1. Descriptive statistics of the level of manifestation of organizational culture in private schools in terms of values

Indicators	Mean	Interpretation
1. Promotes a sense of mutual respect and open communication between employees.	3.40	Fully Manifested
2. encourages a positive work-life balance.	3.30	Fully Manifested
3. promotes a clear and well-implemented code of ethics.	3.43	Fully Manifested
4. promotes transparency and fairness in decision-making.	3.32	Fully Manifested
5. promotes professional excellence and operational integrity.	3.51	Fully Manifested
6. employs close relationships with employees and leaders.	3.32	Fully Manifested
7. secures the feeling of expressing my opinions and ideas.	3.21	Manifested
General Assessment	**3.36**	**Fully Manifested**

It shows that the organizational culture of private schools, regarding values, has a clear mission and vision statement incorporating the code of ethics that guides employees in their actions and the fairness of leaders in their decision-making. When the employees perceive that the organization's values match its objective, it helps to strengthen and demonstrate mutual respect and open communication among employees and leaders of the school. Furthermore, the organizational culture has an initiative to promote professional excellence, encouraging employees to learn, grow, and develop continuously. This can include training opportunities, mentorship programs, and performance feedback to help employees enhance their skills, knowledge, and competencies. Similarly, it stated that administrators promote operational integrity, establishing a good culture of trust that develops a pattern among employees, resulting in a good reputation and creating an enjoyable work environment.

To support the study, Simms (2022) noted that a healthy work environment was created by a set of values that were well-defined and put into practice. These values encouraged ethical behavior, collaboration, and goal alignment between the organization and individual employees. Values essentially conveyed to all employees how the company's goals were to be achieved—not in the form of a set of directives, but as behavioral guidelines. The institution's leadership continued to uphold the organization's principles, which included moral and ethical standards. Moreover, the Society for Human Resource Management (2023) stated that shared values fundamentally shaped Organizational Culture. There was no sound or terrible value; firms had to decide which to focus on. Outcome orientation, people orientation, team orientation, stability, innovation, and assertiveness were among these shared values. Values were often separately developed and added to the vision and mission statements.

On the other hand, the organization's ability to secure the employees' feelings by expressing opinions and ideas earned the lowest mean. This indicated that employees may not have felt safe enough to freely share their ideas and opinions due to fear of backlash from management or colleagues. Arieli et al. (2020) added that even a simple misalignment between personal and professional ideals could result in low disposition, disgruntled workers, and eventually more significant turnover rates. Thus, creating a vibrant and long-lasting work atmosphere requires developing and actively maintaining a robust value system.

In terms of Norms

As shown in Table 2, norms were fully manifested (3.31) in private schools. Furthermore, the "organization prioritizes a strong sense of community within the school," and the "organization has principles and daily activities that are well aligned" both attained the highest mean score of 3.38, verbally interpreted as fully manifested. The "organization prioritizes the mental and emotional well-being of the employees" gained the lowest mean of 3.10 verbally interpreted as fully manifested.

Table 2. Descriptive statistics of the level of manifestation of organizational culture in private schools in terms of norms

Indicators	Mean	Interpretation
1. Prioritizes the mental and emotional well-being of the employees.	3.10	Fully Manifested
2. Prioritizes personal and professional development for its employees.	3.34	Fully Manifested
3. Prioritizes a strong sense of community within the school.	3.38	Fully Manifested
4. Prioritizes comprehensive competence in both academic and non-academic operations.	3.37	Fully Manifested
5. Has principles and daily activities that are well aligned.	3.38	Fully Manifested
6. Has employees whom colleagues and supervisors well support.	3.30	Fully Manifested
7. Has employees that have a strong sense of accountability.	3.30	Fully Manifested
General Assessment	**3.31**	**Fully Manifested**

The above findings indicate that the organizational culture of Los Baños' private schools prioritized a strong sense of community and had well-aligned actions and procedures. It denotes a culture that actively focuses on the institution's efforts to develop a supportive and inclusive environment where students, teaching and non-teaching staff, parents, and other stakeholders feel connected, appreciated, and involved. Furthermore, aligning an organization's principles with daily actions can boost employee engagement, motivation, and job satisfaction. Consequently, employees are more likely to feel connected to the school's purpose and values.

In addition, Guerin (2020) noted that establishing explicit norms accelerated interpersonal interaction and procedural processes, which increased efficiency. By guaranteeing polite relationships and encouraging a feeling of unity, they helped support a positive workplace culture. Well-stated norms could also serve as a safety net, reducing conflict and misunderstandings. When the organization's principles and daily activities aligned well with this sense of community, it further strengthened the relationship, boosted morale, and created a cohesive and supportive work environment for all employees. According to Ghosh (2023), these standards served as the inconspicuous framework that defined employee collaboration, interaction, and communication. They fell into two main categories: procedural norms, which specified how tasks were carried out and projects were handled, and behavioral standards, which specified how coworkers should behave toward one another.

In terms of Beliefs

As shown in Table 3, beliefs were fully manifested (3.41) in private schools. The "organization believes in diversity, equity, and inclusion for all employees" attained the highest mean score of 3.49, verbally interpreted as fully manifested. On the other hand, the "organization believes that employees must be recognized and rewarded for their achievements and contributions" gained the lowest mean of 3.37, verbally interpreted as fully manifested.

Table 3. Descriptive statistics of the level of manifestation of organizational culture in private schools in terms of beliefs

Indicators	Mean	Interpretation
1. Believes in diversity, equity, and inclusion for all employees.	3.49	Fully Manifested
2. Believes in open communication and transparency in leadership decisions.	3.38	Fully Manifested
3. Exhibit actions signify they believe employee dedication and commitment are essential to success.	3.42	Fully Manifested
4. Believes employees must be recognized and rewarded for their achievements and contributions.	3.37	Fully Manifested
5. Employees believe in the institution's goal and vision.	3.44	Fully Manifested
6. Employees share a common belief in the value of ethics and integrity.	3.40	Fully Manifested
7. Employees believe the institution gives equal possibilities for growth and advancement.	3.38	Fully Manifested
General Assessment	**3.41**	**Fully Manifested**

The findings indicate that the organizational culture of private schools supports diversity, equity, and inclusion inside the institution. It indicates that organizational value recognizes the different backgrounds, viewpoints, and identities of all employees in the workplace. It also ensures that all school personnel, regardless of background, have equal opportunities for growth, respect, and involvement within the institution. It also suggests that teaching and non-teaching personnel can communicate well despite their different backgrounds. By adopting this culture, the institution aims to develop a more creative, productive, motivated, and supportive work environment for all employees.

Indeed, Ciocirlan et al. (2020) distinguished between two types of beliefs: positive and negative. They noted that positive beliefs, such as a conviction in the company's objective or the importance of teamwork, fostered a more motivated and effective workforce. On the other hand, unfavorable ideas that impeded performance included mistrust of leadership or a pessimistic assessment of prospects for professional growth. Indeed, organizational culture has a significant impact on the workplace environment. Reif et al. (2020) defined workplace beliefs as the core principles and notions that workers had about their jobs, coworkers, and the company. These opinions could be organizational, representing the larger firm culture and ideology, or personal, formed by the experiences and values of the individual.

In terms of Practices

As shown in Table 4, practices were fully manifested (3.30) in private schools. The "organization has consistent and effective compliance with government regulations and requirements" attained the highest mean score of 3.46, verbally interpreted as fully manifested. The "organization has a system that seeks and acts on feedback regularly" gained the lowest mean of 3.22, verbally interpreted as manifested.

Table 4. Descriptive statistics of the level of manifestation of organizational culture in private schools in terms of practices

Indicators	Mean	Interpretation
1. Consistent and effective implementations that apply to all teaching and non-teaching personnel.	3.29	Fully Manifested
2. Consistent and effective evaluation methods to assess employee performance.	3.29	Fully Manifested
3. Consistent and effective human resource management practices that address employees' needs regarding career advancement and employment concerns.	3.24	Manifested
4. Consistent and effective compliance with government regulations and requirements.	3.46	Fully Manifested
5. Consistent and effective management of the maintenance of facilities and improvements inside the premises.	3.28	Fully Manifested
6. Strongly recognized and encouraged teamwork.	3.34	Fully Manifested
7. System that seeks and acts on feedback regularly.	3.22	Manifested
General assessment	**3.30**	**Fully Manifested**

The results infer that the organizational culture in private schools in Los Baños prioritizes consistent and effective compliance with government regulations and requirements. This implies that employees are well-trained regarding relevant laws and standards to ensure adherence. It shows that the processes and procedures are well implemented to monitor and track compliance, with dedicated non-teaching employees overseeing this aspect. This commitment practice demonstrates adherence to legal standards and fosters a culture of integrity and responsibility within the institution.

To support this study, according to Margolis (2023), practices were consistent with the principles and values of a healthy organization's Core Culture. This denoted that the institutions had developed consistent and successful practices to follow. Similarly, Kirti and Goyal (2022) defined workplace practices as the standard operating procedures, methods, and workflows that staff members follow to finish projects and meet company objectives. In like manner, Stefaniak (2020) stated that strong workplace practices were vital in many ways. To begin with, they optimized processes to reduce the waste of time and materials. In addition to facilitating knowledge transfer, standardized methods provided continuity in the event of staff changes and helped new hires quickly pick up on existing procedures. Moreover, clearly defined procedures offered a framework for decision-making, assisting staff members in selecting the best course of action.

3.2 Employees' Work Performance in Private Schools

Table 5 shows employees' work performance in private schools was very good (3.53). The indicator "strive for continuous improvement in the work" obtained the highest mean of 3.66, interpreted as very good. On the other hand, "I am reliable and meet deadlines consistently" obtained the lowest mean of 3.39, which was interpreted as very good. The findings indicate that the employees genuinely commit to personal and professional growth. They denote a proactive approach to seeking opportunities for skill development and innovation within their roles. The employees are also certain in understanding their roles and responsibilities. They are committed to learning, developing, and refining their work to achieve greater results and higher standards. These findings emphasize the importance of individual excellence and collaborative efforts in creating a productive work environment.

Table 5. Descriptive statistics of the level of employees' performance in private schools

Indicators	Mean	Interpretation
1. I demonstrate a strong understanding of my roles and responsibilities.	3.59	Very Good
2. I am reliable and meet deadlines consistently.	3.39	Very Good
3. I effectively utilize available resources to complete their tasks and achieve their goals.	3.52	Very Good
4. I strive for continuous improvement in my work.	3.66	Very Good
5. I have a strong initiative to identify and address problems proactively.	3.45	Very Good
6. I adapt to new situations and changes in the organization's work environment.	3.54	Very Good
7. I exhibit a positive attitude towards students/colleagues/work.	3.49	Very Good
8. I use my newly learned skills appropriately.	3.56	Very Good
9. I exhibit high professionalism in my interactions with students, colleagues, and external stakeholders.	3.55	Very Good
10. I collaborate when needed to achieve common goals.	3.55	Very Good
General Assessment	**3.53**	**Very Good**

To support the result, Manalo et al. (2021) mentioned that human capital was one of the most crucial components that completed any business in every workplace. When their personnel were not operating effectively and appropriately, they could not offer quality goods and services. By appropriately encouraging people, one could improve the caliber of their job. According to Ling et al. (2021), in the educational context of private schools, a supportive organizational culture promotes community, teamwork, and dedication among teaching and staff members. Employee contentment enhanced their propensity to provide original proposals and participate in crucial decision-making. Consequently, when employees were contented and felt integral to the organizational fabric, they were more inclined to offer original solutions and take initiative. This level of engagement and satisfaction profoundly impacted the overall productivity and success of the school. Moreover, positive organizational culture in educational settings helped retain skilled staff, maintaining educational quality and stability. Ultimately, Ling et al. emphasized that fostering such a supportive culture was crucial for nurturing a committed, collaborative workforce in private educational institutions.

Moreover, Mercado's (2023) study unveiled a compelling correlation between an individual's job characteristics and their resultant work performance, garnering commendable ratings across dimensions such as contextual relevance, task specificity, and adaptability. Notably, the research identified a significant association between successful employment outcomes and the inherent attributes of one's work. The data underscored a noteworthy trend suggesting that employees within various institutional settings exhibited heightened levels of workplace efficacy when endowed with exceptional individual work characteristics. This implied that the alignment between an individual's job attributes and the demands of their role played a pivotal role in determining the quality and effectiveness of their performance within the organizational context.

3.3 Employees' Job Satisfaction in Private Schools

Table 6 shows that the employees in private schools were fully satisfied (3.34) with their jobs. " I am proud to be a part of the organization's mission and values" attained the highest mean of 3.54, verbally interpreted as fully satisfied. "I feel valued and appreciated for my contributions" gained the lowest mean of 3.24, verbally interpreted as satisfied.

The findings imply strong pride in connecting with the organization's mission and values. It indicates a strong feeling of alignment, purpose, and satisfaction with their work. This sense of consistency can lead to high dedication, motivation, and loyalty to the institution. Drawing from Taimuri's (2019) study, it became evident that the longevity of employee tenure within organizations was intricately linked to various factors contributing to their overall satisfaction and fulfillment. The presence of a robust reward system, acknowledgment through praise, provision of incentives, opportunities for leadership roles to pursue shared objectives, cultivation of healthy self-esteem, and continuous professional development facilitated by comprehensive training programs and constructive feedback mechanisms all played pivotal roles in enhancing employee retention. Such initiatives validated employees' contributions and empowered them to actively engage in the organizational mission, fostering a mutually beneficial relationship between the individual and the institution. Thus, by nurturing a supportive and rewarding work environment, organizations could cultivate employee loyalty and longevity, ultimately contributing to sustained organizational success and growth.

