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Address: Katipunan St, Tisa, Cebu City, Philippines

Tel # (+32) 238 2027

Email: submissions@jippublication.com

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Training and Development Practices and their Influence on Workers' Job Performance

Ernesto Tumacole, Jr.

Negros Oriental State University, Dumaguete, Negros Oriental, Philippines

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Abstract. Training is the most crucial variable in each area, as it increases workers' and the organization's competency and viability. It enhances employees' skills because, without training, workers fall short of the abilities anticipated for their responsibilities. Therefore, the researcher has investigated the present study to provide recommendations either to find a permanent solution to the existing problem or to decrease the existence of the present condition. The present study employed a descriptive research design, utilizing a questionnaire as the primary tool for data collection. The respondents for this study were employees at an international ministry. The researcher used a validated survey questionnaire to gather data from 60 respondents. The results revealed the substantial impact of training and development on job performance, highlighting its pivotal role in achieving excellence and competencies across various dimensions. The identified strong positive relationship between training/development and job performance emphasizes the integral role played by these initiatives in enhancing the capabilities and overall performance of the Ministry's workforce. Based on the study's findings, recommendations for the Ministry include the continuation of needs-based program design, aligning training initiatives with organizational goals, and maintaining a sufficient budget allocation for ongoing workforce development.

Keywords: Training and development practices; Job performance; Workforce development; Organizational competency.

1.0 Introduction

Employee training and development are vital in the workplace, with a constant demand for improving performance and acquiring new skills (Armstrong, 2001). Organizations recognize the significance of managing human resources since employees are crucial for productivity and success (Elnaga & Imran, 2013). Without a skilled labor force, no equipment or resources can fulfill organizational objectives. Training is the intentional effort to develop employees' skills and knowledge for their roles, an investment in their abilities (Elnaga & Imran, 2013).

Training is not just about current job skills but also about building a foundation for career growth (Elnaga & Imran, 2013). It sets employees up for success in an organization and helps overcome career-related limitations. Ezeani & Oladele (2013) describe training as nourishment and exercise for employees' cognitive, emotional, and physical abilities, crucial for enhancing productivity. Devi and Shaik (2012) stress that training unlocks potential development and improvement, a key strategy for organizational success through capable employees.

Investing in training is a strategic decision for any organization, requiring significant resources but resulting in improved employee performance (Devi & Shaik, 2012). It is an ongoing process that helps employees integrate new skills into their daily work, bridging the gap between current and ideal abilities (Ezeani & Oladele, 2013).

Reskilling and upskilling employees ensure they meet future demands and align with the organization's vision (Devi & Shaik, 2012).

In this context, the current study aims to address organizational gaps hindering effective training and learning capacity (Devi & Shaik, 2012). Overcoming challenges during training, actively listening, and modeling desired behaviors are crucial steps for successful implementation (Ezeani & Oladele, 2013). Training is pivotal for organizational competence and efficiency, recognized even by international ministries (Devi & Shaik, 2012). The study seeks to offer recommendations to permanently resolve existing issues or mitigate their impact, aligning training efforts with organizational goals and success.

2.0 Methodology

2.1 Research Design

The study employed a quantitative research design specifically the descriptive-correlation type. It is descriptive because it will describe the current practices of Banner International. It is also correlation since it also focuses on the conditions of relationships, prevailing practices, ongoing beliefs, and processes, felt effects, or developing trends (Calderon, 1993)

2.2 Research Participants

The respondents for this study were employees at an international ministry in Dumaguete City. Among the 60 workers surveyed, 60% were aged between 21 to 44 years. The majority of respondents were female, making up 70% of the sample, while males accounted for 30%. In terms of education, 60% of the workers had attained at least tertiary-level education. Regarding tenure at the ministry, 83.33% of respondents had been with the ministry for one to five years. Additionally, 61.67% of the workers were voluntary workers. Given the total number of workers being surveyed (60), no sampling was necessary for this study.

2.3 Research Instrument

The researcher employed a survey questionnaire to gather data from the workers of an international ministry in Dumaguete City, aimed at assessing Training and Development's impact on job performance. To ensure the questionnaire's validity and reliability, a panel of experts reviewed it for relevance and substance. After this review, the researcher used Mega Stat software to validate the questions, resulting in a coefficient alpha score of 0.89, indicating high validity.

Following validation, the questionnaire underwent pilot testing in Dumaguete City with 20 respondents. The Cronbach Alpha test was utilized to evaluate the items' consistency in the research instrument. The obtained alpha coefficient was 0.89, which Zikmund et al. (2009) consider highly acceptable, indicating excellent reliability. Consequently, the instrument used in this study is deemed both valid and reliable for assessing the impact of Training and Development on job performance among workers.

2.4 Data Gathering Procedure

In the initial phase of the research activity, the researcher sought information relevant to the population under study. With the go-signal from the panel/thesis committee and upon the approval of the formal request for administering the questionnaire, the researcher proceeded to gather data by scheduling a specific date and time for orienting the respondents on the study's objectives and importance before the actual administration of the questionnaires. After collecting the necessary data, the researcher examined the raw data and prepared tables for various analyses with the assistance of a statistician. The distribution of the instruments was personally conducted by the researcher to minimize non-responses. The retrieval of the completed questionnaires took place on the agreed-upon date between the researcher and the respondents.

2.5 Data Analysis Procedure

For the data analysis, relevant statistical techniques were applied using statistical software. The frequency distribution was used to analyze the numerical profiles of the respondents and their performance ratings. This method provides a clear overview of the distribution of responses across different categories. In addition to the frequency distribution, simple Pearson correlation was employed to test relationships between variables. This

technique helps to determine if there is a statistical relationship between two variables, such as the relationship between training participation and job performance.

Furthermore, the research questions addressing the extent of agreement with statements in the questionnaire were analyzed using the weighted mean. The weighted mean allows for a more nuanced analysis by considering the importance or weight of each response. This provides insight into how strongly respondents agree or disagree with specific statements related to Training and Development and its impact on job performance. By utilizing these statistical techniques, the study was able to comprehensively analyze the data collected from the survey questionnaire. The frequency distribution provided a descriptive summary, correlation analysis tested for relationships, and the weighted mean allowed for a nuanced understanding of respondents' agreement with questionnaire statements.

2.6 Ethical Considerations

The researcher carefully considered ethical considerations in conducting the research, ensuring transparency, informed consent, voluntary participation, confidentiality, and the well-being of the participants.

3.0 Results and Discussion

3.1 Demographic Profile of the Respondents

The first part of the questionnaire includes five items about the profile of the respondents, such as age, sex, educational attainment work experience in the ministry, and current position. The data are presented in Table 1.

Table 1. Profile of the respondents		
Profile	Frequency	Percentage
Age		
15-20	8	13.33
21-26	17	28.33
27-32	9	15.00
33-38	5	8.33
39-44	4	6.67
45-50	7	11.67
51-56	5	8.33
57 and above	5	8.33
Sex		
Male	18	30.00
Female	42	70.00
Educational Attainment		
Elementary	3	5.00
Secondary	21	35.00
Tertiary	14	23.33
College Graduate	22	36.67
Work Experience		
1-5	50	83.33
6-10	10	16.67
Current Position		
Ministers	23	38.33
Voluntary Workers	37	61.67

In Table 1, 60% of respondents fall within the age range of 21 to 44, indicating a predominantly youthful and trainable workforce. The gender distribution shows a higher representation of females, constituting 70% of the respondents. In terms of education, the majority have at least a college-level qualification, emphasizing the value placed on higher education for skill enhancement. Work experience reveals that 83.33% of respondents have 1-5 years of experience, with a mix of relatively experienced and inexperienced individuals, emphasizing the need for periodic refresher training. Occupationally, 38.33% are ministers, while 61.67% belong to the category of voluntary workers, highlighting a diverse workforce with a significant presence of rank-and-file employees.

3.2 Training Needs Assessment

Training Needs Assessments are a popular and helpful tool for human resource development professionals in identifying an organization's employees' skills, knowledge, and talents. At the same time, it provides

information on areas where training programs may be most successfully deployed (Dahiya & Jha, 2011). Before establishing a training program in the ministry, a needs assessment should be performed.

As shown in Table 2, statement (a) "training needs assessments are conducted properly" shows that 42 respondents chose strongly to agree, 13 respondents chose agree, three respondents chose neutral, three respondents chose disagree, and zero respondents disagreed. The data suggest that the respondents believe that training needs assessments are conducted properly to identify training needs. The weighted mean of 4.55 (strongly agree) indicates that the respondents strongly agreed with the said statement because training assessment measures if a training need exists and, if it does, it identifies the specific training that needs to be conducted to fill the gap.

Table 2. The extent of the training and development practices in terms of needs assessment

	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Interpretation
1.	Training needs assessments are conducted properly	42	12	3	3	0	4.55	Strongly Agree
2.	Training selection is based on the result of needs	40	13	7	0	0	4.55	Strongly Agree
3.	The ministry assesses the trainees' knowledge before selecting the training	39	16	3	1	1	4.52	Strongly Agree
4.	The workers attend the training that are appropriate to the needs of the Ministry and in line with its goals and objectives	47	9	4	0	0	4.72	Strongly Agree
	Composite Mean						4.58	Strongly Agree

Also, for statement (b) regarding "training selection is based on the result of needs assessment," 40 respondents strongly agreed, 13 respondents agreed, seven respondents chose neutral, and none disagreed or strongly disagreed. As a result of the remarks, it can be concluded that the overwhelming majority of 53 out of 60 respondents agreed with the said statement. This finding is also strengthened by the weighted mean of 4.55 (strongly agree), which implies that the organization's training selection is based on an assessment of training needs geared toward equipping the organization's members with knowledge and skills and encouraging them to build and enhance their capabilities.

The statement (c) "The Ministry assesses the trainee's knowledge before selecting the training program," 39 respondents strongly agreed, 16 respondents agreed, three respondents chose neutral, one respondent chose disagree, and another one chose strongly disagree. As a result of the aforesaid replies, a conclusion is reached that most of the respondents, 55 out of 60, agreed. In this regard, the Ministry did examine the workers' skill gaps during the assessment of training needs. This is also supported by the weighted mean of 4.52 (strongly agree).

For statement (d) about "The workers attend the trainings that are appropriate to the needs of the Ministry and in line with its goals and objectives," 47 respondents chose strongly agree, nine chose agree, four chose neutral, and no one disagreed or strongly disagreed. Consequently, most of the respondents felt that the workers who attended the training meet the needs of the departments and have shown alignment with the organization's objectives, as can be gleaned from the weighted mean of 4.72 (strongly agree).

The aggregate mean for the Training and Development Practices in terms of Needs Assessment is 4.58 (strongly agree), implying that training needs assessments are fully implemented in the ministry.

3.3 Program Design

Employee Training and Development Programs are developed to accomplish certain objectives that benefit both employees and corporate effectiveness. Reviewing organizational objectives, evaluating the organization's current management resources, determining individual needs, designing, and implementing development programs, evaluating the effectiveness of these programs, and measuring the impact of training on the participants' quality of work life are all part of this. Training must be developed to meet the needs that have

been identified. Effective training design considers learning ideas, legal concerns, and various training methodologies (Dahiya & Jha, 2011).

The response of the respondents in Table 3 for statement (a), "Training and development programs are designed based on need assessments," indicates that 38 respondents chose strongly agree, 20 respondents answered agree, and two respondents strongly disagreed. According to the respondents' response rate, the great majority of 58 out of 60 respondents agreed with the said statement.