Table 6. Descriptive statistics of the level of employees' job satisfaction in private schools

Indicators	Mean	Interpretation
1. I have a workload that is fair and manageable.	3.29	Fully Satisfied
2. I have the resources and support to perform my job effectively.	3.30	Fully Satisfied
3. I am fairly compensated for my work.	3.26	Fully Satisfied
4. I feel valued and appreciated for my contributions.	3.24	Satisfied
5. I find my profession worthy and fulfilling.	3.50	Fully Satisfied
6. I am receiving adequate personal and professional development opportunities.	3.28	Fully Satisfied
7. I am satisfied with the work-life balance the organization let me achieve.	3.25	Fully Satisfied
8. I am motivated to perform well in my role.	3.36	Fully Satisfied
9. I am proud to be a part of this organization's mission and values.	3.54	Fully Satisfied
10. I would recommend this organization as a great place to work.	3.38	Fully Satisfied
General Assessment	**3.34**	**Fully Satisfied**

Scott (2023) elucidated the multifaceted nature of job satisfaction, highlighting various additional elements beyond mere financial compensation that significantly influenced overall workplace contentment. These elements encompassed the attainment of a healthy work-life balance, the provision of autonomy in decision-making and task execution, opportunities for professional growth and advancement, acknowledgment through reward and recognition mechanisms, fair remuneration and comprehensive benefits packages, fostering of a positive and supportive work environment, cultivation of interpersonal solid connections among colleagues, and alignment with the organization's core values and mission. Scott emphasized that to attain optimal levels of motivation, engagement, and effectiveness in the workplace, individuals had to find happiness and fulfillment in their roles. This assertion underscored the intrinsic link between job satisfaction and employee performance, affirming the pivotal role of organizational practices and policies in fostering a conducive and rewarding work environment conducive to individual and collective success.

However, BasuMallick's (2021) research emphasized the dynamic nature of employee work satisfaction within a single organization, emphasizing the importance of considering multiple factors. A comprehensive approach to fostering employee satisfaction encompassed several vital elements, including a challenging work environment that encouraged individuals to excel and grow professionally and provided convenience to facilitate productivity. Regular acknowledgment and appreciation from immediate management and the organization was crucial in nurturing a positive work culture. Competitive compensation that ensured employees could maintain a high quality of life was also essential. Moreover, the promise of career advancement opportunities aligned with individual aspirations added further motivation and fulfillment. By addressing these multifaceted aspects, organizations could cultivate a work environment conducive to employee satisfaction, productivity, and overall success.

3.4 Relationship Between Organizational Culture and Work Performance

Table 7 shows a significant relationship between the organizational culture level and the work performance level of employees in private schools. The probability values are all .000, less than the significance level at .05. Thus, the null hypothesis was rejected. The r values lie between 0.26 and 0.50, indicating a moderately small positive correlation between the organizational culture level of manifestation and employees' work performance in private schools.

Table 7. Analysis of the relationship between the organizational culture and work performance

Variables	r value	P value	Remarks	Decision
Values	0.413	0.000	Significant	Reject Ho
Norms	0.505	0.000	Significant	Reject Ho
Beliefs	0.553	0.000	Significant	Reject Ho
Practices	0.541	0.000	Significant	Reject Ho

It indicates that there is a substantial link between the organizational culture level and the work performance level of employees in private schools: the higher the organizational culture level, the higher the level of work performance. The results of the study reveal that the better the organizational culture of the private schools, the higher the work performance of the teaching and non-teaching employees. They tend to be engaged, motivated, and committed to their work. This shows that establishing a positive and supportive organizational culture that determines values, norms, beliefs, and practices can significantly affect and increase employees' overall performance in private schools. Furthermore, a positive culture can boost employee satisfaction, productivity, and dedication to their work.

Awodiji et al., (2021) examined the relationship between organizational features and the job performance of non-teaching staff in educational institutions. It looked at how each organizational component (environment, culture, and performance evaluation) related to the performance of non-teaching staff. A non-experimental design of correlation was employed. The findings showed a strong and positive link between organizational traits and work success. This had the effect of favorably correlating performance reviews, organizational culture, and surroundings with the work performance of non-teaching staff members. Similarly, Iskamto (2023) aimed to research how organizational culture affected employee performance and the factors contributing to a successful organizational culture. In this study, quantitative methodologies were applied. Processing and hypothesis testing were performed using SPSS version 25. The research site was a government building in Riau. Every individual involved in the research was employed at an office. In this study, 35 workers were assessed using a saturated sample, which used the entire population as a sample if the population was less than 100. The results demonstrated that production was significantly impacted by company culture. It was shown that other factors accounted for 73.4% of the difference in employee performance, with organizational culture having a 26.6% impact.

3.5 Relationship Between Organizational Culture and Job Satisfaction

Table 8 shows a significant relationship between the organizational culture level and the work performance level of employees in private schools. The probability values are all .000, which is less than the level of significance at .05. Thus, the null hypothesis was rejected. The r values lie between 0.26 and 0.50, indicating a moderately small positive correlation between the organizational culture level of manifestation and employees' work performance in private schools.

Table 8. Analysis of the relationship between organizational culture and job satisfaction

Variables	r value	P value	Remarks	Decision
Values	0.650	0.000	Significant	Reject Ho
Norms	0.697	0.000	Significant	Reject Ho
Beliefs	0.752	0.000	Significant	Reject Ho
Practices	0.716	0.000	Significant	Reject Ho

There was a significant relationship between the organizational culture level of manifestation and Job Satisfaction level in private schools in Los Baños. The probability values were all .000 which, is less than the level of significance at .05. thus, the null hypothesis was rejected. The r value ranged between 0.51 to 0.75, high positive correlation between the organizational culture level of manifestation and job satisfaction level of employees in private schools in Los Banos. It indicates that there is a substantial link between the organizational culture level and job satisfaction level in private schools: the higher the organizational culture level, the higher the job satisfaction level. The study's findings show that the better the organizational culture of private schools, the higher the employees' job satisfaction is. This proves that a good organizational culture within a private school is associated with higher levels of employee job satisfaction. As a result, a positive and supportive organizational culture might help the teaching and non-teaching staff at private schools to feel more satisfied with their jobs.

To support this study, according to Nurlaila (2022), organizational commitment and rewards also had a relationship with both employee performance and work happiness. Job satisfaction was a general attitude toward a job, or the difference between the amount of compensation an employee received and what they believed they deserved. Additionally, employees who felt a strong sense of commitment to their organization were more likely to demonstrate higher levels of engagement and dedication to their work tasks. Also, to achieve job satisfaction among employees, according to Nagarajan (2022), the following variables were considered: benefits, professional purpose, peer network, progression, job role, work flexibility, training, challenge, and team leadership. Progression opportunities, including avenues for career growth and advancement, empowered employees to envision long-term trajectories within the organization. However, job roles that were challenging and meaningful provided intrinsic motivation and a sense of purpose, while work flexibility enhanced work-life balance and autonomy. Training initiatives enabled skill development and professional growth, while effective team leadership fostered cohesion, motivation, and goal attainment. Moreover, by considering and addressing these variables comprehensively, organizations could cultivate a conducive environment conducive to employee satisfaction, retention, and overall organizational success.

Batugal (2019) highlighted the pivotal role of employee motivation in driving effective performance and productivity within organizations. Motivated employees demonstrated heightened engagement and commitment to their roles, consequently contributing to superior job performance. Conversely, dissatisfied employees, characterized by negative attitudes towards their work, were prone to exhibit subpar performance outcomes. The study revealed a compelling positive correlation between job satisfaction and organizational culture, suggesting that a nurturing and inclusive organizational culture fostered deeper employee engagement and commitment over time. By cultivating an environment that valued and respected each member, organizations could enhance organizational loyalty and commitment among employees. Satisfied employees, in turn, were more likely to advocate for their organization positively, extend assistance to colleagues, and surpass job expectations, thereby bolstering overall organizational effectiveness and success.

Galay's (2022) study shed light on the multifaceted dynamics of organizational culture, employee commitment, and good governance within the organizational context. Through an examination of various dimensions such as support, mission, success, and bureaucracy, the research elucidated the intricate fabric of organizational culture. Similarly, organizational commitment, spanning affective, normative, and continuance dimensions, emerged as a key component influencing employee engagement and allegiance to the organization. The study also underscored the critical importance of good governance, particularly in resource management, accountability, and participatory decision-making processes. While employees exhibited a moderate level of commitment across dimensions and good governance showed significant evidence in resource management, the accountability and participatory decision-making aspects demonstrated moderate evidence. Moreover, the study established a notable correlation between organizational culture, employee commitment, and good governance, highlighting the interconnectedness of these elements in shaping organizational effectiveness and success.

4.0 Conclusion

This study's findings highlight several key contributions to understanding the organizational culture and employee performance in private schools in Los Baños. First, these schools have well-defined goals and objectives and an effective code of conduct. These elements uphold high standards of professionalism and ethics for teaching and non-teaching staff, fostering an environment of mutual respect and open communication. The emphasis on inclusiveness, diversity, and legal adherence creates a supportive and trustworthy atmosphere for all stakeholders. Secondly, the study underscores the significant impact of employee work performance on their dedication and overall productivity. Employees committed to continuous improvement and professional development tend to exhibit higher levels of motivation and job satisfaction, which are crucial for the school's success. This positive culture enhances task efficiency and helps employees realize their full potential. However, challenges such as unrealistic workloads, poor time management, and insufficient resources can hinder their performance and ability to meet deadlines.

Additionally, the research reveals a critical gap in private schools' recognition and reward system. Despite the evident need to acknowledge employees' achievements and contributions, management and leadership have not effectively fulfilled this requirement. This lack of appreciation may lead to feelings of undervaluation among staff. Moreover, employee satisfaction is closely linked to their job assignments' perceived significance and manageability. Employees are more likely to be satisfied and loyal when workloads are fair and intrinsic and extrinsic needs are met. Fair compensation further reinforces job satisfaction and loyalty, contributing to a stable and committed workforce. Finally, the proposed action plan aims to strengthen the organizational culture of private schools in Los Baños by addressing core values, norms, beliefs, and behaviors. This structured plan provides human resource managers and decision-makers with strategies to enhance the working environment and increase organizational engagement. Implementing these strategies can lead to a more productive and meaningful work environment, ultimately improving institutional efficiency and employee satisfaction.

Future research could explore the long-term effects of these interventions and examine the specific mechanisms through which organizational culture and recognition practices influence employee performance and satisfaction. Comparative studies between private and public schools could provide further insights into the unique challenges and opportunities within different educational contexts.

5.0 Contribution of Authors

There is only one author.

6.0 Funding

None

7.0 Conflict of Interest

There is no conflict of interest.

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Antimicrobial and Cytotoxic Potential of *Barringtonia asiatica* Seed Extracts: A Multi-Assay Approach

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Abstract. This study aimed to evaluate the phytochemical constituents, antimicrobial activities, and cytotoxicity of Barringtonia asiatica seed extract. Phytochemical analysis revealed the presence of alkaloids, saponins, tannins, cardiac glycosides, and flavonoids in both aqueous and ethanol extracts, with terpenoids and steroids present only in the ethanol extract. Antibacterial assays showed that both extracts exhibited resistance against Escherichia coli and Staphylococcus aureus, with streptomycin being the most effective treatment. Antifungal assays demonstrated that commercial fungicides were the most effective against Fusarium verticillioides and Aspergillus niger, followed by *B. asiatica* ethanol and aqueous extracts. Cytotoxicity tests using brine shrimp lethality assay revealed that *B. asiatica* ethanol and aqueous extracts were highly toxic, with LC50 values of 24.55 ppm and 181.97 ppm, respectively. The presence of terpenoids, cardiac glycosides, and saponins may contribute to their cytotoxic effects. These findings suggest that *B. asiatica* seed extracts contain phytochemicals with potential antimicrobial and cytotoxic properties, warranting further drug discovery and development research.

Keywords: Antimicrobial activity; Barringtonia asiatica; Cytotoxicity; Phytochemical analysis; Traditional medicine.

1.0 Introduction

Medicinal plants have been used for centuries as remedies for human diseases because they contain chemical components with therapeutic value (Nostro *et al.,* 2000). According to the World Health Organization (WHO), in 2008, more than 80% of the world's population relied on traditional medicine for their primary healthcare needs. In the Philippines, the importance of the country's diverse medicinal plants lies in their chemotherapeutic value in traditional healthcare and their potential as sources of new chemical entities for drug discovery. Although the country boasts of its remarkable biodiversity and rich cultural traditions of plant use, scientific understanding of medicinal plants remains largely unexplored, and pharmacological investigation of Philippine flora has recently gained momentum (Basco *et al.,* 2016).

The problem of microbial resistance is growing, and prospects for using antimicrobial drugs in the future are still uncertain. Immediate action must be taken to reduce this problem, aiming for efficient antimicrobial drugs. Using plant extracts and phytochemicals with known antimicrobial properties is of great significance in treatments. Several studies have been conducted in different countries to prove their efficiency in recent years. Many plants have been used because of their antimicrobial properties due to compounds synthesized in the secondary metabolism of the plant known by their active substances, such as phenolic compounds, which are part of essential oils and tannins.

Currently, data on the antimicrobial properties of several plants have been measured empirically concurrently with the increasing number of reports on the antimicrobial resistance of pathogenic microorganisms. Products derived from plants may potentially control microbial growth in various situations and cases of disease treatment. Numerous studies have aimed to describe the chemical composition of plant antimicrobials and the mechanisms involved in microbial growth inhibition, either separately or in combination with conventional antimicrobials (Jacob et al., 2016). Barringtonia asiatica, commonly known as the fish poisoning tree, is a medium-sized tree found in coastal areas, particularly on Car Nicobar Island (Ravikumar et al., 2015). It is known for its ichthyotoxic properties and its seeds are traditionally used for fishing in shallow waters during calm seasons (Murdiansyah et al., 2019; Ravikumar et al., 2015). This tree has multiple traditional uses beyond fishing, including medicinal applications. Various parts of *B. asiatica* have been utilized in herbal medicine. The leaves are used for therapeutic purposes such as treating fractures and wounds, de-worming, and pain relief (Ravikumar et al., 2015). Antimicrobial resistance (AMR) is a critical global health challenge threatening modern medicine and potentially cause millions of deaths annually by 2050 (Charlebois et al., 2020). The emergence and spread of AMR are driven by various factors, including inappropriate antimicrobial prescription in healthcare, misuse of antimicrobials in livestock, and propagation of antibiotic-resistance genes in the environment (Ogawa, 2017).

Recent studies have revealed that microbial communication systems, such as quorum sensing and pathogen-host communication mechanisms, play a significant role in the formation and regulation of AMR (Huang et al., 2020). Additionally, non-genetic heterogeneity resulting from fluctuations in gene expression can lead to the fractional killing of microbial populations, causing drug therapies to fail and enhancing the probability of acquiring genetic drug resistance mutations (Charlebois et al., 2020). To effectively combat AMR, a One Health approach is crucial, integrating knowledge of antimicrobial resistance genes (ARGs) across different microbial reservoirs in human, animal, and environmental health (Despotovic et al., 2023). The priorities for action include improving surveillance, enhancing stewardship and infection prevention, promoting basic and applied research, and coordinating global policies (Ogawa et al., 2018). Furthermore, understanding the molecular genetics and evolutionary mechanisms of drug-resistant bacteria is essential to develop fundamental solutions to overcome AMR (He, 2022). Innovative strategies, such as harnessing heat shock protein 90 (Hsp90) and exploring the potential of microbial extracellular vesicles, offer promising avenues for treating drug-resistant infections and developing novel antimicrobial approaches (Cowen, 2008; Jiang et al., 2024).

Existing research on Bacopa asiatica has revealed several gaps in our understanding of its phytochemical composition and antimicrobial and cytotoxic properties. While some studies have identified alkaloids, saponins, glycosides, and tannins in *B. asiatica* (Aparna et al., 2015), there is a lack of comprehensive phytochemical profiling using advanced analytical techniques, such as LC-MS and GC-MS. These methods have been successfully employed for other plants, such as Centella asiatica (Ondeko et al., 2020), and could provide a more detailed understanding of the chemical constituents of *B. asiatica*. However, the antimicrobial properties of *B. asiatica* have not been thoroughly investigated. Unlike studies on other plants, such as Senecio asirensis (Kamaly et al., 2024) and Toddalia asiatica (Hu et al., 2013), which have evaluated antimicrobial activity against a range of microorganisms, similar comprehensive studies on *B. asiatica* are lacking. There is a need for research that assesses its efficacy against Gram-positive and Gram-negative bacteria as well as against fungi. However, the cytotoxic properties of *B. asiatica* extracts have not been extensively studied. Research on other plants, such as Senecio asirensis (Kamaly et al., 2024) and Toddalia asiatica (Hu et al., 2013), has evaluated their cytotoxic activities against multiple cancer cell lines. Further studies are needed to explore the potential anticancer properties of *B. asiatica*. To address these gaps, a multiassay approach is required. This should include comprehensive phytochemical analysis using advanced techniques, antimicrobial testing against various pathogens, and cytotoxicity assays in various cancer cell lines. Additionally, as performed for Senecio asirensis (Kamaly et al., 2024), molecular docking studies could provide insights into the mechanisms of action of the bioactive compounds in *B. asiatica*.

The use of medicinal plants for primary health care is of substantial help to developing countries such as the Philippines in meeting their drug requirements. However, medicinal plant use has been based primarily on empirical grounds. There is a need for the scientific validation of such empirical knowledge (Philippine Council for Health Research and Development, 1991). Plant extracts provide unlimited opportunities for new drug development due to the unmatched availability of chemical diversity, which plays an imperative role in curbing new and re-emerging infectious diseases (Vaghasiya *et al.,* 2009). Therefore, this study evaluated the biofunctional activities of *B. asiatica* seed extract. The utilization of this plant provides an alternative source of antibiotics and cytotoxic drug agents that can promote less expensive, more effective, and novel ways of obtaining bioactive substances. Research on antimicrobial agents has potential applications in pharmaceuticals, agriculture, and food safety. In pharmaceuticals, these agents could lead to developing more effective antibiotics to combat drug-resistant pathogens, thereby addressing a critical global health concern. In agriculture, antimicrobial agents can improve crop protection products, reduce crop losses due to bacterial and fungal infections, and potentially increase food production. For food safety, these agents can be incorporated into food packaging materials or used as sanitizers to prevent foodborne illnesses, extend the shelf life of perishable goods, and ensure safer food supply chains. Developing novel antimicrobial agents could also lead to more environmentally friendly and sustainable practices in all three sectors, reducing reliance on traditional chemical-based solutions and minimizing potential negative impacts on human health and ecosystems.

2.0 Methodology

2.1 Collection and Preparation of *B. asiatica*

The fruit of *B. asiatica* was obtained from the municipal beach of Pagudpod, Ilocos Norte. The collected samples were air-dried at room temperature for about seven (7) to ten (10) days prior to the separation of seeds and pulp. Dried seeds were sliced thinly, pulverized using a grinder after drying, and kept in a sealed container with proper labels.

Ethanol Extraction of B. asiatica

The seed samples were extracted using 95% lab-grade ethanol. Pulverized samples of *B. asiatica (500 g)* were dispensed in a clean, sterile bottle containing 1000 ml of 95% laboratory-grade ethanol and kept for 48 h before filtration. The extracts were filtered using Whatman filter paper no.1 to separate the filtrate. The filtrates were refluxed for four (4) hours at 70-80°C until a sticky residue was obtained, which was stored for phytochemical, antimicrobial, and cytotoxicity analyses.

Aqueous Extraction of B. asiatica

Pulverized samples of *B. asiatica* (50 g) were dispensed in a clean, sterile bottle containing 1000 ml of sterile distilled water. The suspension was pasteurized for two hours before filtration using Whatman filter paper no.1. It was stored in a clean, sterile bottle and refrigerated before use.

2.2 Qualitative Phytochemical Analysis

Qualitative phytochemical analysis was performed using the standard procedures of Sofowara (1993), as cited and modified by Jacob and David (2016). Results were determined based on reaction and color intensity and interpreted as + if the chemical is present in traceable amounts, ++ if the chemical is present in appreciable amounts, and – if the chemical is absent. The phytochemicals tested were as follows:

Test for Alkaloids

The extracts were dissolved in dilute hydrochloric acid and filtered. The filtrate was then treated with Wagner's reagent. The formation of a reddish-brown precipitate indicates the presence of alkaloids.

Test for Saponins

Ten (10) ml of the filtered ethanolic extract was mixed with five (5) ml of distilled water in a test tube and shaken vigorously to obtain a stable, persistent froth. Three drops of olive oil were added to the test tube to form the emulsion, indicating the presence of saponins.

Test for Flavonoids

Two (2) to three (3) drops of 1% NH_3 solution were added to two (2) ml of the extracts in a tube. Yellow indicates the presence of flavonoids.

Test for Cardiac Glycosides

Approximately one (1) ml of concentrated H_2SO_4 was prepared in a test tube. Then, five (5) ml of the ethanolic extract of the samples was mixed with two (2) ml of glacial acetic acid (CH_3CO_2H) containing one (1) drop of $FeCl_3$. The mixture was carefully added with one (1) ml of concentrated hydrogen sulfate prepared so that the H_2SO_4 would be underneath the mixture. The test tube was observed to contain a brown ring, which indicates the presence of cardiac glycosides.

Test for Terpenoids
Using Salkowski's test, 0.2 ml of the extracts was dissolved in 2) ml of chloroform. Concentrated H_2SO_4 was then carefully added to form the lower layer. The reddish-brown color at the interphase indicates the deoxy sugar characteristics of cardenolides.

Test for Tannins
0.5 ml of the extract was boiled in 20 ml of distilled water in a test tube and filtered. 0.1% FeCl3 was added to the filtrate samples, and brownish-to-green or blue-to-black coloration was observed, indicating the presence of tannins. Green coloration indicates the presence of gallotannins, whereas brown coloration indicates the presence of pseudo-tannins.

Test for Steroids
0.5 ml of the extract was mixed with two (2) ml of acetic anhydride, followed by two (2) ml of sulfuric acid. The samples' change in color from violet to blue or green indicated the presence of steroids.

2.3 Antibacterial Assay
The antibacterial properties of ethanol and aqueous extracts of *B. asiatica* were assessed using the procedure described by Bauer *et al.* (1996). Following the aseptic technique, the assay was performed inside a laminar flow chamber containing a high-efficiency particulate air (HEPA) filter to avoid contaminants that may affect the process.

2.4 Preparation of Mueller Hinton Agar (MHA)
Approximately 38 g of Mueller Hinton agar (MHA) was dispensed in a clean, sterile Erlenmeyer flask with one (1) liter of distilled water. The mixture was heated until homogenized. It was then sterilized in an autoclave for 15 minutes at 121°C/15 psi. After sterilization, the samples were allowed to cool and plated on sterilized Petri dishes.

2.5 Disc Diffusion Assay
The antibacterial assay was performed using the disc diffusion method of Bauer et al. (1996). This involved the use of filter paper discs as carriers of antimicrobial agents. Whatman filter paper no.1 was cut into discs with six (6) mm diameter and impregnated with distilled water, streptomycin, 95% Ethanol, *B. asiatica* ethanol extracts, and *B. asiatica* aqueous extracts. *E. coli* and *S. aureus* cultures were then spread thoroughly onto MHA plates using sterile cotton swabs. The impregnated discs were placed equidistant on the surface of the medium. The plates were incubated at 37 °C and turned upside down to prevent contamination. The zone of inhibition of each paper disc was observed and recorded every eight (8) hours within a 24-hour incubation period. The zone of inhibition was measured using a calibrated digital Vernier caliper.

2.6 Antifungal Assay
Preparation and Revival of the Test Organism
Approximately 250 g of potato was boiled in ((1) liter of distilled water until it became tender. The resulting mixture was strained and reconstituted in water until a volume (1) liter was obtained. Ten (10) grams of sugar were added with 20 g agar until a homogenized mixture was obtained. The resulting mixture was dispensed into a clean Erlenmeyer flask, plugged with cotton, and covered with clean paper to absorb moisture. It was then sterilized using an autoclave at 121°C/15 psi for 15 min. After sterilization, they were allowed to cool and plated on Petri dishes, which were used to revive the pure culture.

Cultures of *F. verticillioides* and *A. niger* were obtained from the fungal collection at the Microbiology and Bio-Industry Laboratory of Biological Sciences, Isabela State, University, Echague, Isabela. Cultured cells were aseptically transferred onto potato dextrose agar (PDA) supplemented with 1 g/ml streptomycin to prevent bacterial interactions. These were allowed to grow for five–seven days until fully ramified plates were obtained.

Treatment Preparation and Inoculation of Test Organism

Two (2) ml of the prepared *B. asiatica* ethanol extract were poured onto sterile Petri plates. Approximately 15-20 ml of sterilized PDA was added and swirled clockwise to cool and solidify. Each plate containing the mixtures was inoculated with 10 mm of the fungal disc for the revival of pure cultures of *F. verticillioides* and *A. niger*. These were incubated at room temperature (28-32^{o}C), and growth was measured using calibrated Vernier calipers every 24 h for seven (7) days. Aseptic techniques were used to prevent contamination by pathogens.

2.7 Cytotoxicity Test using Brine Shrimp Lethality Assay

Brine shrimp eggs were obtained from the Bureau of Fisheries and Aquatic Resources, San Mateo, Isabela, the Philippines. They were hatched in prepared artificial seawater as Mclaughlin and Rogers (1998) described. Brine shrimp eggs were added to artificial seawater, where 30 g of salt was diluted per liter of water in a glass chamber and kept under constant aeration and illumination. After 48 h of incubation, brine shrimp nauplii were attracted to one side of the vessel using a light source and collected using a pipette.

2.8 Cytotoxic Lethality Assay

The cytotoxic properties of the *B. asiatica* extract were monitored using the brine shrimp lethality test described by Mclaughlin and Roger (1998) with modifications. Nine newly hatched nauplii were placed in an ELISA well with three (3) nauplii per well. Triplicates were performed for each treatment concentration. The setup containing extracts of the seed extract at different concentrations was left uncovered under a lamp. The number of dead nauplii was monitored 6th, 12th, 18^{th,} and 24th hours. Observations of live and dead nauplii were compared to the standard. Live brine shrimps were observed to be actively squirming and constantly moving, whereas dead nauplii were observed to be non-motile and floating. The number of dead nauplii was counted using a stereomicroscope. Percent mortality was documented, and the LC_{50} was determined through Probit Analysis.

2.9 Experimental Design and Layout

Antibacterial, antifungal, and cytotoxic assays were performed separately. Each test was carried out using a Completely Randomized Design (CRD) with three (3) replicates. The treatments used in the antibacterial assay (Figure 1) were as follows:

Treatment 1 – Distilled water (+ control)
Treatment 2 – Streptomycin (- control)
Treatment 3 – 95% Ethanol
Treatment 4 – *B. asiatica* ethanol extracts
Treatment 5 – *B. asiatica* aqueous extracts

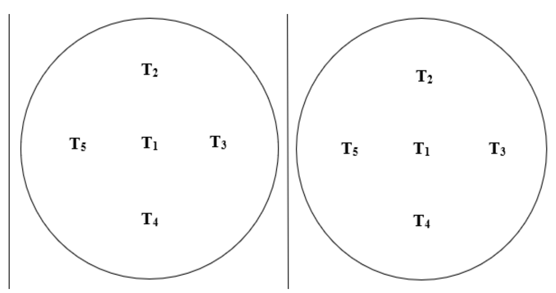

Figure 1. Experimental design for antibacterial assay

These treatments were used for both *E. coli* and *S. aureus*.

For the antifungal assay, the ethanol and aqueous extracts of *B. asiatica* were treated as follows:

Treatment 1 – Distilled water (- control)
Treatment 2 – 95% lab-grade Ethanol
Treatment 3 – Commercial Fungicide (+ control)
Treatment 4 – *B. asiatica* ethanol extract
Treatment 5 – *B. asiatica* aqueous extract

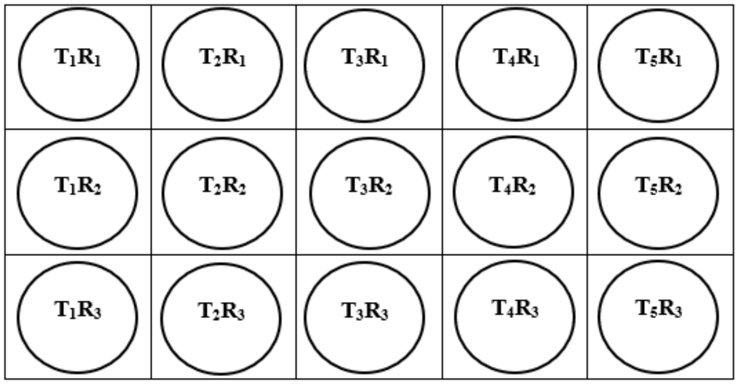

Figure 2. Experimental design for antifungal assay

The same treatments were used for *F. verticillioides* and *A. niger*.