Table 3. The extent of the training and development practices in terms of program design

Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Interpretation
1. Training and development programs are designed based on need assessment.	38	20	0	0	2	4.53	Strongly Agree
2. Training objectives are conformity with the worker's training needs.	38	14	5	0	3	4.40	Strongly Agree
3. Training programs are designed with due consideration of the level of abilities and educational attainment of the workers.	39	18	3	0	0	4.60	Strongly Agree
4. An opportunity for training and development exists in the ministry.	44	15	0	1	0	4.70	Strongly Agree
Composite Mean						4.56	Strongly Agree

For statement (b), "Training objectives conform with the workers' training needs," 38 respondents chose strongly agree, 14 agreed, five respondents chose neutral, and three strongly disagreed. Based on the rate of the responses, 52 out of 60 respondents agreed regarding the goal of training that is consistent with the workers' training needs. This finding suggests that the organization's training objectives are compatible with the needs of the personnel. Also, for statement (c), "Training programs are designed with due consideration of the level of abilities and educational attainment of the workers," 39 respondents strongly agreed, while 18 chose to agree. Three picked indifferently, and no one disagreed with the said statement. Based on the rate of the responses, the majority of 57 out of 60 respondents opted to agree. This means that the design of training programs was focused on the employees' abilities and educational levels. For statement (d), "An opportunity for training and development exists in the Ministry," 44 respondents picked strongly agree, 15 chose to agree, and only one opted to disagree. As a result, the overwhelming majority of 59 out of 60 respondents agreed with the said statement. This could be taken to mean that the Ministry has suitable training opportunities for the workers. Furthermore, Table 3 reveals that the overall training and development practices in terms of program design score have a weighted mean of 4.56, which means that the respondents strongly agreed with all the statements. A closer look at each item reveals that the highest score belongs to the statement "An opportunity for training and development exists in the Ministry" with a weighted mean of 4.70, followed by the statement "Training programs are designed with due consideration of the level of the abilities and educational attainment of the workers" with a weighted mean of 4.60. This is, in turn, followed by the statement "Training programs are designed with due consideration of the level of abilities and educational attainment of the workers" with a weighted mean of 4.53. Finally, with a mean of 4.40, is the statement "Training objectives conform with the workers' training needs." Based on this, it can be said that the ministry is properly implementing training and development design and provides appropriate training opportunities for workers.

3.4 Effectiveness

Elnaga and Imran (2013) posit that a training program serves as a stimulus for workers to enhance their performance and skills, thereby increasing corporate productivity. Consequently, training should be developed to meet the unique demands and objectives of the organization. Effective training is viewed as a deliberate intervention aimed at achieving the learning required for improved employee performance.

As depicted in Table 4 on the preceding page, the statement (a) "The training is relevant to the job" reveals 40 respondents choosing strongly agree, 12 respondents choosing agree, four respondents choosing neutral, and four respondents choosing strongly disagree. According to these responses, 52 of those polled agreed. It can be implied that most respondents agreed, noting that there are small skill gaps, if any, to consider when assessing their relevance.

For statement (b), “The training method is coherent with its objectives,” 40 respondents chose strongly agree, 13 chose to agree, four chose neutral, and three chose strongly disagree. These responses indicate that 53 respondents agreed with the said statement, implying that there are also small skill gaps when assessing the relevance of the training technique with the training purpose. For statement (c), “The criteria for training and development are well defined,” 42 respondents confirmed strongly agree, 16 respondents agreed, two chose neutral, and no respondents disagreed with the statement. This indicates that there are defined criteria that have to be followed for training and development in the organization. For statement (d), “In-service trainings help improve the workers’ job performance,” 46 respondents strongly agreed, 12 agreed, 2 confirmed neutral, and no respondent disagreed with the statement. Accordingly, 58 (45.3%) opted to agree.

Table 4. The extent of the training and development practices in terms of effectiveness

	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Interpretation
1.	The training is relevant to the job performance.	40	12	4	0	4	4.40	Strongly Agree
2.	The training method is coherent with its objectives.	40	13	4	0	3	4.45	Strongly Agree
3.	The criteria for training and development are well.	42	12	2	0	0	4.73	Strongly Agree
4.	In-service training helps improve the worker’s job performance	46	12	2	0	0	4.75	Strongly Agree
5.	The effectiveness of training is properly evaluated in terms of improvement.	47	12	0	1	0	4.75	Strongly Agree
	Composite Mean						4.56	Strongly Agree

For statement (e), “The effectiveness of training programs is properly evaluated in terms of improvements in employees’ performance,” 47 respondents strongly agreed, and 12 agreed with the statement. With only one respondent choosing to disagree, 59 out of 60 respondents are in the affirmative concerning the given statement. This is because it has to be meticulously done, as effectively measuring employee performance anchored on effective training programs contributes positively to the achievement of organizational goals. Furthermore, Table 4 shows that the mean of the overall efficacy of training and development design is 4.56, indicating strong agreement with the statement. An examination of each item reveals that the highest score is 4.75 for the statement “The effectiveness of training programs is properly evaluated in terms of improvements in employees’ performance,” followed by 4.73 for the statement “In-service trainings help improve the workers’ job performance.” Coming in third with a weighted mean of 4.67 is the statement “The criteria for training and development are well defined,” followed by the statement “The training method is coherent with its objectives” with a weighted mean of 4.45. The lowest weighted mean belongs to the statement “The training is relevant to the job.” However, all weighted means have a verbal description of strongly agree. This result suggests that there are defined criteria that need to be followed for training and development in the organization and that there should be a clear training and development policy to govern how to administer during and after the training specifically.

3.5 Overall Factor

The provided table illustrates the elements influencing the implementation of a training and development program. Table 9 indicates that for statement (a), “Directions are clearly provided during training,” 46 respondents chose strongly agree, 12 respondents chose to agree, two chose neutral, and no one disagreed. According to the respondents' response rate, the majority, 58 out of 60, agreed with the statement.

In Table 5, for statement (b) “The training and development conform to the Ministry’s objectives,” 44 respondents strongly agreed, 14 agreed, 2 were neutral, and zero disagreed. Based on the response rate of the respondents, 58 respondents affirmed agreement on the alignment of training with the organization's objectives. For statement (c) “There are opportunities for career development advancement after receiving training,” 39 respondents strongly agreed, 14 agreed, four respondents were neutral, and three strongly disagreed. As a result, according to the answer rate, 53 out of 60 respondents agreed with the chance for professional advancement after receiving training.

Table 5 illustrates that the weighted mean of the Overall Factors of Training and Development Implementation score is 4.62. For each item, the highest score belongs to the statement “Directions are clearly provided during training” with a weighted mean of 4.62, followed by the statement “The training and development conform to the Ministry’s objectives” with a weighted mean of 4.70, and finally, the statement “There are opportunities for career development advancement after receiving training” with a weighted mean of 4.43. It can be implied from the findings that there are clear norms and regulations regarding the chance for career growth for employees following training.

Table 5. The overall factor of training and development implementation

Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Interpretation
1. Directions are provided during training based on need assessment.	46	12	2	0	0	4.73	Strongly Agree
2. The training and development conform to the ministry objectives.	44	14	2	0	0	4.70	Strongly Agree
3. There are opportunities for career development advancement after receiving training.	39	14	4	0	3	4.43	Strongly Agree
Composite Mean						4.62	Strongly Agree

3.6 Extent of the Contributions of the Training and Development to Job Performance

Table 6. Extent of the contributions of training and development to job performance

Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Interpretation
1. Training provides workers with skills, knowledge, attitudes, and creativity.	48	9	2	0	1	4.72	Strongly Agree
2. Training will help make the workers feel satisfied with their jobs.	43	14	2	0	1	4.63	Strongly Agree
3. Workers are satisfied with the overall aspect of the training programs.	41	15	3	0	1	4.58	Strongly Agree
4. Training is crucial for improving individual and organizational performance.	47	10	3	0	0	4.73	Strongly Agree
5. Workers become more committed to their jobs after receiving training.	39	17	1	0	3	4.48	Strongly Agree
6. Training increases employee confidence when performing health-related tasks.	50	10	0	0	0	4.83	Strongly Agree
7. Training motivates employees to enhance their job performance.	47	10	0	0	3	4.62	Strongly Agree
8. Workers become more responsible after receiving training.	31	8	0	0	1	4.80	Strongly Agree
Composite Mean						4.64	Strongly Agree

Furthermore, Table 6 illustrates that the aggregate mean for the extent of the contribution of training and development to job performance is 4.64. An examination of each item reveals that the statement “Training increases employee confidence when performing work-related tasks” has the highest weighted mean of 4.83, followed by the statement “Workers become more responsible after receiving training.” The statement “Training is crucial for improving individuals and organizational performance” comes in third with a weighted mean of 4.73. In fourth place is the statement “Training provides workers with skills, knowledge, attitude, and creativity” with a weighted mean of 4.72. Tied for fifth are the statements “Training will help make the workers feel satisfied with their jobs” and “Training motivates employees to enhance their job performance.” Both statements have a weighted mean of 4.63. Ranked sixth with a weighted mean of 4.58 is the statement “Workers are satisfied with the overall aspect of the training programs.” Bringing up the rear with a weighted mean of 4.48 is the statement “Workers become more committed toward their jobs after receiving training.” It is worth mentioning that all of the statements in Table 10 have a verbal description of “strongly agree.” This could be taken to mean that the respondents are in unison about the significant contributions of training and development to the job performance of the workers in the Ministry.

3.7 Degree of the Relationship between Training/Development and Job Performance

Table 7. Distribution of the respondents by performance rating

Performance Rating (%)	Frequency	Percentage
70-76	11	18.3
76-82	13	21.7
82-88	22	36.7
88-94	13	21.7
94-100	1	1.70

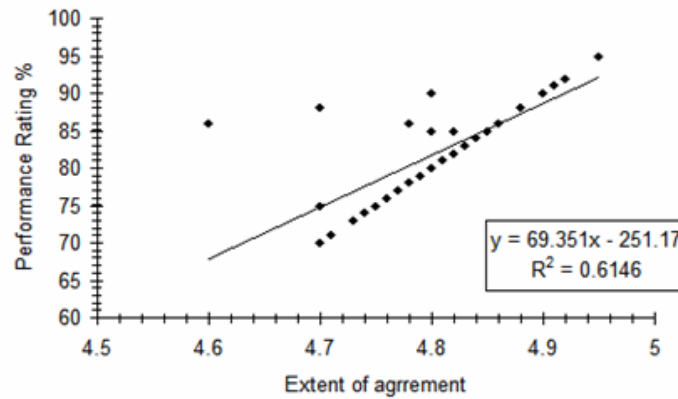


Figure 1. Test for the relationship between Job Performance and Training and Development

To confirm the extent of the contributions of training and development to job performance, the researcher obtained the performance ratings of each respondent, presented in Table 7. The table reveals that 58.4 percent of the respondents received performance ratings within the range of 82 percent to 94 percent. The result indicates a coefficient of determination of 0.6146, displaying a positive correlation coefficient of 0.784. This suggests a high degree of relationship between the variables. The regression equation, $y = 69.351x - 251.17$, with a positive slope of 69.351, further suggests that the higher the respondent's perception of the contributions of training and development to job performance, the higher their performance rating. This finding aligns with the literature, indicating that training and development positively influence worker performance.

According to Mathis and Jackson (1997), training is an organized and deliberate effort to change or foster information, expertise, and mentality through learning and experience, aiming for effective performance in an action or range of activities. In the work context, its purpose is to enable an individual to acquire skills so that they can perform a given task or job effectively and realize their true potential. On the other hand, Buckley and Caple (2009) argue that training is the process through which skills are developed, information is provided, and attributes are nurtured, helping individuals working in organizations become more effective and efficient in their roles.

Furthermore, training aids the organization in achieving its purposes and objectives while contributing to the overall development of employees in the organization. There is a positive correlation between training and development and employee performance. Training not only benefits the employee but also positively impacts employee performance through the development of knowledge, skills, capabilities, expertise, and behavior (Sri Divya and Gomathi, 2015). Moreover, employee performance is a crucial building block of an organization, and factors laying the groundwork for superior performance need to be analyzed by organizations. As every organization cannot progress with the work of a few individuals, it is the collective effort of all members of the organization. Performance is a complex construct essential to achieving results and is critical to the key goals of an organization (Mwita, 2000). According to Amisano (2009), employee performance may be associated with various factors within the workplace, such as overall job satisfaction, knowledge, and management. However, there is a positive connection between training and performance, as training programs can address various issues related to lackluster performance.

4.0 Conclusion

Based on the study's findings, it is evident that the majority of respondents, predominantly females in the prime of their lives, possess at least tertiary-level education, and bring significant voluntary service experience. The Ministry's commitment to conducting needs assessments serves as a strategic foundation for designing and implementing effective training and development programs, supported by continuous evaluations to ensure ongoing efficacy. Clear directions aligning training initiatives with organizational objectives, coupled with opportunities for career development, contribute positively to the overall training and development of the workers. The study underscores the substantial impact of training and development on job performance, highlighting its pivotal role in achieving excellence and competencies across various dimensions. The identified strong positive relationship between training/development and job performance emphasizes the integral role played by these initiatives in enhancing the capabilities and overall performance of the Ministry's workforce.

Based on the study's findings, recommendations for the Ministry include the continuation of needs-based program design, aligning training initiatives with organizational goals, and maintaining sufficient budget allocation for ongoing workforce development. Regular reviews of training practices, along with the formulation of a clear training and development policy and documentation criteria, are crucial for measuring and adapting the program's success over time.

In conclusion, the study's findings and recommendations provide valuable insights for the international ministry in Dumaguete City to enhance its training and development efforts. By strategically aligning training initiatives with organizational objectives, understanding employee profiles, and maintaining a commitment to continuous evaluation and improvement, the ministry can foster a highly skilled and motivated workforce capable of achieving its mission and goals effectively.

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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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Silenced Narratives: Assessing the Human Rights Situations of Indigenous Peoples in the Philippines

Lloyd Lyndel P. Simporios

Faculty of Management and Development Studies, University of the Philippines Open University
Los Baños, Laguna, Philippines

Author email: lloydlyndel.simporios@upou.edu.ph

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Abstract. This article presents an analysis of the human rights situations experienced by many indigenous peoples (IPs) throughout the Philippines. Through an analysis of various sources, it uncovers a range of alarming violations of human rights confronted by IPs, including forced evictions and land grabbing, as well as the degradation of their cultural heritage. It also emphasizes the historical and inherent rights of IPs concerning ancestral territories and self-determination, as protected by national and international laws. A meticulous evaluation of the Philippine government, particularly the National Commission on Indigenous Peoples, exposes substantial inadequacies when it comes to fulfilling their duty to safeguard these rights and combat human rights violations. Drawing on these revelations, this article emphasizes the imperative for the Philippine government to take resolute action in acknowledging and preserving the rights of IPs. Additionally, this calls for the adoption of an approach based on human rights to effectively tackle the challenges confronted by indigenous communities. Above all, this article underlines the utmost significance of ensuring the complete realization of these rights for IPs in the country. It ardently advocates for unwavering monitoring and dedicated advocacy endeavors in this pivotal sphere, aiming to instigate substantial transformations and address the systemic issues that persist.

Keywords: Indigenous peoples; Human rights violations; Philippines; Ancestral territories, Advocacy efforts.

1.0 Introduction

As per the 2015 national census, a notable segment of the Philippines' population is identified as indigenous, ranging from 10% to 20% of the overall national population, amounting to 100,981,437 individuals (IWGIA, 2022). IPs globally continue to rank among the most poor, most excluded, and the most marginalized sectors of the population, facing a variety of issues such as poverty, human rights abuse, suffering disproportionately in domains like education and healthcare, and regularly facing systematic prejudice and exclusion (Bamba et al., 2021).

Human rights are as old as human civilization. They are necessary for a dignified and respectable existence, as well as the proper development of human personality. But what are our indigenous brothers and sisters going through? Isn't it only fair that indigenous communities deserve the same rights that others have been fortunate enough to enjoy? How can we take meaningful action to support them in exercising their fundamental rights as human beings?

It is undeniable that the Philippines has shown its commitment to the rights of indigenous peoples by supporting the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) and ratifying the Indigenous

Peoples Rights Act (IPRA) of 1997, which draws heavily from the ILO Convention No. 169 (Doyle, 2020). Despite various initiatives, cases of discrimination, unfair treatment, exclusion from political involvement and economic advantages, exclusions, and loss of ancestral lands are still felt by many of the IPs. There are challenges in implementing these rights, particularly in the context of the Philippines' colonial and post-colonial legal frameworks (Doyle, 2020). Doyle (2020) compares the Philippines' recognition of indigenous peoples' rights with the provisions of ILO Convention 169, which suggests that ratification of the convention could benefit the indigenous peoples by enhancing the implementation of their rights.

The human rights situation of indigenous peoples in the Philippines was marked by a range of challenges. Rodriguez et al. (2022) highlighted the need for ethical guidelines in genetic research among indigenous communities, which emphasizes the importance of respecting their rights and autonomy. Bamba et al. (2021) proposed a culturally sensitive approach to community organizing that would involve indigenous knowledge and participation. Sinay et al. (2021) identified inconsistencies in the protection of indigenous rights in the management of coastal areas and small islands, calling for policy advocacy and empowerment. Eduardo and Gabriel (2021) underscored the barriers to education faced by the Dumagat community, including poverty and the use of English as the primary medium of instruction. These studies collectively point to the need for a more comprehensive and rights-based approach to addressing the challenges faced by indigenous peoples in the Philippines.

The main objective of the paper is to offer an assessment that is thorough about the country's indigenous peoples' human rights condition. A review of current laws, how they are implemented, and experiences with them will be covered, as well as the implementation or enforcement of the same. Moreover, the paper aims to identify key elements of the current institutional and legal framework as well as means for advancing and upholding human rights.

2.0 Methodology

2.1 Research Design

This study uses a systematic review framework as its research methodology. This involved a comprehensive as well as structured examination of the available literature, reports, and documents related to indigenous peoples in the country and their human rights conditions. This systematic review ensures a rigorous and transparent analysis of the available evidence, allowing a comprehensive assessment of the human rights situations affecting indigenous communities.

2.2 Data Source

The research data for this study encompasses various sources of literature, reports, and documents related to indigenous peoples' human rights conditions in the country. These sources may include national and international databases, government publications, academic journals, and reports from non-governmental organizations (NGOs) and human rights agencies.

The selection criteria for the systematic review were based on the relevance of the studies to the topic, their publication in peer-reviewed journals, and their focus on indigenous communities. Bamba (2021) and Ninomiya et al. (2017) both emphasized the importance of community engagement and the inclusion of indigenous perspectives in research, which likely influenced the selection of sources. Huria et al. (2021) and Roche (2017) highlighted the need for a comprehensive understanding of the social, cultural, and structural factors affecting indigenous communities, which have also influenced the selection of sources.

2.3 Data Gathering Procedure

The data-gathering procedure involves several steps. Firstly, relevant literature, reports, and documents about the human rights conditions of indigenous peoples were identified through comprehensive searches of databases and repositories. Next, these sources were systematically reviewed and analyzed using predetermined criteria to extract pertinent information. The extracted data were then synthesized and interpreted to provide insights into the human rights situation affecting indigenous communities.

2.4 Ethical Considerations

In conducting this systematic review, the researcher adheres to principles of integrity, confidentiality, and respect for intellectual property rights. Moreover, meticulous attention is given to proper citation and attribution practices when utilizing information from existing sources.

3.0 Results and Discussion

3.1 Demographic Profile of IPs in the Philippines

Indigenous Peoples: Distribution Across the Philippines

The indigenous communities in the country trace their roots back to a rich and diverse array of origins. There are more than a hundred ethnic communities, comprising the lineage of the Philippines, with around 14 to 17 million indigenous peoples, reflecting the incredible diversity of biological and ecological systems that the nation's more than 7,000 islands can truly boast (UNDP, 2013). IPs and cultural communities, as diverse as the archipelago's entire flora and fauna, have made their home in the different ecological territories. Moreover, the classifications of IPs in the Philippines are composed of eight (8) significant groups, which comprise around 100 ethnolinguistic groups and are dispersed throughout about sixty (60) provinces of the country (Tindowen, 2016).

The Lumads, who are non-Muslim IP groups of Mindanao, comprise the largest current population, while Cordillera's IP groups, the "Igorots," also make up a large part of the IP populace. Caraballo tribes from the mountain ranges of Eastern Central Luzon, Central Luzon's Agta and Aeta or Negrito, the Mangyans from Mindoro, the hill tribes of Palawan, the IPs of the Visayas regions, and the Mindanao's Islamic IP comprise the other major groups of IPs in the country (FPE, n.d.).

Table 1 reflects the top ten indigenous peoples in the country as identified by NCIP, wherein about 48.3% of all IPs in the Philippines were made up by the top 10 IP groups (Philippine Statistics Authority, 2023).

Table 1. Top 10 Indigenous Peoples in the Philippines

Rank	Indigenous Peoples	Number	Percent to Total Ips
	<i>Total IPs</i>	<i>9,841,785</i>	<i>100%</i>
	<i>Total of Top Ten IPs</i>	<i>4,754,694</i>	<i>48.3%</i>
1	Subanen/Subanon	758,499	7.7%
2	Manobo	644,904	6.6%
3	Mandaya	523,475	5.3%
4	Kankanaey	466,970	4.7%
5	Ibanag	463,390	4.7%
6	Higaonon/Higa-onon	452,338	4.6%
7	Sama/Samal*	398,666	4.1%
8	Blaan	373,392	3.8%
9	Cuyonen/Cuyunon	339,606	3.5%
10	Iranun/Iraynun*	333,454	3.4%

Note: *Declared by the NCMF as a Muslim tribe

Source: Philippine Statistics Authority, 2020

Who are the Indigenous Peoples?

As defined in Republic Act No. 8371, indigenous peoples are those with a unique identity recognized by both them and others. They live in organized groups on communal lands, where they've continuously lived, sharing a common language, customs, and traditions. Some have maintained their distinctiveness through resistance to

outside influences, while others trace their lineage back to pre-colonial times, preserving their ways despite potential displacement.