For the cytotoxicity (Figure 3), the treatment used for the ethanol and aqueous extracts of *B. asiatica* was:

Treatment 1 – 1000 ppm concentration
Treatment 2 – 500 ppm concentration
Treatment 3 – 250 ppm concentration;
Treatment 4 – 125 ppm concentration;
Treatment 5 – Saltwater (– control)
Treatment 6 – Ethanol (+ control)

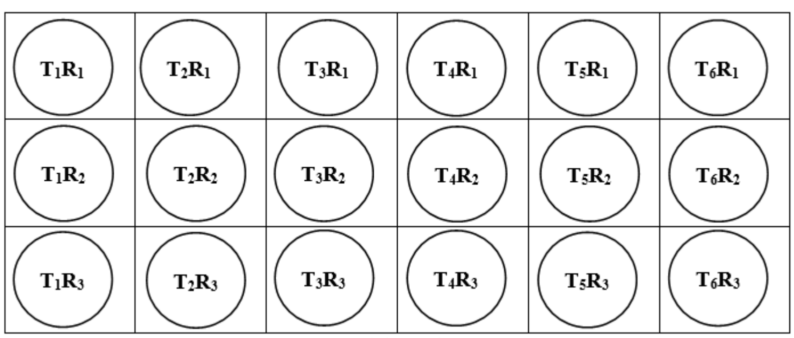

Figure 3. Experimental design for cytotoxicity assay

All recorded data were treated statistically using one-way analysis of variance (ANOVA), and means were compared using LSD at $p < 0.05$.

2.10 Data Gathered

The following data were gathered during the study period:

a. Phytochemical Properties of *B. asiatica*
b. Zones of inhibition of *B. asiatica* ethanol and aqueous extracts against *E. coli* and *S. aureus*;

c. Mycelial diameter of *F. verticillioides* and *A. niger*; and
d. Mortality rate and LC_{50} of the fungal isolates in brine shrimp.

2.11 Ethical Considerations
The ethical considerations of this study, conducted at Isabela State University, were rigorously upheld to ensure responsible research practices. The study adhered to the ethical guidelines set by the university's Institutional Review Board, focusing on the welfare of all participants and environmental stewardship. Special attention was given to sustainable sourcing practices for Barringtonia asiatica seeds to avoid negative ecological impacts and to ensure compliance with local biodiversity conservation laws. Additionally, the study was designed to minimize harm and prioritize safety throughout the laboratory procedures, ensuring that all experiments involving cytotoxic and antimicrobial assays were conducted following stringent safety protocols. Informed consent was obtained for any human cell line usage while maintaining strict data confidentiality and adequately disposing of biohazardous materials to prevent environmental contamination. These ethical practices underline the commitment of Isabela State University to uphold its integrity and responsibility in scientific research.

3.0 Results and Discussion

3.1 Phytochemical Constituent of the *B. asiatica*
Table 1 presents the phytochemical constituents of ethanol and aqueous extracts of *B. asiatica*. Seven (7) phytochemical constituents were screened: alkaloids, saponins, tannins, cardiac glycosides, flavonoids, steroids, and terpenoids.

Table 1. Phytochemical composition of *B. asiatica* using aqueous and ethanol extract

Phytochemicals	Aqueous extract	Ethanol extract
Alkaloids	+	+
Saponins	++	++
Tannins	+	++
Cardiac Glycosides	+	+
Flavonoids	+	+
Steroids	–	+
Terpenoids	–	+

Legend: (+) present in traceable amount, (++) present in appreciable amount, (–) absent

Of the seven (7) phytochemical constituents screened, *the B. asiatica* aqueous extract exhibited five (5) phytochemicals: alkaloids, saponins, tannins, cardiac glycosides, and flavonoids. In contrast, the ethanol extract of *B. asiatica* exuded seven (7) phytochemicals, namely: alkaloids, saponins, tannins, glycosides, flavonoids, and terpenoids. However, terpenoids and steroids were absent in the aqueous extracts. Alkaloids, cardiac glycosides, and flavonoids were observed in traceable amounts, whereas saponins were present in appreciable quantities in both extracts. However, phytochemical constituents, such as terpenoids and steroids, were present in the ethanol extract but absent in aqueous extracts. Tannins, however, were found to be appreciable in the ethanolic extract but in a significant amount in the aqueous extracts.

The results showed that The ethanol extracts contained more phytochemicals than the aqueous extracts. This may be because of the higher solubility of the active components in organic solvents (de Boer et al., 2005). Phytochemicals are naturally occurring constituents of plants. Although the knowledge of how these phytochemicals provide medicinal value to humans reveals a recent scientific understanding, the use of plants and plant extracts to heal, relieve pain, and promote good health dates back to the beginning of medical science. (Basco et al., 2016; Jacob and David, 2016). In this study, alkaloids in perceptible amounts have been shown to act as a pain reliever and a contemporary anesthetic in ophthalmology with stimulating results and antipyretic effects (Yadav and Agarwala, 2011).

As cited by Jacob and David (2016), the presence of saponins includes significant biological effects such as erythrocyte hemolysis, enzyme inhibition, cholesterol and bile acid metabolism, antifungal activity, anti-carcinogenic, and impact on reproduction. This compound can also delay the growth of cancer cells, boost the immune system and energy, lower cholesterol, act as a natural anti-inflammatory, antibiotic, and anti-oxidant, and can reduce the uptake of certain nutrients, including glucose and cholesterol, in the gut through intraluminal physicochemical interactions (De Silva *et al.*, 2013; Aberoumand, 2012).

Tannins are a broad class of compounds that fight cavities and diarrhea; some even protect against heart diseases and cancer. Tannins are well known for their astringent properties; thus, they have been used as bases for several herbal treatments. They act by iron deprivation, hydrogen bonding, or specific interactions with proteins, such as enzymes, cell envelopes, and complex formation with polysaccharides (Dharmananda, 2003; Hisanori *et al.,* 2001). Herbs containing tannins as their component are used to treat intestinal disorders such as diarrhea and dysentery (Just *et al.,* 1998). However, in the study of Jacob and David (2016), it was stated that the presence of tannins in plants can also cause adverse effects on productivity, reduced nutrient availability, reduced digestibility, impaired digestive physiology, and maybe mucosal perturbations for those who will intake such plants. Plants that are naturally poisonous contain cardiac glycosides. Cardiac glycosides commonly comprise one or more sugars combined with an alcohol, phenol, or another complex molecule (Hollman, 1985). Cardiac glycosides are the common agents of choice in treating congestive cardiac failure (CCF), and these compounds are said to have a narrow therapeutic index. They hence can often cause intoxication (Rashmika & Manish, 2012). Pongrakhananon (2013) indicated that these constituents are primarily involved in treating cardiac failure since they increase cardiac output and are used to treat congestive heart failure and cardiac arrhythmia.

Flavonoids are secondary metabolites of polyphenolic plants (Janićijević *et al.*, 2007). According to a study by Janićijević *et al.* (2007), flavonoids play a vital role in the protection of plants from insects and mammalian herbivores (Harbone *et al.*, 2000) and have the ability to modify enzymatic and chemical reactions that have either positive or negative impacts on human health (Beecher, 2003). Flavonoids are also considered angiotensin-converting enzyme inhibitors in regulating hypertension (Balasuriya & Rupasinghe, 2011). They are also involved in stress phenomena, such as antibiotics and modulating molecules (Petrussa *et al.,* 2011). According to a study by Middleton et al. (2000), plant flavonoids can act as therapeutic agents in mammalian cells and can be implicated in inflammation, heart disease, and even cancer. Steroids are vital for the average growth and development of plants. Based on the study by Ylstra *et al.* (1995), steroid hormones can stimulate germination and pollen tube growth. Steroids possess physiological roles similar to the plant, allelochemical substances related to animal hormones, and plant-specific allelochemical substances, which often display protective actions against phytophagous animals or parasitic fungi. According to Zhang et al.'s (2014) report, terpenoids or terpenes have varied biological activity profiles, including cytotoxicity (i.e., sesquiterpene lactones), antimalarial drugs (i.e., sesquiterpene lactone endoperoxide), growth hormones, tumor promoters, and anticancer agents against paclitaxel (i.e., diterpenes).

3.2 Antibacterial Assay

The extracts of *B. asiatica* were examined for their antibacterial activity against the test bacteria *E. coli* and *S. aureus* using a disc diffusion assay. The data presented in Tables 2 and 3 show the results of the antibacterial assay against *E. coli* and *S. aureus*, respectively.

Table 2. Antibacterial activity of *B. asiatica* against *E. coli*

Treatments	Zone of inhibition (mm)		
	8 hrs	**16 hrs**	**24 hrs**
Distilled water	6.00^{b}	6.00^{c}	6.00^{b}
Streptomycin	27.96^{a}	32.74^{a}	32.99^{a}
95% Lab grade ethanol	10.28^{b}	10.33^{b}	10.96^{b}
B. asiatica ethanol extract	7.12^{b}	7.49^{c}	8.13^{b}
B. asiatica aqueous extract	6.59^{b}	6.86^{c}	7.47^{b}
ANOVA	*	*	*

Legend: *significant. Note: Results are presented as the mean± standard deviation. Results with the same superscript letter are not significantly different at the 5% significance level, using the least significant difference.

At 8 h, the Analysis of Variance (ANOVA) showed a significant result wherein streptomycin obtained the highest value in terms of zone of inhibition with a mean value of 27.96 mm followed by 95% Lab grade ethanol, *B. asiatica* ethanol extract, *B. asiatica* aqueous extract, and distilled water. There was a significant difference between streptomycin and 95 % lab-grade ethanol at 16 h. At 24 h, streptomycin maintained the highest zone of inhibition (32.99 mm and was significant in 95% Lab grade ethanol, *B. asiatica* ethanol extract, *B. asiatica* aqueous extract, and distilled water. The results showed no statistically significant difference between the inhibition zones in 95% Lab grade ethanol, *B. asiatica* ethanol extract, *B. asiatica* aqueous extract, and distilled water. According to standard zone sizes (Bauer *et al*., 1996), streptomycin with a size of 15 mm or more is sensitive. Since the zones of inhibition exhibited by all the other treatments were less than 11 mm, *E. coli* was resistant to the treatments.

Table 3. Antibacterial activity of *B. asiatica* against *S. aureus*

Treatments	Zone of inhibition (mm)		
	8 hrs	**16 hrs**	**24 hrs**
Distilled water	6.00^{b}	6.00^{c}	6.00^{c}
Streptomycin	33.79^{a}	34.38^{a}	34.70^{a}
95% Lab grade ethanol	10.36^{b}	11.35^{b}	11.57^{b}
B. asiatica ethanol extract	7.48^{b}	7.75^{c}	7.80^{c}
B. asiatica aqueous extract	6.98^{b}	6.99^{c}	7.28^{c}
ANOVA	*	*	*

Legend: *significant. Note: Results are presented as the mean± standard deviation. Results with the same superscript letter are not significantly different at the 5% significance level, using the least significant difference.

ANOVA at 8 h showed significant differences between streptomycin and 95% Lab grade ethanol, *B. asiatica* ethanol extract, *B. asiatica* aqueous extract, and distilled water. Significant results were also obtained after 24 h, with streptomycin having the highest zones of inhibition at 34.70 mm. According to standard zone sizes (Bauer *et al*., 1996), S. aureus is resistant to 20 mm or less. According to Ragasa *et al.* (2011), compounds from *B. asiatica* seed extracts were slightly active against *S. aureus*. They were more active against *C. albicans* due to the presence of different triterpenes in the extracts.

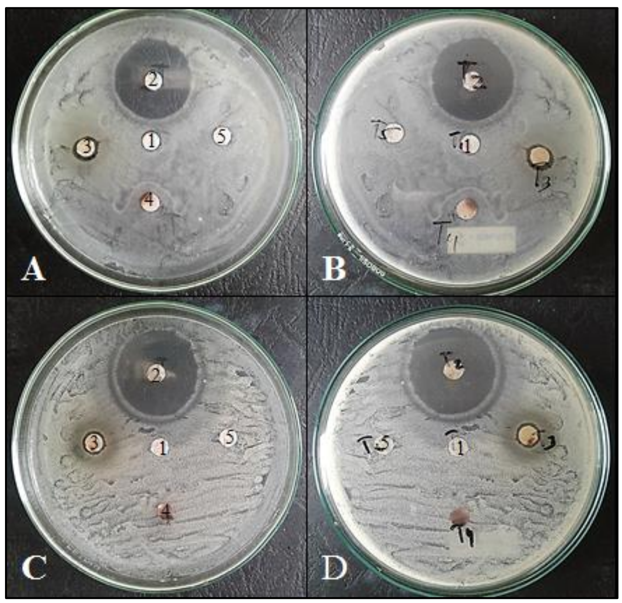

Figure 4. Zones of inhibition of (A, B) *S. aureus* and (C, D) *E. coli* on Mueller-Hinton agar (MHA) after 24 h of incubation. Treatments (1) distilled water (2) streptomycin (3) 95% lab grade ethanol (4) *B. asiatica* Ethanol extracts (5) *B. asiatica* aqueous extracts

One of the biggest threats to human existence is microbial resistance to synthetic medicines or drugs. The use of conventional synthetic drugs in offering remedies to existing human, animal, and plant disease therapies has proven to be unsuccessful. According to the study by Orhana *et al.* (2010), flavonoids have strong antibacterial activity, and the extract would also display antimicrobial activity against some of the bacteria. Lamb and Tim Cushnie (2005) explained the antibacterial mechanisms of action of selected flavonoids. Quercetin activity was at least partially attributed to the inhibition of DNA gyrase activity. It has also been proposed that sophoraflavone G and (−)-epigallocatechin gallate inhibit cytoplasmic membrane function and that licochalcones A and C inhibit energy metabolism. Other flavonoids whose mechanisms of action have been investigated include robinet, myricetin, apigenin, rutin, galanin, 2,4,2 -trihydroxy-5 -methyl chalcone, and lonchocarpol A.