3.2 Realizing Indigenous Peoples' Human Rights

Equality and Discrimination

International Human Rights Legislation

The inherent and undeniable human rights precepts of equality as well as nondiscrimination are ingrained in legal frameworks, necessitating no further validation. Numerous international laws encompassing the rights of IPs derive their foundation from human rights conventions. Among these, UNDRIP stands as the most extensive tool, intricately outlining the rights of IPs and establishing essential benchmarks for their acknowledgment, safeguarding, and advancement.

National Legislation

1. The 1987 Philippine Constitution

The primary legal foundation for all legislation and ordinances relating to IPs is the 1987 Philippine Constitution. It talks about four important sections about the State's acceptance of IPs/ICC's rights (Official Gazette, 1987):

- Section 22 of Article II talks about how the rights of the ICCs are being acknowledged and upheld as far as national unity as well as development are concerned.
- Article XII, specifically under Section 5, discusses the responsibility of the State to safeguard ICCs' rights to their ancestral lands and to guarantee their cultural, economic, and social well-being.
- Article XIII, particularly Section 6, states that the government must follow rules for sharing or using natural resources like land. It mentions considering the rights of small farmers and ICCs to their ancestral lands; and
- Section 17 of Article XIV talks about how the government must protect as well as respect ICCs' rights to keep their institutions, traditions, and cultures alive. It also says that these rights should be considered when making national plans and policies.

2. Republic Act No. 8371

R.A. No. 8371 (Indigenous Peoples' Rights Act, or IPRA) is a significant legal framework aimed at protecting the rights of IPs in the Philippines. The law acknowledges the presence of IPs as a unique sector within the country and outlines their rights. It categorizes these rights into four distinct clusters (Official Gazette of the Philippines, 1997). These rights include social justice and human rights, rights to ancestral lands, right to self-governance or autonomy, as well as cultural integrity.

Under this law, the IPs are entitled to own and control the land and resources in their ancestral domain (Official Gazette of the Philippines, 1997). In addition, this law also grants them the right to govern themselves, ensures social justice, and protects human rights, along with preserving their cultural integrity (Official Gazette of the Philippines, 1997). It is also provided under this law their right to approve or disapprove of specific development projects in their communities (Official Gazette of the Philippines, 1997). Here are some specific requirements under IPRA (Official Gazette of the Philippines, 1997):

- a.* The law requires the Free, Prior, and Informed Consent (FPIC) of every IP/ICC member. There is a need for the proponent of the project to secure FPIC following the community's procedures, and it is specifically required from the affected community.
- b.* The law ensures that IPs have complete access to project records and information through an agreement on full disclosure.
- c.* Submitting an environmental and socio-cultural impact statement is necessary, following DENR's standard procedure known as the Environmental Impact Statement (EIS) System.
- d.* The project author must agree with IPs on compensation, bonds, benefit sharing, and protecting indigenous rights and values.

3. Republic Act No. 8425 (Enacted December 11, 1997)

RA No. 8425 establishes and strengthens the 'Social Reform Agenda' to address poverty. It highlights the creation of the National Anti-Poverty Commission (NAPC) as part of this initiative. It followed a sector-based,

area-based approach to tackling poverty that aims to give every Filipino family the avenue they need to meet the most basic requirements in terms of housing, income security, food and nutrition, water and environmental sanitation, security, education, family support, and mental well-being. To combat poverty, social change must take a multifaceted, cross-sectoral strategy that respects and acknowledges the fundamental beliefs, cultural integrity, and spiritual variety of the sectors and communities. One of the sectors represented in the NAPC is indigenous peoples.

4. NCIP Administrative Issuances

The NCIP has released several administrative orders, circulars, and programs, including the ones listed below:

Administrative Order No. 1, s. 1998. IPRA's Implementing Rules and Regulations (IRR) are included in this Administrative Order of NCIP. The FPIC process is the main regulatory instrument for safeguarding. The following must undergo FPIC:

- a. Activities like exploring, developing, exploiting, and using natural resources in ancestral domains/lands.
- b. Research of native practices, processes, and knowledge in the fields of forestry, agriculture, and resource management, as well as in the fields of medicine and science, biodiversity, bioprospecting, and the collection of genetic resources.
- c. Relocation, access to sacred sites, and archaeological research.
- d. Policies that would impact the well-being and rights of IPs/ICCs, as well as military operations in ancestral lands.

Administrative Order No. 3, s. 1998, acknowledges and honors all pre-existing agreements and other concessions within ancestral domains that were established before the effective date of Administrative Order No. 1, issued in 1998. In response to the prospect of several mining corporations withdrawing their investments because they think some of the provisions of the IRR are unfavorable, NCIP issued supplemental guidelines. These businesses were particularly worried that Section 1 of this administrative order (A.O. No. 3) would void any existing agreements established in ancestral lands. To address these allegations, a mining task group was set up by the Office of the President inside the Economic Mobilization Group (The World Bank, 2007). Therefore, NCIP Administrative Order No. 3, s. 1998 can be seen as a resolution of a disagreement with the mining advocacy group. Because of these rules, mining companies with agreements, permits, and contracts that were approved before 1998 can already proceed with their mining activities without needing FPIC approval (The World Bank, 2007). Instead, they need to get a certification from the NCIP beforehand, which streamlines the process and allows them to proceed with their mining activities in compliance with the new regulations (The World Bank, 2007).

Administrative Order No. 1, issued in 2002, establishes a Special Committee to review and verify ancestral domain and land titles approved by the previous NCIP Commissioners (The World Bank, 2007). Suspicions of irregularities in the issue of these certifications led to the establishment of the special committee. Upon conducting its investigation, the special committee will propose the most suitable course of action regarding the certificates of ancestral domain titles to the commission, considering its findings (The World Bank, 2007). This directive comprehensively lists the various types of instances considered anomalous that the Committee will investigate, encompassing cases involving significant flaws, infirmities, fraud, coercion, threats, and misrepresentations. According to the administrative order, if the ancestral domain certificates or certificates of ancestral land titles are proven to be anomalous, it is obligatory to revoke or reject them (NCIP Administrative Order No.1, 2022)

Administrative Order No. 2 (2002) necessitates a detailed review of DENR records related to ancestral domain and land claims certificates. Furthermore, it stipulates the establishment of Special Provincial Task Forces to conduct on-site validations of these claims, with the Ancestral Domains Office (ADO) overseeing the process. The following must receive special attention during the field validation: the veracity of the claimants' names as they appear in the previous census if there is any; the communities' confirmation regarding their actual consent to the

conversion is sought; the validation process involves verifying the authority of the community representative in the conversion application; and presenting to the community the survey plan for their confirmation.

Administrative Order No. 3, issued in 2002. The implementation of this supersedes A.O. No. 3 by introducing new guidelines for CP/FPIC issuance. In the past AO, certification was given for areas that were not inhabited by IPs, and FPIC for those areas with IPs. Nevertheless, the updated guidelines address this by clarifying that the certification will be issued by NCIP, and the FPIC will be issued by the IP community. Additionally, the NCIP has the authority to impose a certification requirement on projects, irrespective of whether they are found inside or outside of the territories traditionally inhabited or owned by IPs.

Administrative Circular No. 1 from 2003 declares that NCIP holds original and exclusive jurisdiction, through its Regional Hearing Officer, over various types of cases (Republic of the Philippines, n.d.). These encompass a range of conflicts and contentions concerning ancestral lands of IPs/ICCs, transgressions against the FPIC requirement, legal actions about decisions made by IPs/ICCs for breaking customary laws or disrespecting sacred places, as outlined in RA 8371 specifically in Section 8(b), and other analogous cases. Moreover, it emphasizes the primary role of the IP community's council elders in attempting to resolve cases internally. If a resolution cannot be reached, they can ask the Regional Hearing Officer for help by giving a written statement explaining why.

Administrative Order No. 3, issued in 2003. This aims to establish a multi-level consultative body at the different administrative tiers or scales within the country's governance structure (national, regional, provincial), with similar structures to be set up at the community level. Coordinating committees will assist the NCIP in organizing this consultative body.

Administrative Order No. 1 from 2004. This underscores the gradual and methodical approach involved in formulating the Ancestral Domain Sustainable Development and Protection Plans (ADSDPPs). These plans embody the aims, purposes, policies, and approaches of the IPs to sustainably manage and develop their ancestral domains, including everything within, like people and their cultural knowledge and practices. The ADSDPP also encompasses a comprehensive list as well as a schedule of programs and/or projects focused on sustaining and safeguarding ancestral lands. It serves as a powerful tool for empowering IPs and as a blueprint for their overall development plan.

Administrative Order No. 1, issued in 2006. This revokes A.O. No. 3 (s. 2002), introducing fresh guidelines for FPIC. The new guidelines distinguish between the certification requirement and non-overlap certificate. The former pertains to the NCIP-issued certificate, affirming the applicant's compliance with FPIC requirements from affected IPs/ICCs. On the other hand, the non-overlap certificate is provided by the NCIP Regional Director, confirming that the proposed initiative does not intersect with any ancestral land. In contrast to the previous administrative order, the issuance of both certificates is now the responsibility of the NCIP Regional Director. The earlier order stipulated that the certification precondition would be issued by the ADO, but this has been revised, and the authority now rests with the NCIP Regional Director. Verification of non-overlaps with ancestral domain areas involved cross-referencing the suggested project location together with the approved ancestral domain areas list. As for the approval of any initiative by the indigenous community, a "resolution of consent" is used to document it, whereas a "non-consent resolution" is used to conclude the FPIC refusal.

5. Other Philippine Laws

The following are some other pieces of legislation that partly discuss indigenous peoples' rights and contribute to Philippine jurisprudence on IPs' rights:

Commonwealth Act No. 141, or the Public Land Act. Although this was approved in the time of the Commonwealth in the country, this law is still in effect. As provided under Sections 7 and 8 of the said law, confirming titles that are incomplete or imperfect can be achieved through two avenues. Titles can be confirmed either through court proceedings (judicial legalization) or administrative processes, which is known as the free patent. To qualify for either option, the applicant must demonstrate continuous, uninterrupted, and sole ownership of the land since 1945. Nevertheless, for the former, the area that can be legalized is limited to 144 hectares, while for the second,

the limit is not to exceed more than 24 hectares. Indigenous peoples have the option to utilize either of the two ways mentioned.

The Philippine Environmental Impact Statement System of 1978, also known as Presidential Decree 1586. Under this legislation, projects with significant environmental importance or those located in environmentally sensitive and/or critical areas are classified as those for which an Environmental Impact Statement (EIS) must be submitted. Section 4 requires individuals, partnerships, or corporations to acquire a certificate on environmental compliance before starting or running any part of environmentally critical projects in environmentally critical areas.

Republic Act No. 4846. As modified by PD 374, this legislation stipulates that exclusive authority for archaeological explorations, assessments, and excavations lies with the National Museum of the Philippines. Any violation of this law is subject to fines. The National Museum asserts that this law applies nationwide. Consequently, agencies or individuals, including those in the academe, intending to engage in archaeological practice must obtain a permit from the National Museum to conduct their work.

Republic Act 6657, or the Comprehensive Agrarian Reform Law (CARL). This law, which has implications for IPs, offers legal safeguards for ancestral domains and lands. Paragraph 5 under Section 2 of this law stipulates that the government will be utilizing the guiding principles underlying the structuring of land ownership and distribution when managing natural resources, as appropriate, particularly public lands suitable for agriculture. It also highlights the indigenous communities' rights to ancestral land. This legislation signifies the primacy of the IPs' rights when it comes to ancestral domain/land compared to those of farmers. Additionally, the law says that when renting out undeveloped public lands to eligible entities for farming, whether it's traditional crops or new ones that need a lot of investment, particularly for export, IPs' rights to their native lands shall also be duly acknowledged (Section 2, paragraph 12).

Republic Act 7076, or the People's Small-Scale Mining Act of 1991. This law permits citizens of the Philippines to establish cooperatives, which need approval from the DENR to extract minerals. However, indigenous peoples will be prioritized for obtaining licenses or contracts within designated ancestral lands. Republic Act 7076 doesn't cover active mining areas, which exposes indigenous peoples to the intrusion of established large-scale miners into their indigenous lands.

The 1991 Local Government Code, or R.A. No. 7160. This law allows ICCs to decide if they want to create 'tribal barangays.' As per Section 386 of this Code, Congress can pass a law to create barangays in indigenous cultural communities, aiming to improve basic service delivery, in disregard of the prerequisites for the establishment of a barangay. This alternative is duly acknowledged in the IPRA (Section 18), wherein it is specified that IPs or ICCs hailing from areas where they are the main population but not the majority in a city, municipality, or province, can create a separate barangay following the Local Government Code's guidelines for forming tribal barangays.

The 1992 National Integrated Protected Areas System Act, also known as R.A. No. 7586. This law is tailored to ensure the preservation of protected areas against additional encroachments while permitting development projects that align with their purpose or bolster their safeguarding. It also encompasses explicit clauses safeguarding the cultural communities' rights to their ancestral lands. According to this legislation, IPs are protected from eviction within these conservation areas.

"Strategic Environment Plan for Palawan," also known as R.A. No. 7611. This serves as a comprehensive framework plan for all the islands within Palawan. The framework plan guides government agencies in creating and carrying out programs, projects, and plans that affect Palawan's natural resources. It introduces a system called the Environmentally Critical Areas Network, which aims to oversee the protection and development of Palawan as a whole. One of the key goals of this network is to safeguard the IPs' rights and preserve their rich cultural heritage.

The 1995 Philippine Mining Act, also known as R.A. No. 7942. This legislation gives ICCs the authority to approve or reject mining projects that are being proposed in their areas through FPIC. It establishes clear definitions of ICCs as well as ancestral lands, explicitly banning mining on ancestral lands without ICCs' consent. Moreover, it ensures that the ICCs receive royalty payments for mineral usage, directing these royalties to a trust fund dedicated to the ICCs' socio-economic development.

Republic Act No. 9054. RA 6734 was amended by this law and created the Autonomous Region in Muslim Mindanao (ARMM), which assumes authority and control over a diverse range of matters. These encompass administrative organization, revenue generation, ancestral lands and resources, personal and family matters, regional planning, social, economic, and tourism growth, policies on education, preservation of cultural heritage, eminent domain, and powers previously handled by national government departments. In the context of ARMM, special considerations are given to the indigenous peoples. Notably, the establishment of tribal courts, including the possibility of a Tribal Appellate Court, is outlined. These courts have the important role of adjudicating disputes, rendering decisions, and implementing judgments concerning family as well as property rights, all guided by the indigenous community rules. As a result, the law requires the Regional Assembly to make local laws that mandate collecting and organizing indigenous laws and customs within the region.

Department Administrative Order 2003-30. According to this, locations that have historically been inhabited by tribal or cultural groups are considered environmentally significant areas. As mentioned in the manual (Part 2.2E), this covers all ancestral lands that belong to the National Cultural Communities, as defined under Presidential Decree No. 410 (Section 1). Moreover, this encompasses areas designated as settlements established, executed, and maintained by PANAMIN for national minorities, specifically referring to the non-Muslim hill tribes as stated in PD No. 719. The definitions given might change due to RA 8371 and its corresponding rules and regulations. This applies to areas currently used or asserted as ancestral lands or domains by ICCs, or officially recognized as such through certificates according to Administrative Order No. 2 of DENR, issued in 1993, which outlines the process for identifying and marking claims to ancestral land or domain.

Situation and Assessment

Despite the existence of IPRA, their rights' protection under the 1987 Constitution, as well as the profusion of covenants and treaties at the international level, IPs in the country still face economic marginalization, social discrimination, and a lack of political empowerment (News, 2015). This can be understood within the context of structural inequalities and historical injustices. Drawing on critical theoretical perspectives, such as critical race theory and postcolonial theory, we can analyze how economic marginalization, social discrimination, and political disenfranchisement persist among IPs, particularly in conflict-affected regions like Mindanao. Many have faced difficulties in the development discourse, human rights, peace, and security, especially those in the Mindanao region, where there has been armed conflict, and the socio-economic indicators are at their lowest (News, 2015).

According to the Indigenous Peoples Rights Monitor (n.d.), 120 Indigenous Peoples have been killed outside of the judicial process since 2001, during the presidency of former President Arroyo. Among the victims, there were 13 women, including four who were pregnant, and 16 minors who were affected (Indigenous Peoples Rights Monitor, n.d.). Due to their political views or advocacy to protect their rights as a group from government projects and policies, indigenous peoples have become victims of politically motivated killings. IP leaders and community members continue to feel threatened as they assert their collective rights. From 2010 to 2016, human rights defenders had reportedly been the target of harassment and killing, with a total of 76 documented cases involving indigenous human rights defenders (Tebtebba Foundation, n.d.). Many people have encountered difficulties in discussions about development, human rights, peace, and security, especially those in the Mindanao region, where prolonged armed conflict, and socio-economic measures are typically at their lowest levels.

It is disheartening to discover that extrajudicial killings and threats targeting indigenous peoples in the Philippines have intensified during Duterte's administration. Regrettably, his aggressive "war on drugs" campaign has led to the deaths of numerous individuals, primarily impoverished Filipinos, including a significant number from indigenous communities (Human Rights Watch, 2020). Furthermore, the government

stands accused of engaging in the disturbing practice of "red tagging," where indigenous leaders and activists are unjustly branded as communists or terrorists, resulting in their harassment, arrest, torture, and even loss of life (Amnesty International Public Statement Philippines: End Attacks Against Indigenous Peoples, 2021). This underscores the systemic challenges faced by IPs in asserting their rights and challenging dominant power structures. In response to these distressing circumstances, organizations advocating for indigenous peoples' rights are steadfastly demanding an end to these assaults and seeking justice and accountability for the victims (Amnesty International Public Statement Philippines: End Attacks Against Indigenous Peoples, 2021).

The extra-judicial killings and ongoing threats to IP leaders have given rise to several adverse social impacts, including heightened conflicts, fear, and deepened distrust within indigenous communities, ultimately undermining their system of cooperation as well as solidarity. The IP's efforts to gain respect and acknowledgment of their collective rights have been weakened by the impact of the killings they have faced.

3.3 Conflict Between the IPRA and Other Laws

According to Josefo B. Tuyor et al. (2007), there are perceptions of conflict about some parts of the IPRA law and NCIP rules with other laws like the R.A. No. 8942 (National Museum Act), the R.A. No. 7942, and the R.A. No. 7586. These could be classified as jurisdictional issues, procedural issues, or substantive issues. In terms of the legal system in the Philippines, the more recent the law and its provisions are, the more binding they usually are. The resolution of conflicting implementing rules and regulations (IRR), which are considered subsidiary laws, can be achieved through either harmonization of the agencies' IRR or court proceedings in cases of litigation.

Ancestral Domain vs. Public Domain

The Public Land Act (RA 2874) does not acknowledge original or pre-conquest vested rights comparable to a native title. Instead, the acquisition of ownership of ancestral domains or lands is solely dependent on the "administrative grace" of the State. This poses a direct contradiction to the IPRA, which acknowledges the possibility for IPs to obtain a title certificate per Commonwealth Act 141, subsequently revised as the Public Land Act.

Native Title vs. Private Title

Within the struggle between ancestral domains or lands and Torrens titles, the Comprehensive Agrarian Reform Law tends to lean towards prioritizing the titles of lands registered through the Torrens System. Within the provisions under the Comprehensive Agrarian Reform Law (Section 9), lands that have undergone the Torrens System of titling are given precedence over ancestral domains/lands.

Right to Traditional Practice vs. Right to Modernize

There is conflict about the self-determination of IPs as emphasized by the IPRA versus what the IRR of the NIPAS Act means by "traditional." Section 10 of the IRR states that it involves not using machinery in extraction, following traditional production methods. The decision to retain traditional practices or embrace modernization within their ancestral domains is ultimately left to the discretion of the IPs themselves.

State Law vs. Customary Law

There is confusion between the country's Local Government Code and the IPRA law about the resolution of conflict between ICC/IP members and non-IP. Although it is stipulated under Philippine jurisprudence that new laws prevail over older laws, as such, IPRA does. Nevertheless, there has never been a particular provision under IPRA as to how disputes involving indigenous and non-indigenous peoples could be resolved.

3.4 Ancestral Domain/Land Right

International Legislation

The UNDRIP tackles various land rights, like traditional activities, resources, and managing indigenous lands. Indigenous peoples are entitled to the resources, territories, and lands that they have traditionally owned or used, as stated in Article 26.

National Legislation

As specified under the 1987 Philippine Constitution under Article XII, particularly in Section 5, it says that the government must safeguard the indigenous groups' rights to their ancestral lands, in line with the Constitution and national development policies. In addition, Republic Act No. 8371 of 1997 (Chapter III, Section 7) focuses on the eight rights to the ancestral domain, emphasizing the recognition and safeguarding of entitlements belonging to ICCs/IPs as the rightful owners of ancestral lands.

Situation and Assessment

Land is crucial for indigenous peoples because it determines their existence. Ancestral domain titling, which is facilitated by the NCIP as mandated by IPRA, has been a burden as there is no signification or streamlining of the process. Making the process worse was the issuance of Joint Administrative Order No. 01-12 (JAO 01-10) of DAR, DENR, LRA, and NCIP. The aim was to resolve issues related to jurisdiction as well as operations among government bodies or organizations responsible for issuing titles or deeds that officially recognize land ownership or rights that resulted in delays in the issuance and registration of Certificates of Ancestral Domain Titles (CADTs). The registration of CADTs with the Land Registration Authority (LRA) has been completed for less than 50 out of the 182 CADTs that have been issued (Indigenous Peoples in the Philippines, n.d.). IPs would find it difficult to prevent any intrusion made by migrants or corporations if they were unable to register their ancestral domain with the LRA.

To date, it can be noted that IPs are still denied their lands and resource rights. According to IPRA, ancestral domain refers to lands, water bodies, as well as forests within the territory or jurisdiction of an indigenous community, while ancestral land refers to land that is owned collectively by clans or families within the domain of an indigenous community. This framework is, to some extent, suggesting the essentiality of private land ownership to ensure security. Additionally, what IPRA acknowledges is solely the so-called 'surface right' of the villages, stating that minerals under the ground are still owned by the public or government.

Indigenous peoples' rights to their ancestral lands and resources are crucial for their cultural and physical survival (Wiersma, 2005). Denial of these rights can lead to human rights violations and conflicts (Northcott, 2012). The communal ownership of these lands is integral to the cultural survival of indigenous communities (Perera, 2009). However, indigenous peoples are often excluded from the right to use, manage, and control the water on their lands (Macpherson, 2019).

3.5 Rising Militarization in Indigenous Peoples' Territories

International Legislation

Article 30 of the UNDRIP says that military activities should not happen in indigenous peoples' lands or territories unless there's a valid public interest or the indigenous peoples agree to it freely.