The presence of alkaloids in the phytochemical analysis indicates their antibacterial properties because alkaloids are a large and structurally diverse group of compounds that serve as scaffolds for essential antibacterial drugs such as metronidazole and quinolones. The antibacterial mechanism of action has been investigated for alkaloids in indolizidine, isoquinoline, quinolone, and polyamine classes (Tim Cushnie *et al.,* 2014). In the indolizidine class, alkaloids such as pergularinine and tylophorinidine act by inhibiting nucleic acid synthesis, as they inhibit the enzyme dihydrofolate reductase in cell-free assays (Rao & Venkatachalam, 2000). Studies on benzophenanthridine and protoberberine isoquinolines in the isoquinoline class suggest that these compounds perturb the Z-ring and inhibit cell division. Researchers working with phenanthridine isoquinoline ungeremine suggest that this alkaloid acts by inhibiting nucleic acid synthesis after observing inhibition of type I topoisomerases in cell-free assays (Tim Cushnie *et al.,* 2014). Research on alkyl methyl quinolones suggests that these are respiratory inhibitors, as they reduce O2 consumption in treated bacteria but do not affect 3H uptake (Tominaga *et al.,* 2002). Lastly, studies on the polyamine alkaloid squalamine suggest that it acts by compromising the outer membrane and cytoplasmic membrane integrity (Tim Cushnie *et al.,* 2014). The flavonoids and alkaloids in both extracts indicated their antibacterial effect on the test bacteria.

3.3 Antifungal Assay

The antifungal activity of the ethanol and aqueous extracts of *B. asiatica* against the test bacteria *F. verticilloides* and *A. niger* was determined using an antifungal bioassay. The data presented in Table 4a show the results of the antifungal assay of *B. asiatica* against *F. vercilloides* and in Table 4b for *A. niger*. The results of the antifungal assay of *B. asiatica* against *F. verticilloides* showed a significant difference on day 1, where the fungicide obtained the lowest mycelial growth and was comparable to the ethanol extract with a mean value of 11. 30 mm, followed by the aqueous extract at 13.40 mm, ethanol at 13.75, and the highest mean exhibited by distilled water at 17.63 mm. From day 2 to day 7, fungicide showed a significant difference in both aqueous and ethanol extracts, as well as ethanol and distilled water. The highest mycelial growth and the least effective were exhibited by distilled water, as fungi can grow here. The most effective antifungal agent is fungicide, followed by *B. asiatica* ethanol, aqueous extracts, and ethanol.

For the results of the antifungal assay of B. asiatica against A. niger in Table 4b, fungicide has the lowest mycelial growth at 10 mm. It differs significantly from the aqueous extract at 14.38 mm, ethanol at 13.75 mm, and distilled water at 16.63 mm during Day 1. Fungicide was still significantly different in all treatments from days 1 to 7. Distilled water had the highest mycelial growth at 45.55 mm, followed by ethanol at 36.18, aqueous extract at 31.24, and ethanol extract at 28.74. The most effective antifungal agents are fungicide, *B. asiatica* ethanol and aqueous extracts, and ethanol with distilled water as the least effective treatment.

Statistically, the results of this experiment suggest that all treatments were significantly different from each other. Various medicinal plant extracts have shown inhibitory effects against phytopathogenic fungi in vitro (Shalini & Srivastava, 2009). The antifungal activity results were supported by previous studies that showed that the crude methanolic extract of *B. asiatica*, including leaves, fruits, seeds, stems, and root bark, exhibited an excellent level of broad-spectrum antifungal activity (Khan & Omoloso, 2002). In addition, the methanolic extract of *B. asiatica* flower also exhibited the growth of *Microsporum canis* and *Trichophyton rubrum* at 1000 µg/ml, and *Epidermophyton floccosum* at 125 µg/ml (Locher *et al*., 1995).

Mycelial inhibition of *B. asiatica* may be associated with the presence of phytochemical constituents. A distinguishing characteristic of tannins is their binding to proteins, essential compounds, and large molecules (Okuda & Ito 2011). The presence of tannins in the seeds may have affected the production of chitin, a protein structure of the cell wall. Chitin deficiency may result in a flaccid cell wall that can expose the cells to the outside environment. In addition, the presence of terpenoids in plants causes cytotoxic effects, growth hormones, and tumor promoters (Zhang *et al*., 2014). Once tannins act on the cell wall, the toxin present in terpenoids can act on the organelles inside the cell, causing damage to the cell organelles. Wooley (2001) suggested that alkaloids (*i.e.*, pyrrolizidine and indolizidine) cause serious toxicity and even death for horses, cattle, and sheep. Alkaloids play a role in plant defense (Evans *et al.,* 2006), which explains the inhibition performance of *B. asiatica.* The presence of alkaloids in the plant might have destroyed the mycelia of the fungi, resulting in mycelial inhibition. Alkaloids and steroids contradict each other because steroids are growth-promoting phytohormones in aquatic filamentous fungi (Dinnan *et al*., 2011). Poisonous plants are known to contain cardiac glycoside (Hollman *et al.,* 1985). Cardiac glycosides are the common agents of choice in treating congestive cardiac failure (CCF), and these compounds are said to have a narrow therapeutic index.

They hence can often cause intoxication (Rashmika & Manish, 2012). The cell wall of a fungus is affected by the antifungal agent acting on the fungi. Cardiac glycosides are believed to act on the cells of the heart. They may have acted on the cells of the cell wall, decomposing it and causing growth retardation. Flavonoids can modify enzymatic and chemical reactions, which have positive or negative effects (Beecher *et al.,* 2003). In a study by Middleton *et al..* (2000), plant flavonoids can act as therapeutic agents in mammalian cells and have been implicated in inflammation, heart disease, and cancer. The presence of flavonoids in *B. asiatica* may have caused inflammation in the fungi cells, causing them to die, and could be one of the reasons for mycelial growth inhibition. According to Geyter *et al.* (2007), saponins have the potential to be utilized as natural insecticides, where they can exert robust insecticidal activity in a wide range of insect types and stages and can also be used to prevent transmission of insect-mediated disease. The difference in antimicrobial properties of a plant extract might be attributed to the age of the seeds used, physical factors (temperature, light water), contamination by field microbes, and incorrect preparation and dosage (Calixto, 2000; Okigbo & Igwe, 2007).

3.4 Cytotoxicity Test Using Brine Shrimp Lethality Assay

The brine shrimp lethality assay (BSLA) has been used routinely in the primary screening of crude extracts and isolated compounds to assess toxicity towards brine shrimp. This could also provide an indication of possible cytotoxic properties of the test materials (McLaughlin et al., 1991). Figures 5 and 6 show the mortality rate of nauplii exposed to different concentrations of ethanol and aqueous extracts of B. asiatica.

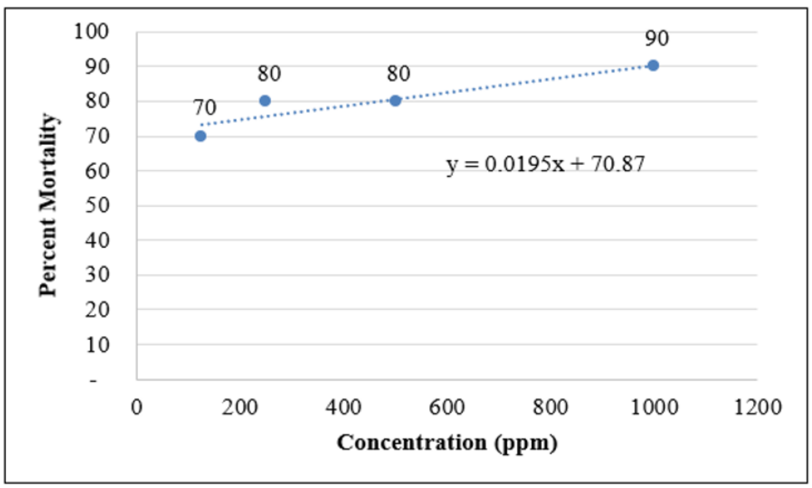

Figure 5. Cytotoxic lethality assay of B. Asiatica ethanol extract to A. Salina after 24 hours

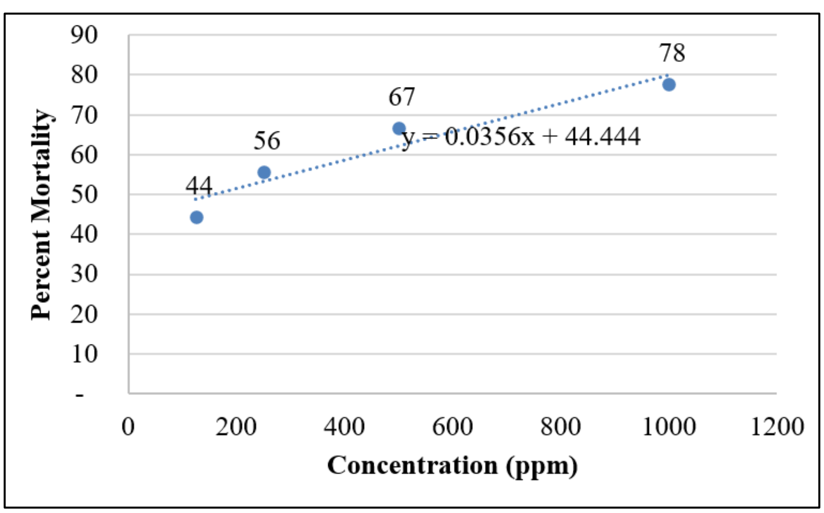

Figure 6. Cytotoxic lethality assay of *B. asiatica* aqueous extract to *A. salina* after 24 hours

Concentrations of *B. asiatica* extract used ranged from 125 to 1000 ppm, with pure artificial seawater as a control. It was observed that the highest mortality rate in ethanol extracts was exhibited at 1000 ppm, which makes it lethal to 90% of the test organisms after 24 h of observation. In contrast, 250 ppm exuded 80% lethality, whereas 125 ppm showed 70% lethality. In addition, the highest mortality rate of aqueous extracts was observed at 1000 ppm, which was lethal to 78% of the same test organism. Moreover, 125 ppm displayed 44% lethality, and 250 ppm showed 56% lethality. The graphs show that the higher the concentration, the higher the mortality rate. The lethal concentration (LC_{50}) of *B. sciatica* ethanol extracts was observed at 24.55 ppm, while in aqueous extracts, 181.97 ppm concentration. McLaughlin and Rogers (1998) state that LC50 of ≤ 249 ppm is highly toxic; LC50 of 250 - 499 ppm is moderately toxic; LC_{50} of 500-1000 ppm is mildly poisonous, and values above 1000 ppm are non-toxic. Therefore, the ethanol and aqueous extracts of *B. asiatica* are considered highly toxic.

The results of the present study are similar to those of Mojica and Micor (2007). Their study showed that the aqueous extract of *B. asiatica* seeds is highly toxic against A. salina. Their results showed that the LC_{50} was lethal at 2.25 ppm after 48 h of exposure. In comparison to the result of the present study, the LC_{50} was found deadly at 181.97 ppm, which is also considered highly toxic, according to McLaughlin and Rogers (1998). Another survey by Umuri *et al.* (2018) demonstrated the cytotoxic activities of *B. asiatica* essential oil from different plant parts. The results of their research are congruent with the results of the present study, wherein the ethanol extract of *B. asiatica* was found to be toxic at 24.55 ppm after 24 h of exposure. In association with the result of their study, the 50% lethality concentration of the leaves and the stem-bark essential oil were observed at 56.87µg/mL and 457.63µg/mL, respectively. Other species of Barringtonia, like *B. racemose* and *B. acutangula* (L.) Gaertn. also exhibit cytotoxic activity against different types of test organisms (Osman *et al.,* 2015; Mohanty *et al.,* 2016).

The presence of terpenoids, cardiac glycosides, and saponins in the ethanol and aqueous extracts of *B. asiatica* had toxic effects on the test organism. According to Zhang et al. (2014) and Rashmika and Manish (2012), the presence of terpenoids varies biological activity, which includes cytotoxicity, antimalarial drugs, growth hormones, and anticancer against paclitaxel. However, cardiac glycoside compounds are also said to have a narrow therapeutic index and, hence, can cause intoxication. Currently, *the A. salina* (brine shrimp, fairy shrimp, or sea monkeys) lethality assay is commonly used to evaluate the cytotoxic effects of bioactive chemicals (Quazi *et al.,* 2017). Brine shrimp nauplii have been previously utilized in various bioassay systems. Several novel antitumor and pesticidal natural products have been isolated using this bioassay (Meyer *et al.,* 1982; Sam TW, 1993). According to the National Cancer Institute (NCI, USA), this bioassay is used as a pre-screening tool for antitumor drug development because of the significant correlation between the brine shrimp assay and *the in vitro* growth inhibition of human solid tumor cell lines (Basco *et al.,* 2016).

Environmental pollution poses a significant risk to human health and ecosystems, highlighting the urgent need for practical and sustainable bioremediation and antimicrobial solutions. While research on *Barringtonia asiatica* seed extracts has shown promising antimicrobial and cytotoxic effects, supporting their potential in combating pathogens, recent findings on the phytoremediation capacity of *Ipomoea reptans* (Kangkong) offer insights into another approach for mitigating toxic contaminants. Ingente and Anselmo (2024) demonstrated that *I. reptans* effectively reduces Pb levels in a hydroponic system, highlighting the potential of plants for heavy metal remediation in contaminated water sources. This intersection of phytoremediation and antimicrobial research underscores the need for a multifaceted approach to address pollution and infection risks, with natural extracts and plant-based systems playing vital roles in health and environmental remediation efforts.

4.0 Conclusion

The ethanol extract of *B. asiatica* contains phytochemical constituents, such as alkaloids, saponins, tannins, glycosides, steroids, flavonoids, and terpenoids. Moreover, five phytochemical constituents were present in the aqueous extract: alkaloids, saponins, tannins, glycosides, flavonoids, steroids, and terpenoids. Based on the results of the antibacterial and antifungal activities, it was found that *B. asiatica* showed potential as a medicinal plant used by traditional herbal medical practitioners as a natural antimicrobial agent; thus, it can be further used to determine the bioactive products that may lead to the development of new drugs. The presence of flavonoids and alkaloids in both extracts indicated its antibacterial effect on the test bacteria. At the same time, the mycelia inhibition of *B. asiatica* can be associated with the presence of phytochemical constituents such as tannins and terpenoids. The selected ten medicinal plants are the source of the secondary metabolites, i.e., alkaloids, flavonoids, and terpenoids; Brine shrimp lethality assay was used for the preliminary cytotoxicity assay of plant extract and others based on the ability to kill a laboratory cultured larva (nauplii). Nauplii were exposed to different concentrations of the plant extract for 24 h. The number of motile nauplii was calculated to determine the extract's efficacy. It is simple, cost-effective, and requires only a small amount of test material. The lethal concentration (LC_{50}) of *B. asiactica* ethanol extracts was observed at 24.55 ppm. In aqueous extracts, 181.97 ppm of concentration. According to McLaughlin and Rogers (1998), an LC50 of ≤ 249 ppm is considered highly toxic; an LC50 of 250 - 499 ppm is moderately toxic; an LC50 of 500-1000 ppm is mildly toxic, and values above 1000 ppm are non-toxic. Therefore, the ethanol and aqueous extracts of *B. asiatica* are considered highly toxic.