National Legislation

Section 22 of the IPRA says that ICCs and IPs have special protection rights during armed conflict. The State is required to adhere to standards that are recognized and accepted at a global level, such as those outlined in 1949's Fourth Geneva Convention, ensuring the protection of civilians during emergencies and armed conflicts. It's prohibited to forcibly recruit IPs into the armed forces, to enlist minors from ICCs/IPs into the military under any circumstances, or to make IPs leave their lands for military purposes in a discriminatory manner.

Situation and Assessment

The government has deployed military forces in indigenous territories as a response to ongoing armed conflicts within the region and the proliferation of big development projects, which reflects a broader pattern of state intervention driven by armed conflicts and development agendas. Harassment of IPs by the military groups had been reported because of the suspected association of the former with the New People's Army (NPA). Rebel groups are believed to be more active in rugged terrain and areas with poor infrastructure, which are common features of many indigenous territories. In the Cordillera region, four indigenous hunters were killed from 2003 to 2006, in separate incidents, as many IPs have been wrongly accused of being rebels due to some of their indigenous practices, like hunting, where they carry "weapons" (IPR-Monitor, n.d.). The presence of paramilitary groups, specifically Civilian Armed Force Geographical Units (CAFGU), within indigenous areas

has intensified the problem of militarization, with instances of forced recruitment of indigenous peoples to meet recruitment quotas set by the military, as seen in Kalinga Province (IPR-Monitor, n.d.). Just to draw recruits, the absence of employment opportunities, conflicts over tribal lands, and various other disputes have been the military's ways. Consequently, this has resulted in the erosion of cooperation, unity, as well as cohesion among indigenous communities. As reported by an ally of the IPs, the "Kalipunan ng mga Mamamayan ng Pilipinas" (KATRIBU), the military had encamped in 12 villages in the town of Talaingod (Ayroso, 2015).

Manobo chiefs in Talaingon town claimed harassment by soldiers from the Army's 68th Infantry Battalion, according to a mission conducted in many provinces. The troops coerced them into joining Alamara, a Lumad paramilitary group operating in the districts surrounding Davao del Norte and its highlands (Ayroso, 2015). As presented by Silverio (2012), the "Rural Missionaries of the Philippines in Northern Mindanao Region" (RMP-NMR) had charged the CAFGU under the 26th Infantry Battalion (IB) of the Philippines for killing a 23-year-old indigenous leader and an anti-mining advocate. Soldiers of the 26th IB of the Philippine Army together with Bagani Forces, an identified paramilitary group, threatened to massacre a certain village in La Paz, Agusan del Sur, causing several 118 families to flee from their homes (Ellao, 2014). These incidents underscore the complex interplay between security imperatives, development pressures, and indigenous rights, which emphasizes the need for a more subtle comprehension and approach informed by theories of state violence, conflict resolution, and indigenous rights frameworks.

These are just a few of the reported incidents involving indigenous peoples who have, in a way, experienced unfortunate dealings with military/paramilitary groups. The militarization of communities involves the presence of military forces within ancestral territories, either permanently or temporarily, conducting regular military operations that include unwarranted searches of houses, interrogation, and harassment of suspected rebels, and forcing people to join the paramilitary, which violates IP rights, both individual and collective, even though there is a rule for FPIC.

3.6 Right to Health

International Legislation

Article 21 of the UNDRIP says that indigenous peoples are entitled to better social and economic circumstances, without discrimination, in areas like social security, healthcare, work, housing, and education.

National Legislation

Section 25 of R.A. 8371 states that ICCs/IPs are entitled to specific measures, such as jobs, training, housing, health care, and social security, to improve their economic and social circumstances. The State needs to focus on the specific needs of youth, children, the elderly, and women of indigenous descent. Additionally, it ensures that ICCs and IPs can utilize government services like infrastructure, water and power, health care, and education.

Situation and Assessment

The "No Home-Birthing Policy" enforced by the Department of Health (DOH) in collaboration with Local Government Units (LGUs) has led to the creation of ordinances that impose penalties on traditional birth attendants and women who opt for home births. Indigenous women face additional challenges due to the lack or absence of basic social services, such as limited access to health centers, particularly considering the remote locations of indigenous communities (Rishworth et al. 2016; Ruiz et al. 2013; Greeson et al. 2016). This further compounds the difficulties experienced by indigenous women. They face significant challenges accessing healthcare, often having to endure long hikes to reach the nearest health facility. Regrettably, this challenge has contributed to the issue of low birth registration rates among indigenous children. Moreover, the enforcement of a six thousand peso fine for women who opt for home births with the help of traditional attendants serves as a deterrent, discouraging them from registering their children. These policies and their enforcement are detrimental to maternal and child health, as they often disregard the cultural, social, and emotional risks and realities faced by these women (Rishworth et al., 2016). The lack of access to culturally appropriate care and sustainable funding further exacerbates the situation (Ruiz et al., 2013). Additionally, the imposition of penalties for home births can create new financial burdens and widen health, economic, and gender inequities in these communities (Greeson et al., 2016).

As a response to the non-existence of health facilities in many IP communities, the Modified Conditional Cash Transfer (MCCT) program was introduced by the Department of Social Welfare and Development (DSWD), which could be considered one of the most effective government programs as it is meant to address problems identified with the Pantawid Pamilyang Pilipino Program (4Ps). These challenges encompass the inadequacy of catering to cultural and language requirements, the isolation due to geographical seclusion, and the insufficient education and health facilities in the indigenous communities. As per DSWD's identification of geographically isolated and disadvantaged areas, all MCCT beneficiaries, including IPs, are automatically signed up and included as indigent members under the National Health Insurance Program (NHIP) as specified through PhilHealth Circular No. 2015-040. A total of 663,616 indigenous families benefit from the Pantawid Pamilyang Pilipino Program (4Ps) (Cudis, 2020). This approach aligns with theories of social welfare and indigenous rights frameworks, which emphasize the importance of culturally sensitive interventions to address systemic inequities.

3.7 Right to Education

International Legislation

UNDRIP's Article 14 says that education must be made accessible to the IPs, especially children, and this education should be given to them fairly and without any form of discrimination. Additionally, Article 21 of the same Declaration highlights the entitlement of indigenous communities to enhance their economic and social circumstances, including health, and education, without facing unfair treatment.

National Legislation

Section 30 of IPRA guarantees that ICCs and IPs have fair access to cultural opportunities, education support like scholarships and grants, and the ability to run their educational systems. It ensures that education is provided in their language and cultural methods, and indigenous children and youth can attend all levels of education offered by the government.

Situation and Assessment

The indigenous peoples, together with the Lumads (native tribes in the Mindanao region) in the country, have experienced a lot of challenges in terms of accessing education. It may not be that clear to most of us, but the specific needs and interests of IPs have not been seriously taken into consideration by the government when formulating policies, even with the establishment of an IP Education Office under the DepEd to help implement education programs for IPs. Frequently, they are the least prioritized recipients of vital services from the government, which hampers possibilities for indigenous children, particularly in the realm of education. As presented by Castro (2016), compared to non-IPs, IPs have a 12.7% lower percentage of school participation. In her speech about indigenous children, Senator Loren Legarda, as part of the press release of the Philippine Senate (19th Congress) on October 18, 2016, emphasized the difference in enrollment numbers. The enrollment of IP children in Kinder to Grade 6 is only around 1.9 million, and in Grade 7 to 11, it is about 500,000 (Senate of the Philippines, 2016). However, there are an estimated 4 to 5 million school-aged children who are supposed to be enrolled in Kinder to Grade 9 using NCIP estimates and data from the 2010 Philippines Census (Senate of the Philippines, 2016).

The distance of indigenous lands, poverty, discrimination, and the relatively high cost of schooling have made indigenous children the least served in terms of education access. Indigenous children comprise the majority of out-of-school children (State of the World's Minorities and Indigenous Peoples 2009, n.d.). Philippine statistics show that in Mindanao, 9 out of 10 children lack education access, and several indigenous communities do not have schools (Ambay, 2017). The ongoing battle between the Philippine Armed Forces and the NPA remains a threat to IP areas. Alternative schools established by non-government organizations for IPs have been utilized by the military's counterinsurgency program, known as "Oplan Bayanihan" or the Internal Peace and Security Plan, leading to increased violations in IP areas (Urgent appeal to keep children in school, n.d.). Between July 2016 and July 2017, approximately 68 attacks targeted 89 Lumad schools, impacting thousands of indigenous children, with at least 2,500 affected. Notably, 80% of these attacks occurred in southern Mindanao (Urgent appeal to keep children in school, n.d.). Government and military officials often perceive many Lumad or IP schools as being operated by the CPP-NPA and serving as breeding grounds for subversion.

In the face of numerous assurances for change and peace, it seems that the government remains steadfast in pursuing a "policy of repression" against many indigenous communities. Several policies aimed at improving indigenous peoples' education have not been effectively implemented or allocated adequate funding.

3.8 Freedom from Violence and Abuse Among Indigenous Women and Children

International Legislation

Article 22, Paragraph 2, of the UNDRIP, says that the State must work with IPs to safeguard women and children from any form of violence and discrimination.

National Legislation

RA No. 8371 emphasizes the need to ensure that women and children of indigenous descent have the right to be treated fairly and equally without facing unjust or prejudicial treatment and have equal opportunities. This shouldn't lessen the rights and benefits already given to them under existing laws. (Official Gazette, 1997). The government, via NCIP, should strongly back organizations that have aimed at empowering women and youth, encouraging their active involvement in community and nation-building.

Section 50 of the IRR of RA 9262 (Anti-VAWC Act of 2004) emphasizes that other relevant agencies, including the NCIP, must include violence against women and children (VAWC) issues in their planning and programs and provide services to prevent and stop VAWC and protect victim-survivors.

The Magna Carta for Women acknowledges women's rights more comprehensively, encompassing equal access to education, protection from violence, the right to health, which includes food security and maternal health, social protection, and all aspects related to marriage and family relations.

Situation and Assessment

Indigenous women play a central role in their communities, dedicating their lives to land cultivation, development, and resource management for their survival. They have the natural right to self-rule, allowing them to govern their ancestral lands and determine their development. Throughout history, indigenous women have actively participated in the collective struggles of their communities, defending their land, resources, and dignity. It is imperative to empower these indigenous women, as the communities need to have their leadership characterized by their nurturing nature (Phillips, 2024). Regrettably, the heavy militarization in indigenous and cultural community areas, particularly where mining companies operate, disproportionately affects women and children. These communities bear the adverse impacts of such operations, wherein women and children are often the most affected. Their resilience and perseverance in the face of these challenges highlight the need to tackle the intersecting concerns of gender, indigenous rights, and environmental justice to advocate a more equitable and just society.

The dominant aggressive development models, notably driven by extractive industries like mega hydropower plants, alongside the presence of armed forces, and compounded by inadequately carrying out policies and programs, have led to the erosion of women's dignity and identities in the region. The violence against Indigenous women is deeply intertwined with their collective and individual rights to land, territories, and resources, just as it impacts their identities, cultures, and well-being. The aggressive development models have caused widespread damage not only to our lands and resources but also to our people, fostering a culture of unequal gender norms, marriage dynamics, as well as family relationships, which in turn contributes to domestic violence.

Furthermore, an intersection of conflicting realities arises when considering the status of indigenous women. In this context, a disparity arises between the rules outlined under R.A. No. 7160 and the stance of the national government. For example, the customary practice of early marriage (as young as 12 years old) and pregnancy (as young as 15 years old) among indigenous peoples poses a constitutional dilemma that has yet to be resolved. Even though the law sets the minimum marriage age at 18, it is embedded in the Philippine Constitution, specifically under Section 22 of Article II, to respect and support the rights of ICCs. The Magna Carta for Women ensures protection in marriage and family matters, while the IPRA respects the applicability of customary laws. This complex situation demands thorough examination and resolution, safeguarding the rights and well-being of indigenous women, while harmonizing constitutional principles with cultural practices.

On the other hand, due to continuing militarization in many indigenous communities as well as extra-judicial killings, children have not been spared from these atrocities. A substantial number of violations against indigenous peoples, many of whom are children, were recorded in 2015. From May to July 2015, a 14-year-old indigenous girl was raped by three soldiers on three separate occasions (Legarda, 2016), but the case was dropped because the alleged perpetrators and the victims' families reached an agreement outside of court.

The Children's Rehabilitation Center reported 23 incidents in 2013 to 64 in 2014 of violations against children in Mindanao, and 19 documented incidents in 2015 involving thousands of children (Espina-Varona, 2015). Schools have not been spared from militarization. The UN's concern over the surge in attacks on indigenous schools in the Philippines, particularly after 2015, reflects the broader issue of violence in educational settings. Hillis et al. (2017) highlight the enduring consequences of such violence on children, including physical as well as mental health repercussions. Reddy et al. (2018) emphasize the need for improved measurement and research on educator safety, while Moon et al. (2019) underscore the importance of effective school interventions in addressing violence against teachers. Sivaraman et al. (2019) further underscore the need for evidence-based anti-bullying interventions in low- and middle-income countries, where such attacks are prevalent.

A range of studies have highlighted the prevalence of attacks on education and children in conflict-affected areas. Bennouna (2018) and Bennouna (2016) both underscore the need for improved surveillance and response mechanisms, with the former emphasizing the importance of local knowledge and the latter proposing a method for real-time monitoring. Grisales (2020) and Briceño-León (2019) further underscore the challenges in providing protection and inclusion for children affected by armed conflict, with the former noting a gap in institutional capacity. These studies collectively underscore the urgent need for improved protection and support for children in conflict-affected areas.

3.9 Right to Self-Governance and Empowerment

International Legislation

Article 3 of the UNDRIP gives IPs self-determination rights, allowing them to freely decide their political status and advance economically, socially, and culturally. *Article 4* also allows IPs to have autonomy in their local affairs and provides ways to fund their self-governing functions while practicing their right to self-determination.

National Legislation

Chapter IV (Sections 13 to 20) of RA No. 8371 talks about the empowerment rights and self-governance of the ICCs/IPs, as presented below:

Section 13. The government acknowledges the ICCs'/IPs' inherent right to govern themselves and make their own decisions. It also respects their traditions and institutions. As a result, the government ensures that ICCs/IPs can freely develop economically, socially, and culturally. (Official Gazette of the Philippines, 1997).

Section 14. The government will keep supporting self-governing areas as needed. It will also encourage other ICCs/IPs to live according to their traditions while respecting basic rights and global human rights standards (Official Gazette of the Philippines, 1997).

Section 15. ICCs/IPs are entitled to utilize the justice systems that are native to them, approaches to resolving conflicts, and customary laws within their communities. These ought to be compliant with both domestic legislation and global standards for human rights (Official Gazette, 1997).

Section 16. ICCs/IPs are entitled to get involved in making decisions that affect them, using their procedures. Additionally, they can preserve and enhance their native political systems. It is a must for the government to guarantee that ICCs/IPs will be represented in policy-making and legislative councils at the local level (Official Gazette, 1997).

Section 17. ICCs/IPs have the autonomy to decide what aspects of development are most important for their communities and to be involved in planning and carrying out programs that affect them (Official Gazette, 1997).

Section 18. ICCs/IPs hailing together in areas where they are predominantly populated but not the majority can create their own separate barangay or local administrative unit following the guidelines set out in the Local Government Code for establishing tribal barangays (Official Gazette, 1997).

Section 19. The government will respect the ICCs/IPs' role as independent organizations, allowing them to pursue their interests peacefully and lawfully (Official Gazette, 1997).

Section 20. The State will support the empowerment and development of ICCs' /IPs' institutions and projects by providing resources when needed (Official Gazette, 1997).

Situation and Assessment

The experiences of many indigenous peoples about their self-determination rights have shown that the government has failed them. The IPRA and government agencies haven't effectively safeguarded the rights of indigenous peoples or stopped development projects that negatively affected them. This right of the national minorities has been undermined further because companies prioritize their interests, with the government aiding in the process. The experience they have had with the previous administration of then President Benigno Aquino is a concrete example of how the government prioritized the extraction of mineral reserves through large-scale investment. Many mining companies were competing in mining applications. 900,000 hectares, or 3% of the 9 million hectares identified with high mineral reserves, have been occupied by mining residences (Contributors, 2016). Still, a great number of mining applications are in process by the government.

The endorsement of 'development aggression' by the government has flagrantly violated the rights of the IPs to decide for themselves and govern their affairs, leaving them deprived of their autonomy. For example, the Philippine Mining Act permits both local and foreign mining companies to explore and use ancestral lands. The so-called National Integrated Protected Areas System claims to protect ecosystems, but it has led to indigenous peoples losing their homes and livelihoods. Similarly, the Forestry Code imposes restrictions on indigenous peoples, prohibiting them from using forest products or cutting trees for household or small community needs in forested areas, while turning a blind eye to industrial and illegal logging perpetrated by influential individuals. These laws contradict the interests of the IPs, a significant number of whom inhabit designated protected areas, mineral lands, and forests. It is tantamount to saying that state laws and policies have made the IPs "squatters of their own "lands" – mining companies have taken advantage of and invested in the lands that belong to indigenous communities for their profit. The implementation of the Regalian Doctrine, wherein all resources, including aquaculture, wildlife, and other public lands, waterways, oil, coal, and minerals in the Philippines, are owned by the government, has facilitated this practice. There has been State control and imposition of power over these mineral-rich territories, thus causing the overthrow of indigenous socio-political institutions and governance systems.

4.10 Poverty and Sufficient Quality of Life

International Legislation

As outlined in the *Universal Declaration of Human Rights, Article 25 (Paragraph 1)*, everybody is entitled to a decent quality of life that ensures their family's well-being and overall health (United Nations, 1948). The right to a sufficient quality of life entails access to fundamental necessities like food, clothing, housing, healthcare, and essential social benefits, providing security even in situations where individuals face circumstances beyond their control that result in a loss of livelihood. The main idea is that everyone should be able to engage fully in daily interactions with others without feeling ashamed or facing unnecessary obstacles. Hence, people ought to be able to fairly fulfill their necessities.

Every person's entitlement to a decent quality of life is recognized in Article 11 of the International Covenant on Economic, Social, and Cultural Rights (ICESCR) (United Nations, 1966). This encompasses accessibility to fundamental necessities as well as the continuous enhancement of living circumstances. Additionally, it imposes a duty on nations to collaborate to eradicate global hunger.

National Legislation

Article 2 (Section 9 of the Philippine Constitution of 1987 mandates the government to create a fair and vibrant society that guarantees the nation's prosperity and independence while freeing its citizens from poverty. This is to be achieved through policies aimed at providing adequate social services, promoting employment opportunities for all, improving living standards, and enhancing the overall quality of life for everyone (Official Gazette, 1987).

Situation and Assessment

It cannot be denied that ICCs/IPs that have experienced relocation from their traditional cultural communities, lost their land, resources, and other properties, and individuals who have had their means of earning a living affected by mining, logging, and related extractive operations, have suffered from poverty as well as socio-cultural deprivation.

It is noteworthy that there is not much available data at the national level about ethnicity and poverty. The proportion of the Filipino population that was impoverished for the year 2015, or 23.3%, was estimated (updated from 21.6% announced on October 27, 2016), which corresponds to 23.5 million Filipinos (up from 21.9 million) who did not meet the poverty line in 2015 (Mapa, 2019). If not for the natural disasters ravaging the country, like the super typhoon Yolanda in 2013, as well as the major shocks, the poverty reduction could have resulted in a bit faster and in a greater percentage. As emphasized in the said report, Regions XI and XII have recorded the largest drops in poverty reductions among regions, with 8.7 percent and 7.4 percent reductions, respectively. Essentially, the decrease was observed in all regions. Furthermore, it is noteworthy that although Regions XI and XII belong to those with a high population of indigenous peoples, they have managed to decrease poverty incidences in their respective regions.

The MCCT for IPs (MCCT-IP), which is a component of the Pantawid Program implemented by the DSWD, has the purpose of empowering, supporting, and safeguarding indigenous peoples from the adverse impacts of development in remote and marginalized regions. This initiative has benefited many indigenous communities across the country and has played a role in lowering poverty rates among them.

Table 2 shows how indigenous households, and their members are spread across different regions. As per DSWD (2023), among the total 3,798,151 households, 580,382 (15.28%) are IPs. The DSWD (2023) data in Table 2 shows that most IP households, precisely 415,331 (71.56%), are in Mindanao. In Luzon, there are 146,173 (25.19%) IP households, and in Visayas, there are 18,878 (3.25%).

Additionally, when it comes to regional distribution, it is worth noting that Region XI has the most IP households and members, with 94,935 households (16.36%) and 499,551 household members (15.79%) (DSWD, 2023). BARMM (15.83%) and Region XI (15.79%) came next, respectively (DSWD, 2023).

According to the latest poverty statistics (Philippine Statistics Authority, 2022), the Bangsamoro Autonomous Regions in Muslim Mindanao (BARMM) had the highest poverty rate at 37.2%, followed by the Bicol Region at 26.9%. These regions topped the list for the most poverty among families in 2021. The Philippine Statistics Authority (2022) also noted a reduction in poverty among families from 12.1% in 2018 to 13.2% in 2021 and a decrease in poverty among the population from 16.7% to 18.1% during the same period. However, these figures might not accurately depict the COVID-19 pandemic's effects, which likely worsened the situation for many poor Filipinos.

The BARMM and Bicol regions' susceptibility to both natural and man-made calamities contributed greatly to this. The battle that happened in Marawi City, Lanao del Sur, between Islamic State terrorists and Philippine government forces was one great example of a man-made-caused disaster that greatly affected many of our Muslim countrymen and increased the number of poor families in the region, which catapulted Lanao del Sur to remain the province with the highest poverty incidence (71.9%) among families in 2021 (Philippine Statistics Authority, 2022). Conversely, the Bicol region is prone to typhoons, floods, landslides, volcanic eruptions, and droughts that can damage crops, infrastructure, and livelihoods.