5.0 Contributions of Authors

In this study, author 1 conceptualized and designed the research, including formulating the research questions and hypotheses, contributing significantly to data collection and analysis and ensuring the accuracy and consistency of the data gathered. Played a crucial role in reviewing the literature and drafting the introduction, providing insights into relevant theories and prior research findings, instrumental in interpreting the results, and assisted with statistical analyses, bringing clarity to the findings, focusing on the discussion and implications, linking the findings to practical applications, and suggesting avenues for future research. Author 2. Contributed to the final manuscript by reviewing and refining it for coherence, accuracy, and clarity, and approved the final version for submission, and lastly oversaw the entire project

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7.0 Conflict of Interests

no conflict of interest.

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Examining Attitudes and Perceived Usefulness of AI Integration in Teaching and Learning Processes

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Abstract. With the rapid advancement of technology, Artificial Intelligence (AI) has become a transformative force in education, offering new ways to enhance teaching and learning processes. This study assessed the attitudes and perceived usefulness of AI integration among students and faculty members in an educational environment. An inferential-quantitative research design was employed to examine the differences and relationships between these perceptions. Data were collected through a validated survey tested for reliability (Cronbach's alpha = 0.92 for students and 0.87 for faculty) from 296 randomly selected students and 56 faculty members at a Philippine State University in Biñan, Laguna. Statistical analyses were conducted to interpret the data, including Frequency, Percentage, Mean, Mann-Whitney U, and Spearman's Rho tests. The results revealed that both groups commonly use AI tools like ChatGPT, Grammarly, and Canva and generally hold positive attitudes and perceptions regarding the usefulness of AI integration in education. A significant difference was found between students' and faculty members' perceptions of AI's usefulness, suggesting varying views on how AI supports learning and teaching. Additionally, a significant positive relationship was observed between students' attitudes and their intent to use AI tools, indicating that favorable attitudes lead to a greater inclination to utilize AI in academic activities. The study highlights the importance of responsible and ethical AI usage and recommends targeted training for students and educators to optimize AI's role in enhancing the educational experience.

Keywords: Artificial Intelligence; Attitudes; Education; Integration; Perceived usefulness.

1.0 Introduction

With the rapid advancement of technology, Artificial Intelligence (AI) has become a transformative force in education, offering exciting opportunities for personalized learning, intelligent tutoring, and enhanced student engagement. AI has the potential to reshape how education is delivered, tailoring instruction to meet the unique needs and learning styles of students. For example, Reyneke (2023) found that AI-powered adaptive learning systems significantly improve student outcomes by customizing content and pacing based on student data. As AI continues to evolve, educators are discovering how this technology can empower learners, optimize instruction, and create dynamic, real-world learning experiences. AI is not only personalizing education but also automating administrative tasks and providing immediate feedback, which leads to a more inclusive and efficient learning environment (Kamalov et al., 2023). In this context, reflecting on AI's implications in education becomes critical. At a Philippine State University, where tradition meets the future, understanding the attitudes and perceived usefulness of AI integration in teaching and learning is essential for fostering innovation and enhancing educational experiences (Estrellado & Miranda, 2023).

Integrating Artificial Intelligence (AI) into education holds immense potential, but it can bring significant risks if not used responsibly. One primary concern is educators' lack of awareness and understanding of AI's capabilities and limitations (Fahimirad & Kotamjani, 2018). Without proper knowledge, faculty members may either hesitate to adopt AI-driven approaches or misuse them, fearing that AI could replace their role or lower the quality of education (Aldosari, 2020). This reluctance or misuse can hinder AI's potential benefits, such as personalized learning, intelligent tutoring, and enhanced engagement, which could otherwise improve teaching and learning outcomes. A recent survey by Best Colleges (Nam, 2023) revealed that 56% of college students used AI in their exams or assignments, underscoring the need for proper education about AI use. Misuse or over-reliance on AI by students without a deep understanding of its ethical implications or potential pitfalls can lead to academic dishonesty and a lack of critical thinking skills. As noted by Esteban et al. (2023), while students are aware of AI's impact, their knowledge is often limited due to insufficient training, highlighting the need for better education on AI's appropriate use. Furthermore, while AI has the potential to promote a learner-centered approach and optimize instruction (Luan et al., 2020), its misuse could lead to ethical issues, such as biased decision-making or unfair treatment in automated systems. Educators need to be knowledgeable about AI's technical aspects and its ethical implications. Proper training is essential for faculty and students to avoid misconceptions and prevent the negative consequences of AI misuse (Chan & Tsi, 2023). In conclusion, while AI offers promising educational opportunities, the lack of understanding and improper use can lead to significant drawbacks. Providing proper training and raising awareness about AI's capabilities, ethical considerations, and responsible use is crucial to fully harness its potential while minimizing risks.

The Technology Acceptance Model (TAM) by Davis (1986) provides a valuable framework for examining attitudes and perceived usefulness of AI in teaching and learning. TAM suggests that users' acceptance and adoption of new technologies are influenced primarily by perceived usefulness (the belief that technology enhances job performance) and perceived ease of use (the belief that the technology is effortless to use). This model helps researchers understand the behavioral intentions of educators and students regarding AI integration in education (Granic & Marangunic, 2019). This study aims to assess attitudes toward AI integration and its perceived usefulness in teaching and learning. By applying TAM, the study can analyze how educators and students perceive AI and how these perceptions influence their willingness to adopt AI-based tools. Understanding these factors will inform strategies for effective AI implementation, ensuring higher acceptance and more impactful use of AI technologies in educational environments.

The significance of this study lies in addressing the gap in understanding the attitudes and perceived usefulness of AI integration in teaching and learning, particularly within the context of a Philippine State University. There is currently no policy regarding integrating AI tools for students and teachers in the research locale. Additionally, faculty members show limited concern about the potential increase in academic dishonesty associated with AI usage. Furthermore, there is a lack of in-depth understanding and awareness among educators and students of how AI can support authentic learning and enhance meaningful teaching delivery. As AI becomes more prevalent in education, it is crucial to ensure that students and faculty comprehend its proper use. This study explores knowledge, attitudes, and possible training needs regarding AI integration to inform educational stakeholders about its benefits and challenges. With AI integration into schools becoming inevitable, the study seeks to understand how students and faculty perceive AI as an academic tool. Proper AI utilization holds great potential to enhance education, but it must be carefully implemented within the educational setting (Fatlagic, 2022; Systo, 2022, as cited by Majewska-PyrKosz, 2023). By examining these perspectives, the study aims to bridge the gap in AI education, promote informed use of AI tools, and contribute to improved learning outcomes.

The researchers specifically aim to a) identify the most common AI; b) assess the attitudes and perceived usefulness of AI in teaching and learning as viewed by students and teachers; c) examine any differences between teachers and students in their perceptions of AI's usefulness and their attitudes toward it; and d) explore the relationship between their attitudes toward AI and how useful they find it.

2.0 Methodology

2.1 Research Design

This study utilizes an inferential research design to examine the attitudes and perceived usefulness of Artificial Intelligence (AI) integration in teaching and learning at a Philippine State University. This design is appropriate for exploring associations between two or more variables (Robinos et al., 2023). It is well-suited to this study as it enables the analysis of the relationship between students' and teachers' attitudes and their perceived usefulness of AI integration in an academic setting.

2.2 Research Locale

The study was conducted at one state university in Region IV-A, CALABARZON. The university offers eight bachelor's degree programs and two diploma programs. The university is located in the city of Biñan, Laguna, Philippines.

2.3 Research Participants

The target population consisted of 65 teachers and approximately 1,280 students enrolled in the second semester of the 2023-2024 school year. Student participants were selected from various courses, as the researchers believed that students' perspectives on AI as an academic tool would differ based on their field of study and experiences. Similarly, faculty members were expected to have their attitudes and experiences in integrating AI into delivering the curriculum, teaching, and assessment methods. To determine the sample size, the researchers used the Raosoft Sample Size Calculator, an online application, setting a 5% margin of error and a 95% confidence level. The calculated sample sizes were 56 faculty members and 296 college students. Respondents were randomly selected using the fishbowl technique to ensure fairness, giving each individual an equal chance of being chosen. This simple random selection method minimized bias (Robinos, 2022). It enabled the exploration of any differences and relationships between the attitudes and perceived usefulness of AI among students and faculty in the teaching and learning process.

2.4 Research Instrument

To investigate the attitudes and perceived usefulness of AI integration in teaching and learning at a Philippine State University, the researchers used a self-developed questionnaire divided into three main sections. The first section asked about the most commonly used AI tools by participants, the second focused on students' attitudes toward AI integration and its perceived usefulness, and the third was directed at faculty members. The instrument employed a 4-point Likert scale, ranging from "Strongly Agree" to "Strongly Disagree." After content validation by three experts in research, each holding a Master's Degree in Educational Technology, a pilot test was conducted with 30 students and 30 faculty members from a private institution (who were not part of the main study's sample). The instrument's reliability was confirmed with a Cronbach's alpha value of 0.92 for the student questionnaire and 0.87 for the faculty questionnaire, indicating high internal consistency and reliability.

2.5 Data Gathering Procedure

After finalizing the instrument, the researchers sought authorization to conduct the study from the office of the Research and Development center and the Campus Director. Once approval was granted, the randomly selected respondents, chosen through the fishbowl method, were given the survey questionnaires. The administration of the research instrument took place onsite over a week, ensuring that the sample size was distributed across various programs and that teachers could participate during their available time. Upon receiving the completed questionnaires, the researchers recorded the responses in an Excel sheet and submitted the data to a statistician for analysis. The study used descriptive statistics, including mean and frequency, to evaluate the data, and applied the Mann-Whitney U-Test and Spearman's rho to analyze relationships and differences. Non-parametric tests were chosen because the normality of the sample distribution was not tested, making these statistical methods appropriate for the analysis (Alcazaren & Robinos, 2022).

2.6 Ethical Considerations

Ethical standards were strictly upheld throughout the study, particularly in data collection. The researchers personally obtained informed consent from all participants, clearly explained the objectives of the study, and ensured complete awareness of the respondents' rights. The orientation conducted included informing the respondents about the confidentiality of their responses, their right to withdraw from the study at any time, and the procedures for data destruction. The researchers also ensured full compliance with the Data Privacy Act of 2021, safeguarding the privacy and security of all collected information.

3.0 Results and Discussion

3.1 Most Common AI Tools Among Faculty and Students

Artificial Intelligence (AI) is increasingly being integrated into educational settings, transforming how teachers and students interact with learning materials, available teaching resources, and other learning platforms. Based on Table 1, Grammarly (73%), ChatGPT (63%), and Canva (52%) are the most common AI tools utilized and integrated by the faculty. Meanwhile, students used Canva (97%), ChatGPT (96%), Quillbot (95%), and Grammarly (91%).

Table 1. Most common AI tools among faculty and students

AI in Education	Teachers		Students	
	f	%	f	%
Canva	29	52	288	97
ChatGPT	35	63	283	96
Grammarly	41	73	269	91
CoPilot	5	9	95	32
QuillBot	25	45	281	95
Turnitin	20	36	168	57

n = Students = 296 and Faculty = 56, Legend: f – frequency, % - percentage

The findings revealed that teachers and students increasingly embrace and adopt rapidly evolving educational technologies, particularly AI tools. Available AI tools like ChatGPT and online platforms like Canva for creating presentations can transform education. However, their successful integration requires addressing ethical and practical challenges (Adiguzel et al., 2023). AI tools directly linked to writing, such as Grammarly and Quillbot, were also identified as commonly used by both teachers and students. These tools enhance writing tasks like essays, reflections, and research. Furthermore, AI can personalize learning experiences by identifying students' interests and skills, providing relevant resources, and promoting creative collaboration among students with shared interests (Hasibuan & Azizah, 2023). This highlights the transformative potential of AI in fostering individualized learning, meaningful realization of intended learning outcomes, and innovation in educational environments.

3.2 Attitudes Towards Integration of AI in the Teaching and Learning Process

The overall mean in Table 2 reveals that students demonstrated a very high and positive attitude (x=3.355) on utilizing AI in education, particularly regarding its effectiveness in helping them meet their desired learning outcomes while recognizing the importance of not becoming overly reliant on its use. Moreover, the results indicate that students are aware of the ethical implications of AI, including its impact on human roles, fairness, and transparency in educational settings.

Table 2. Students' attitudes towards the integration of AI in the teaching and learning process

Indicators	Mean	Interpretation
1. AI enhances my learning experience as a student by providing personalized content, feedback, and learning pathways.	3.34	Strongly Agree
2. AI tools are easy to navigate and integrate into my academic activities.	3.26	Strongly Agree
3. AI is a reliable, accurate, and ethical tool for learning, though I have concerns about data privacy and biases.	3.12	Agree
4. AI-based tools make learning more interactive and motivating, encouraging me to actively participate in and sustain interest in academic tasks.	3.31	Strongly Agree
5. Over-reliance on AI might hinder the development of my critical thinking, creativity, and problem-solving skills.	3.65	Strongly Agree
6. AI positively influences my interaction and collaboration, especially during collaborative learning experiences.	3.26	Strongly Agree
7. I am aware of AI's ethical implications, particularly its potential impact on human roles in education, fairness, and transparency.	3.35	Strongly Agree
8. I see AI's potential to help me meet my learning expectations and needs.	3.55	Strongly Agree
Overall	**3.35**	**Very High Level**

Interpretation Scale: 1.00 – 1.75 = Strongly Disagree; 1.76 – 2.50 = Disagree; 2.51 – 3.25 = Agree; and 3.26 – 4.00 Strongly Agree
1.0 – 1.75 = Very Low; 1.76 – 2.50 = Low; 2.51 – 3.25 = High; and 3.26 – 4.00 Very High

These findings suggest that while students have an affirmative stance, are open to the integration of AI, and acknowledge its potential benefits in enhancing their learning experience, they also demonstrate a critical awareness of the potential risks associated with over-dependence on AI tools, explicitly leading to possible academic dishonesty. This balanced perspective highlights the need for HEIs, particularly academic leaders, to foster responsible AI use, ensuring students can maximize its advantages and be mindful of its limitations (Lampou, 2023). Additionally, the emphasis on ethical considerations implies that academic institutions should guide ethical AI usage, probably policies, and emphasize transparency to build trust and confidence in AI-driven educational solutions.

Table 3 presents teachers' very high positive attitudes toward integrating AI in education (x=3.348), particularly in the successful delivery of the curriculum and provision of meaningful teaching and learning experiences. Most indicators that provide teachers' attitudes and insights into how AI integration supports the teaching process received strong agreement. Based on Table 3, teachers highly acknowledged with confidence that AI will never replace them as teachers. AI is seen as a tool to assist and enhance the teaching and assessing process rather than replace teachers. It can personalize learning and teaching, provide adaptive assessments, and use data analytics to improve educational outcomes that teachers can utilize (Chan & Tsi, 2023). Moreover, teachers believe that through AI, collaboration with colleagues and students is in a great position. AI has great potential to improve education, but it should be approached with caution, and more research is needed to fully understand its impact and best apply it in classrooms (Mena-Guacas et al., 2023).

Table 3. Teachers' attitudes towards the integration of AI in the teaching and learning process

Indicators		Mean	Interpretation
1.	AI tools streamline administrative tasks (grading, attendance, etc.) and reduce my workload, allowing more time for lesson planning and student interaction.	3.22	Agree
2.	AI enhances the delivery of quality instruction by supporting personalized learning and adapting to diverse learners' needs.	3.34	Strongly Agree
3.	Integrating AI into teaching practices is easy, especially when training and support are available.	3.22	Strongly Agree
4.	AI integration contributes to my professional growth, providing opportunities for learning new technologies relevant to education.	3.38	Strongly Agree
5.	I'm not concerned about AI replacing teachers in grading, tutoring, or assessment tasks.	3.46	Strongly Agree
6.	Ethical concerns with AI include student data privacy, algorithmic bias, and fairness, which is why students need to be responsible users of AI.	3.30	Strongly Agree
7.	AI boosts student motivation, engagement, and learning outcomes by creating interactive and adaptive learning environments.	3.42	Strongly Agree
8.	AI reshapes collaboration with colleagues and students and may require changes in pedagogy or classroom management to leverage its benefits for teaching and learning fully.	3.44	Strongly Agree
Overall		**3.34**	**Very High Level**

Interpretation Scale: 1.00 – 1.75 = Strongly Disagree; 1.76 – 2.50 = Disagree; 2.51 – 3.25 = Agree; and 3.26 – 4.00 Strongly Agree
1.00 – 1.75 = Very Low; 1.76 – 2.50 = Low; 2.51 – 3.25 = High; and 3.26 – 4.00 Very High

3.3 Perceived Usefulness of Artificial Intelligence

The overall mean in Table 4, with a computed value of 3.678, indicates that students perceive AI as a handy tool in their learning experiences. This suggests that AI technologies support their academic efforts and improve their productivity by making learning resources more accessible and learning tasks more efficient. Students recognize that AI helps simplify complex concepts, personalize learning experiences, conduct effective independent learning, and enhance engagement with educational content.

As expected in this 21st-century education, the positive perception of AI's usefulness implies that students are more engaged and productive in their academic work when AI is integrated into their learning environment. This could lead to better learning outcomes, as students can access tailored resources that cater to their individual needs and preferences, more so attaining authentic and relevant learning. As students find AI tools beneficial, educational institutions may consider expanding the integration of AI-driven technologies across different courses and subjects to maximize these benefits. This could enhance the learning experience and ensure students receive more personalized support (Kumar & Raman, 2022; Idroes et al., 2023).

Table 4. Students' perceived the usefulness of Artificial Intelligence

Indicators	Mean	Interpretation
1. AI helps me understand complex subjects by providing personalized feedback and tailored study materials.	3.58	Strongly Agree
2. Using AI tools saves me time and makes completing assignments and research tasks more efficient.	3.66	Strongly Agree
3. AI enhances my academic performance by adapting to my learning pace and offering customized learning resources.	3.73	Strongly Agree
4. AI makes accessing relevant information and learning materials more accessible based on my academic needs.	3.78	Strongly Agree
5. AI improves group collaboration by facilitating better communication and real-time assistance during group projects.	3.65	Strongly Agree
6. AI helps me continuously develop new skills and stay updated with the latest knowledge in my field of study.	3.67	Strongly Agree
Overall	**3.678**	**Very Useful**

Interpretation Scale: 1.00 – 1.75 = Strongly Disagree; 1.76 – 2.50 = Disagree; 2.51 – 3.25 = Agree; and 3.26 – 4.00 Strongly Agree
1.0 – 1.75 = Very Low; 1.76 – 2.50 = Low; 2.51 – 3.25 = High; and 3.26 – 4.00 Very High

Meanwhile, the overall mean in Table 5, with a calculated value of 3.402, indicates that teachers perceive AI as a handy tool for professional development. It enables them to design more interactive and dynamic learning strategies that enhance student motivation and engagement. Additionally, teachers view AI tools as instrumental in increasing their effectiveness, efficiency, and productivity by helping them monitor student performance. This allows them to identify areas of improvement or address potential academic concerns in a timely manner.

Table 5. Teachers' perceived usefulness of Artificial Intelligence

Indicators	Mean	Interpretation
1. AI enhances my ability to provide personalized instruction by adapting lessons to meet students' diverse needs.	3.22	Agree
2. AI saves time on administrative tasks like grading and attendance, allowing me to focus more on teaching and student engagement.	3.34	Strongly Agree
3. AI supports differentiated instruction by offering tailored resources that match students' learning levels and preferences.	3.24	Agree
4. AI helps me track student progress more effectively by providing real-time insights into performance and areas for improvement.	3.42	Strongly Agree
5. AI-based tools enable more interactive and dynamic classroom experiences, improving student motivation and participation.	3.56	Strongly Agree
6. AI assists in my professional development by keeping me informed about the latest trends and technologies in education.	3.62	Strongly Agree
Overall	**3.40**	**Very Useful**

Interpretation Scale: 1.00 – 1.75 = Strongly Disagree; 1.76 – 2.50 = Disagree; 2.51 – 3.25 = Agree; and 3.26 – 4.00 Strongly Agree
1.00 – 1.75 = Very Low; 1.76 – 2.50 = Low; 2.51 – 3.25 = High; and 3.26 – 4.00 Very High

The affirmative perception of AI's usefulness among teachers implies that AI integration could lead to more effective teaching strategies. By leveraging AI to craft engaging learning experiences, teachers are better equipped to address diverse learning needs, ultimately improving student outcomes (Abdulmumen, 2023; Chan & Tsi, 2023). Teachers' ability to monitor student performance through AI tools suggests they can more proactively intervene when students face academic challenges. This could result in earlier identification of learning gaps, providing opportunities for timely intervention and support to prevent academic struggles from escalating.

3.4 Difference in the Attitudes of Students and Faculty Towards Integrating AI

Table 6 shows that there is no significant difference in the attitudes of students and faculty towards integrating AI in the teaching and learning process (z = 0.14822, p = 0.88076). However, a significant difference was found in students' and faculty's perceptions of AI's usefulness (z = 3.00161, p = 0.0027).

Table 6. Results of Mann Whitney U-test of significant differences

Variables	U Value	Z-score	P-value (2-tailed)
Attitudes	8184	0.148	0.8807
Usefulness	6191	3.001	0.0027

Note: The result is significant at p<.05. n = 296 (Students) and 56 (Faculty)

The similarity in attitudes suggests a shared openness among students and faculty toward integrating AI in teaching and learning. This alignment may facilitate smoother adoption and acceptance of AI-driven initiatives within the learning environment, as both groups are receptive to the potential benefits AI can bring to the educational process (Chiu et al., 2021). The significant difference in perceived usefulness indicates that students and faculty may view AI's role in education differently. While students might see AI as a resource that enhances access to learning tools and supports academic tasks, faculty may value AI more for its ability to streamline instruction, support teaching efficiency, and offer new ways to engage students. Understanding these differences can help tailor AI policies, training, and resources to meet each group's unique needs, maximizing AI's impact on teaching and learning. Still, in general, students and faculty both acknowledge the usefulness of AI in education, although with different focal points. Students appreciate AI for its role in personalizing and improving learning, while faculty members value AI for its ability to enhance teaching effectiveness and streamline administrative tasks (Holmes et al., 2029; Chen et al. 2020; and Bation & Pudan, 2024).

3.5 Relationship Between Students' Attitudes Toward AI and their Perception of its Usefulness

Table 7 shows a significant relationship between students' attitudes toward AI and their perception of its usefulness in teaching and learning (Rho = 0.29421, p = 0.0000). However, no significant relationship was found between faculty attitudes and their perceived usefulness of AI (Rho = 0.29421, p = 0.086031).

Table 7. Results of Spearman's Rho test of relationships

Designation	Rho Value	P-value (2-tailed)
Students	0.29421	0.00000
Faculty	0.02406	0.86031

The positive relationship between students' attitudes and their perceived usefulness of AI, according to Idroes et al. 2023 and Almasri, 2024, suggests that as students see more benefits in AI tools, their attitudes become more favorable. This insight highlights the importance of demonstrating AI's practical advantages to students, which could enhance their enthusiasm and willingness to engage with these technologies as part of their academic experience. However, the lack of a significant relationship for faculty may imply that their attitudes toward AI may not directly correlate with perceived usefulness, indicating that factors other than perceived utility—such as ethical considerations, workload impact, or professional development needs—may shape their overall attitude (Chounta, 2021). Addressing these additional factors in faculty training or resources could increase AI adoption and support faculty in integrating AI into their teaching practices more effectively.

4.0 Conclusion

The study indicates that both students and teachers show very high positive attitudes towards AI, with a shared openness to integrating AI into the teaching and learning process. Students frequently use AI tools like Canva, ChatGPT, Grammarly, and Quillbot, perceiving AI as beneficial for achieving their learning goals and accessing resources efficiently. Teachers view AI as an asset for professional growth, enabling them to effectively design more dynamic teaching strategies and monitor student performance. However, while there was no significant difference in attitudes toward AI integration between students and faculty, a significant difference emerged in their perceived usefulness of AI, suggesting that students focus on AI as a learning aid. At the same time, teachers value its role in instructional efficiency and student engagement.

Additionally, the study found a significant relationship between students' attitudes toward AI and their perception of its usefulness in their learning process, implying that students who see the benefits of AI tend to have more favorable attitudes toward its use. Conversely, the lack of a significant relationship between faculty attitudes and the perceived usefulness of AI suggests that these attitudes may be influenced by factors like ethical concerns and a need for professional development rather than utility alone. Faculty inconsistency could hinder successful AI integration in curriculum delivery, which may limit students' benefits. Addressing this requires clear institutional policies or process flow on ethical AI use and professional training on its educational value. Such policies or process frameworks could help faculty view AI as a beneficial tool, supporting smoother and more effective adoption in teaching. Furthermore, future research may consider acknowledging the potential impact of attitudes toward AI on perceptions regarding its application and use in curriculum delivery to provide a more nuanced interpretation of results.

5.0 Contributions of Authors

All authors have contributed equally to writing, data gathering, analyzing the study results, and finalizing the article.

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7.0 Conflict of Interests

No potential conflict of interest.

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Exploring the Influence of Field-Based Learning Experiences on the Professional Development of Pre-Service Teachers

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Abstract. This study investigates the impact of field-based teaching experiences on the professional development of 110 randomly selected pre-service teachers at a Philippine State University in Binan City, Laguna, Philippines. Utilizing an inferential quantitative research design, the study employed a researchers-made survey questionnaire that was validated and tested for reliability (Ca = 0.92), distributed via Google Forms, and analyzed through mean and Pearson "r" coefficient correlation. The findings revealed that field-based experiences were implemented very well (M = 3.844), with students generally rating their professional growth as very high (M = 3.816). Furthermore, calculated correlation analysis indicated a strong positive significant relationship [r(108) = 0.891, p = 0.0000] between field-based experiences and professional development. The study concluded that these field experiences significantly enhance students' practical understanding, confidence, instructional and assessment skills, and commitment to life-long learning. Recommendations include the strict implementation of practice teaching processes, the establishment of evaluation mechanisms for continuous improvement, and further research to investigate differences across fields of specialization and types of higher education institutions.

Keywords: Field-based learning; Influence, Pre-service teachers; Professional development.

1.0 Introduction

Teaching practice is vital to all teacher education programs, allowing graduates to earn a teaching credential. It allows student-teachers to apply the teaching methods they have learned during their studies. Through teaching practice, they gain real-world experience in the classroom before officially becoming teachers (Mahmood et al., 2023). This process helps develop essential skills such as communication, teaching techniques, and cultural understanding beyond just knowing what and how to teach (Garcia-Noblejas et al., 2023). The teaching practice program has three main goals: a) to let student-teachers apply their knowledge in natural settings, b) to assess their potential as teachers and offer feedback, and c) to provide practical experience in managing classrooms and adapting to new challenges. In the Philippines, student-teacher practice is a long-standing tradition in teacher education programs, where students typically spend four years in structured learning. However, practical teaching experience can sometimes be limited.

Professional growth is essential for every teacher, improving their knowledge, skills, and effectiveness. This includes workshops, conferences, advanced degrees, and online courses. Professional development is an ongoing process that helps teachers stay current with new teaching methods and strategies, directly impacting the quality of education (Taylor, 2020). By engaging in professional development, teachers can adapt to evolving educational practices and meet the diverse needs of their students. This enhances student learning outcomes and boosts teachers' confidence and expertise, making professional development a critical factor in educational success (Neyney et al., 2023).

While many student-teachers view teaching practice as an exciting opportunity to apply their knowledge, significant challenges often accompany it. Despite training in teaching techniques, many struggle to effectively apply theoretical knowledge in real classroom settings (Childhope Philippines, 2021; Yu, 2023). The Philippine education system faces broader issues, such as curriculum gaps, inadequate teacher training, resource shortages, and misalignments between teacher specializations and their assigned subjects (Educating Teacher Education, 2023; Hegwood, 2023; Jones, 2023). These issues impact student learning and teacher preparedness. Although previous research has highlighted challenges such as insufficient training, low compensation, and inadequate resources, the specific role of practice teaching in shaping the professional growth of education students has not been fully explored. The gap lies in understanding how practice teaching directly influences the development of essential teaching competencies and professional skills among student-teachers, which this study aims to address.

This study is based on Social Cognitive and Experiential Learning Theory (Kolb, 1984), which posits that learning is a cyclical process involving concrete experiences, reflective observation, abstract conceptualization, and active experimentation. It emphasizes observational learning, modeling, and imitation (Bandura, 1986; Kong, 2021), where students learn by observing and interacting with experienced educators (Hoose, 2020; May-Varas et al., 2023). Previous studies have used this framework to assess how field experiences contribute to skill development and professional growth in education students. During field experiences, education students actively participate in teaching, reflect on their actions, and derive general principles from these experiences. Observing experienced teachers allows students to internalize effective teaching practices and classroom management skills, which helps shape their professional identities. The continuous cycle of experiential learning, as students apply their new knowledge in real-world situations, is hypothesized to enhance their professional development significantly (Cherry, 2022).

This study holds significance for various stakeholders. University supervisors can gain valuable insights to improve field experience programs, ensuring they provide substantial learning opportunities for education students. Stakeholders, such as school administrators and policymakers, can use the findings to enhance teacher recruitment and policy implementation. Cooperating teachers will benefit from guidance on mentoring student teachers during their practicum. In contrast, pre-service teachers will gain a deeper understanding of how to apply theoretical knowledge in real-world settings. Additionally, researchers can use the study to assess their teaching readiness, and future researchers can build on the findings to explore further areas of professional development in education.

The main objective of this study is to explore the influence of field study and practice teaching on the professional development of graduating college education students. Specifically, the researcher aims to: a) determine the extent of the implementation of field-based teaching experiences; b) identify the perceived level of professional development attained by graduating students through their participation in field experiences; and c) investigate the significant relationship between the extent of field-based teaching implementation and the perceived level of professional development among graduating students.

2.0 Methodology

2.1 Research Design

This quantitative study used an inferential research design, which has helped to explore associations between two or more variables (Robinos et al. 2023). The researcher's purpose in using an inferential research design was to discover the relationship between field experience and professional development of education in a Philippine State University and to generalize findings from the sample to the larger population.

2.2 Research Locale

The study was conducted at the Polytechnic University of the Philippines – Binan Campus. The campus was created through a memorandum of agreement between the university and the city government of Biñan in 2010. The campus is located in Biñan, Laguna, Philippines, offering eight (8) undergraduate courses and two (2) diploma programs. Among these undergraduate programs are Bachelor of Elementary and Secondary Education majors in English and Social Studies.

2.3 Research Participants

The study focused on fourth-year college students pursuing an Education degree enrolled in the second semester of the school year 2023-2024, with a total population of 148 pre-service teachers. Considering the inferential statistics, the achieved power is 0.85 with the following assumptions: a) effect size = small (0.1) and) threshold of statistical significance of 0.05 or 5%, the qualified sample size of 110. The researchers employed a simple random selection technique to mitigate bias and provide each individual in the entire population with an equitable opportunity for selection (Mahmutovic, J. 2022) to investigate the influence of field experience on the professional growth of education students in a Philippine State University.

2.4 Research Instrument

A researcher-made survey questionnaire was used to determine the relationship between field experience and the professional development of pre-service teachers. The research instrument contains two parts, with the consent letter as the introductory portion. Part I is about implementing the field teaching experience, while Part II includes the extent of perceived professional development among student-teachers. The survey questionnaire utilized a 4-point Likert scale interpreted from very high to very low extent (Implementation) and levels of agreement (perception of professional growth). After the content validation among experts in the research and education field, a pilot test was conducted among 30 pre-service teachers not included in the sample size, and reliability was calculated, leading to a Cronbach alpha value of 0.92. Implementation of field-based learning was cross-checked using the Manual for Practice Teaching of the College of Education.

2.5 Data Gathering Procedure

Before distributing the survey questionnaire via Google Forms, the researchers requested authorization to conduct the study in the office of the head of the academic program and the campus director. Upon approval, the randomly chosen respondents via the Wheel of Names online application were given the online survey administered by the researchers. Once the survey questionnaire was returned, the researchers downloaded the Excel sheet and submitted the gathered data to a statistician for statistical analysis and interpretation to evaluate the collected data.

2.6 Data Analysis

To analyze the collected data, the researchers used the mean to measure the extent of implementation of field-based teaching experiences and the perceived professional development of pre-service teachers. To determine the association between the extent of implementation of practice teaching and the perceived professional growth of pre-service teachers, the Pearson *r* correlation coefficient was applied.

2.7 Ethical Considerations

Ethical standards were maintained throughout the course study by carefully paying attention to procuring the necessary data. The researchers personally asked for consent, explained the study rationale, and oriented the participants on their rights, including data destruction and the Data Privacy Act of 2021 observance.

3.0 Results and Discussion

3.1 Extent of Implementing the Field-Based Teaching Experience

Table 1 shows the weighted mean with the interpretation of the respondents' perceived extent of implementing field-based teaching experiences in a Philippine State University. The table reveals that field-based learning experiences are highly implemented (x=3.844, very high extent).

Table 1. Extent of implementing the field-based teaching experiences

Indicators	Mean	Interpretation
Establishing Partnerships – the university partners with schools to provide student-teachers with practical teaching experiences. Cooperating teachers from partner schools are selected to mentor and supervise student-teachers.	3.87	Very High Extent
Orientation and Preparation – Student-teachers undergo orientation sessions to familiarize themselves with the school's policies, classroom environment, and expectations. Before entering the classroom, student-teachers work on lesson plans and teaching materials, often in consultation with their university supervisors or cooperating teachers.	3.92	Very High Extent
Observation and Classroom Immersion – Student-teachers first observe their cooperating teachers in action. Following observation, student-teachers may gradually take on minor roles, such as assisting with classroom management, preparing teaching materials, or conducting parts of lessons under the cooperating teacher's supervision.	3.62	Very High Extent
Demo Teaching – Student-teachers begin conducting complete lessons, known as demo teaching. After demo teaching sessions, student-teachers receive feedback from the cooperating teacher and their university supervisor.	4.00	Very High Extent
Classroom Teaching Practice – After successful demo lessons, student-teachers take on more responsibility by teaching lessons independently. Throughout the teaching practice, cooperating teachers and practice teaching supervisors continue to provide and offer guidance and assess the student-teacher's progress.	3.71	Very High Extent
Evaluation and Assessment of Student-Teachers – Student-teachers are regularly evaluated based on their teaching performance, classroom management, lesson planning, and adaptability. At the end of the teaching practice, student-teachers undergo a final evaluation.	3.81	Very High Extent
Evaluation of Student Learning – Student-teachers are also responsible for evaluating their students' learning progress. This includes administering assessments, providing feedback, and adjusting teaching strategies to meet student needs.	3.82	Very High Extent
Final Reporting and Certification – Student-teachers submit a narrative report or portfolio that includes their lesson plans, teaching reflections, and feedback from supervisors and cooperating teachers. Student-teachers are awarded a teaching credential upon successful completion, recognizing their preparedness to enter the teaching profession.	4.00	Very High Extent
Overall	**3.844**	**Very High Extent**

Interpretation Scale: 1.00 – 1.75 = Very Low; 1.76 – 2.50 = Low; 2.51 – 3.25 = High; and 3.26 – 4.00 Very High Extent

Findings revealed that the field-learning experiences given to pre-service teachers of the PUP-Binan campus are highly observed, starting from partnership up to certification. The implemented field-based learning ensures that student-teachers gain hands-on experience while supported by experienced educators, ultimately preparing them for their teaching careers. Today, higher education institutions utilize comprehensive education management solutions to streamline procedures and provide students with a quality field-based learning experience (Borkar, 2021). According to the study by Kaiser and König (2019), field-based experiences, such as student teaching practicums, are essential components of many teacher education programs. These experiences offer teacher candidates invaluable opportunities to acquire practical skills and knowledge in natural classroom settings. Educational policies may regulate various aspects of these field experiences, including stipulating the minimum duration of required student teaching, establishing partnerships and collaboration frameworks, defining expected levels of supervision and mentoring, and facilitating demo teaching, conferences, and academic merit assessments. Teacher education is a foundation for student teachers to gain the necessary knowledge, skills, and competencies while cultivating positive attitudes and values that empower them to apply the curriculum effectively (Chirwa et al., 2023). Pre-service teachers typically progress from observational experiences to more active and involved roles during their post-secondary studies. Additionally, student teaching is a practical learning opportunity in a real-world setting that lasts for an entire semester, usually in the last semester before graduation (OTE, 2021).

3.2 Professional Development among Pre-service Teachers

Table 2 reveals that the respondents' perceived overall professional development attained while taking field-based learning experience is very high (x=3.816 = strongly agree, which means very high level). Results validate the social cognitive and experiential learning theory, which posits that learning and progress occur in a cyclical process involving concrete experiences, reflective observation, abstract conceptualization, and active experimentation (Hoose, 2020).

Table 2. Extent of implementing the field-based teaching experiences

Indicators	Mean	Interpretation
Enhanced Teaching Skills: Pre-service teachers develop and refine their instructional strategies, classroom management techniques, resourcefulness and lesson planning skills through hands-on teaching experience.	3.89	Strongly Agree
Reflective Practice: Pre-service teachers enhance their ability to reflect on their teaching practices, evaluating what works well and identifying areas for improvement.	3.78	Strongly Agree
Improved Classroom Management: They learn effective classroom management techniques by engaging directly with students, including behavior management and creating a positive learning environment.	3.99	Strongly Agree
Application of Educational Theory: They learn to apply educational theories and concepts learned in their coursework to real-world classroom scenarios, bridging the gap between theory and practice.	3.56	Strongly Agree
Increased Confidence: Through practical experience and mentor feedback, pre-service teachers often gain confidence in their teaching abilities and decision-making skills.		Strongly Agree
Assessment and Evaluation Skills: They improve their skills in assessing student performance and understanding how to use data to inform instruction and provide constructive feedback	3.92	Strongly Agree
Development of Professional Relationships: They build relationships with cooperating teachers, school administrators, and peers, fostering a network of professional support that can aid their future careers	3.68	Strongly Agree
Commitment to Lifelong Learning: Exposure to professional development opportunities and mentoring encourages pre-service teachers to pursue continuous learning and growth in their teaching careers.	3.89	Strongly Agree
Overall	**3.816**	**Strongly Agree (Very High)**

Interpretation Scale: 1.00 – 1.75 = Strongly Disagree; 1.76 – 2.50 = Disagree; 2.51 – 3.25 = Agree; and 3.26 – 4.00 Strongly Agree
1.00 – 1.75 = Very Low; 1.76 – 2.50 = Low; 2.51 – 3.25 = High; and 3.26 – 4.00 Very High Level

Under the supervision of experienced teachers, pre-service teachers receive guidance on their roles, responsibilities, and how to conduct themselves professionally. Practice teaching ensures that student-teachers are prepared for their assignments and are familiar with the classroom setting, student behavior, and the teaching and assessment methods experienced educators use. The results implication highlights that pre-service teachers realize teaching competence, professionalism, and growth throughout the practicum period. The result provides a lens on how field experiences act as catalysts in the experiential learning process, thereby significantly contributing to the professional development of education students, which is already seen after the study to develop different field experiences of pre-service teachers (Vukelic, 2022 & Kim, 2017). In addition, according to Khajornsilp et al. (2021) and Cassidy et al. (2018), any students with a comprehensive training program achieve specific development, which is crucial to understanding the general scope of the education process. Field-based learning experiences expose students to the early life concept of education, the challenges, and societal demands, enhancing their growth and commitment to the teaching profession.

3.3 Relationship Between Extent of Implementation of Field-Based Learning Experience and the Perceived Level of Professional Development

Table 3 shows a very high, positive, significant relationship between the extent of implementing field-based learning experiences and the level of perceived professional growth attained by pre-service teachers in a Philippine State University, r=0.891, n=110, p=.00000.

Table 3. Result of Pearson "r" test of the relationship between the extent of the implementation of field-based learning experience and the perceived level of professional development

		Extent of Implementation	Level of Professional Development
Extent of Implementation	Pearson Correlation	1	0.891
	Sig. (2-tailed)		.0000
	N	110	110
Level of Professional Development	Pearson Correlation	0.891	1
	Sig. (2-tailed)	.0000	
	N	110	110

Note: The result is significant at p<.05

This finding aligns with the previous research conducted by Kulgemeyer et al. (2020), Bates & Burbank (2019), and Barnes (2020), which highlighted the positive impact of practical and field-based learning experience on enhancing professional expertise development. Properly structured field experiences facilitate the cultivation of content, practical abilities, and attitudes while enabling critical reflection on one's practice. Similarly, the findings support Padillo et al.'s (2021) research, which emphasized the importance of practical experiences in shaping future educators' skills, confidence, and understanding of the teaching profession (Robinos et al., 2022).

4.0 Conclusion

Field-based teaching experiences at a Philippine State University are effectively implemented through comprehensive policies and processes. These include establishing linkages, conducting orientations, planning and final reporting and certification, and ensuring that pre-service teachers receive proper monitoring, supervision, and guidance. Graduating students who participated in these field-based experiences reported high professional development, resulting in enhanced confidence, improved classroom management, teaching and assessment skills, reflective practice, professional relationships, and a commitment to lifelong learning. Additionally, practice teaching experiences significantly contribute to the professional growth of pre-service teachers by providing practical insights, boosting their confidence, and preparing them for the complexities of the teaching profession, as evidenced by the calculated very high positive R-value. Based on these findings, the researchers recommend strictly implementing practice teaching processes and conducting evaluations for continuous improvement. Future research may explore the long-term impact of field-based teaching experiences on alumni and investigate specific elements of field-based programs that significantly contribute to professional growth. Furthermore, differences in implementation and professional growth outcomes should be examined across various fields of specialization and between public and private higher education institutions (HEIs).

5.0 Contributions of Authors

The corresponding authors had shared greater writing responsibilities. All the co-authors contributed equally to writing, data gathering, analyzing the study results, and finalizing the article.

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7.0 Conflict of Interests

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