Table 2. Regional distribution of IP households and household members' counts

Island/Region	No. of IP Households	Percentage (%)	No. of IP Household Members	Percentage (%)
NCR	452	0.08%	2,616	0.08%
CAR	31,827	5.48%	189,534	5.99%
I	9,994	1.72%	56,039	1.77%
II	26,740	4.61%	172,104	5.44%
III	11,275	1.94%	60,905	1.92%
IV-A	2,444	0.42%	13,473	0.43%
MIMAROPA	56,981	9.82%	320,996	10.15%
V	6,460	1.11%	34,513	1.09%
Luzon	146,173	25.19%	850,180	26.87%
VI	15,656	2.70%	97,536	3.08%
VII	2,979	0.51%	15,528	0.49%
VIII	243	0.04%	1,159	0.04%
Visayas	18,878	3.25%	114,223	3.61%
IX	76,932	13.26%	398,286	12.59%
X	49,975	8.61%	268,762	8.49%
XI	94,935	16.36%	499,551	15.79%
XII	66,579	11.47%	353,591	11.18%
Caraga	32,929	5.67%	178,538	5.64%
BARMM	93,981	16.19%	500,841	15.83%
Mindanao	415,331	71.56%	2,199,569	69.52%
Grand Total	580,382	100.00%	3,163,972	100.00%

Source: (DSWD, 2023)

Climate change may have made these hazards occur more often and become stronger. IPs play a crucial role in environmental protection, climate change combat, disaster preparedness, and the preservation of valuable indigenous knowledge (Reyes et al., 2020; Bernardo et al., 2014; Hiwasaki et al., 2014). Their unique knowledge, such as the ability to predict natural disasters and mitigate their impact, is a valuable resource for disaster risk reduction (Reyes, 2020). However, these communities are also susceptible to climate change's impacts, and there is a need to enhance their resilience through culturally appropriate strategies (Bernardo et al., 2014).

It is noteworthy that these are some of the possible causes of poverty in both regions, but they are not exhaustive or definitive. Addressing poverty requires a comprehensive and inclusive approach. The government, in coordination with the local communities, the private sector, and civil society groups, needs to work hand in hand to find appropriate and sustainable solutions.

The NCIP's budget for the year 2017 was around Php1.21 billion (Cayabyab, 2017). As presented by Cayabyab (2017), the House of Representatives had approved a Php1,000.00 budget for 2018 for NCIP accordingly due to its failure to address the acquisition of ancestral territories and the execution of indigenous leaders. Though it was not yet final as this needed to get through the Senate to approve, disapprove, and recommend a higher

budget for the commission for 2018, it cannot be denied that the insufficient budget has contributed to numerous impoverished living conditions and a higher poverty incidence, especially in those regions with a high concentration of indigenous peoples.

Furthermore, indigenous peoples face significant concerns regarding food security (Lugo-Morin, 2020). It is noted in the country's strategic plan for 2024-2028 that susceptible communities will become more resilient as far as insecurity in food and nutrition is concerned and can effectively manage risks inclusively and equitably ("Philippines Country Strategic Plan," 2024). Indigenous peoples have their own distinct cultures, languages, traditions, and food systems that are closely linked to their lands and resources. The displacement resulting from development activities in indigenous communities has led to the loss of ancestral lands, contributing to food insecurity. Environmental degradation, including deforestation, water pollution, and the loss of agrobiodiversity caused by development programs and extractive undertakings, further exacerbates the issue. Consequently, indigenous peoples are already struggling to survive, as their daily livelihoods have traditionally relied on their lands.

Also, the introduction of agricultural modernization, spearheaded by the Department of Agriculture, has promoted the adoption of high-yielding crop varieties that often rely on the use of fertilizers and harmful chemicals, which exacerbates the traditions and food systems of the indigenous peoples. Moreover, the shift from traditional crops to genetically modified alternatives has led to the extinction of valuable traditional crop varieties.

The food shortages experienced among indigenous communities have led them to develop coping measures. They engage in domestic labor in the nearby urban areas; others diversify food crops and resources; some families resort to borrowing food or money; they reduce the consumption of their foods; and they sell a portion of their lands as part of their emergency measures to be able to survive. According to a study by the International Labour Organization (2010), there are about 1.9 million domestic workers in the Philippines, of whom some are indigenous women from various ethnolinguistic groups, such as Igorot, Mangyan, T-boli, Manobo, and Subanen.

The study conducted by the International Labour Organization (2010) revealed that indigenous women engage in domestic labor in urban areas for several reasons. Firstly, they face limited livelihood opportunities and food insecurity in their ancestral domains due to factors like land grabbing, displacement, environmental degradation, and armed conflict. Secondly, they undertake domestic work to support their families' basic needs, including food, education, healthcare, and housing. Additionally, indigenous women aspire to learn new skills and gain urban experience. Moreover, the influence of relatives or friends already working as domestic workers also plays a role in their decisions. However, the study also clarifies the difficulties and risks faced by indigenous women in domestic work in urban areas. The challenges involve low pay, extended work hours, insufficient social security and labor entitlements, discrimination and abuse from employers and co-workers, as well as feelings of isolation and loss of cultural identity.

4.0 Conclusion

The indigenous peoples have been living independently, away from the mainstream way of life of most of the country's population. Their long-lasting peace as unique people and as unique communities has long been indoctrinated in their natural, pre-existing, and inalienable rights to ancestral territories and to their integral, interdependent, and interrelated self-determination rights, which the government is supposed to protect and uphold under national and international laws, declarations, and treaties.

Considering the numerous cases of human rights abuses perpetrated against IPs in the Philippines, it can be said that the government, through the office of the NCIP, has failed to fulfill its obligations as enshrined in RA 8371, the UNDRIP, and all UN Human Rights instruments that it has been part of ratifying. Several development aggressions, specifically mining activities, have been done to ICCs/IPs that the government ought to protect and preserve. The government has allowed mining activities in indigenous territories, which perpetuates the violation of the IPs' right to FPIC and their rights to ancestral territories. Although there had been a few instances where violators had been prosecuted nonetheless, this is not tantamount to the many cases of human

rights violations concerning IPs as victims where perpetrators have not been prosecuted and convicted, especially those involving military and/or paramilitary forces. The complacency of the government in taking concrete steps to address these concerns is ubiquitous.

Policymakers, advocacy groups, and stakeholders are urged to adhere to a comprehensive roadmap aimed at addressing the complex difficulties encountered by IPs in the Philippines. Firstly, there is an urgent need for the acknowledgment, observance, and respect of rights, which include their inherent rights to ancestral territories and self-determination, as mandated by national and international laws. Additionally, immediate action must be taken to investigate, and redress reported human rights abuses against indigenous communities, particularly those documented by credible sources. Furthermore, biased laws and policies that undermine indigenous rights should be reformed or abolished, with specific attention given to repealing the Mining Act of 1995 and enacting the People's Mining Bill to protect indigenous territories from development aggressions. Prioritizing peace negotiations over counter-insurgency efforts with militant groups like the NPA and MNLF is essential for resolving conflict and promoting peace in affected regions. Legislative examination and compliance with existing laws and international standards are paramount to ensuring the protection of indigenous rights. Establishing effective complaint mechanisms in collaboration with independent bodies will provide avenues for addressing violations and ensuring redress for affected indigenous communities. Lastly, a dedicated budget allocation for indigenous upliftment, integrated into the country's long-term development plan, is crucial for supporting the empowerment and well-being of indigenous individuals and communities. Through concerted efforts guided by this roadmap, stakeholders can work together to promote indigenous rights, autonomy, and holistic development in the Philippines.

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All contributions to each part of this work were made by the sole author himself. He reviewed and approved the final version of this work.

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The Psychology of Tsismis: A Phenomenological Study About Housewives' Gossip Engagement

Nissi B. Suing*, Junelie R. Gorospe, Lawrence M. Labto, Junea Paula D. Pinca, Rodrigo DP. Tomas
Rizal Technological University, Mandaluyong City, Metro Manila, Philippines

*Corresponding author email: nissi.suing127@gmail.com

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Abstract. The act of gossiping, or "pakikipagtsismisan," is often observed in Filipino culture and pervasive throughout its society. This study explores the psychology of "tsismis" through the perspectives of housewives in selected areas of the National Capital Region (NCR) of the Philippines. Its aim is to investigate the phenomenon of "pakikipagtsismisan" within the Filipino community, particularly among housewives. The study also seeks to understand the motivations of participants for engaging in this activity, as well as the potential advantages and disadvantages they derive from it. A qualitative research design, specifically a phenomenological approach, was employed to explore this phenomenon. Semi-structured interviews were conducted with 11 participants until saturation was reached. Thematic analysis was used to analyze the gathered data, revealing several themes that addressed the research questions posed by the study. "Tsismis" was found to be deeply ingrained in Filipino culture for these housewives, serving various purposes for them individually. Some participants viewed it as a form of entertainment, a source of information, a means of connecting with others, and even as a defense mechanism. Additionally, the results indicated that "tsismis" significantly impacts the well-being of these housewives.

Keywords: Tsismis; Gossip; Housewives; Phenomenological study; National Capital Region.

1.0 Introduction

If you want to know about the latest happenings, all you have to do is keep your ears open, and Filipinos will be talking about it.

Filipinos are well-known to be sociable people. Most of them are not shy about interacting with others, be it through face-to-face communication or digital means. It is not surprising that this sociability extends to how they engage with others in conversations, or what they call "*pakikipagkuwentuhan*" or exchanging stories. *Pakikipagkuwentuhan* is typically a way of recounting events and talking about them with other people. However, when Filipinos exchange stories, they are also open—or at least expecting—the possibility of gossip to make their way into the conversation (Tan, 2016).

Gossiping, or the act of "*pakikipag-tsismisan*" in Filipino terms, has always been a part of the culture in the Philippines. According to the Philippine Entertainment Portal (2022), gossiping and gossipers have played a significant part in Philippine society since before the arrival of the Spaniards. The phenomena may or may not have descended from the pre-colonial "*umalohokan*" which referred to the town crier of the community. Inevitably, these town criers were overshadowed by the Spanish government, which means that stories that did not directly come from the Spaniards were considered "*tsismis*"—the Spanish term for gossip.

In the present, gossiping has been prevalent in the Filipino culture as seen in the majority of the respondents of Philstar Global's (2009) inbox question where they stated that gossiping is the Filipinos' favorite pastime activity. One may see one or two, or even clusters of people, chitchatting in front of a *sari-sari* store, or a house, or maybe in offices and even public places. These scenarios are usually seen—and sometimes, typical—in Filipino communities. Meaning to say, Filipinos are very social creatures and gossiping is only among the many ways they communicate with each other.

Relative to this, it is important to mention that gossiping is more often connoted in a negative light. However, various studies showed that there is more than one form of gossiping—which includes positive gossip. According to Miller (2019), the majority of gossip focuses on sharing information about who did what with whom. Meanwhile, Fox (2001) defined gossip as “the process of informally communicating value-laden information about members of a social setting.” With these definitions, gossiping is not entirely negative or positive. Thus, for this study, the researchers opted to view gossiping in a neutral light.

Marites, an old name turned local internet meme, and a slang term for gossipers—or *tsismosas*, which have been characterized as information gatekeepers, determining whether to communicate or conceal information about others (Foster, 2006). It's hard not to know about her in the Philippines, especially if you spend a significant amount of time using the internet. Every Filipino probably knows a *Marites* in their life or has encountered one. Whether it be a family member, a neighbor, or a colleague, gossipers can be seen in any place and at any time. With this thought, one may wonder why in most cases, gossipers can be observed to appear almost always around the neighborhood. It brings ideas that these gossipers may have more means of engaging in social communities, which is why it is more often associated with individuals who are often seen at home—hence, in relation to housewives.

This research aims to study the phenomena of gossiping within the Filipino community and its ties to its members—in particular, among the housewives. The study attempts to know the reasons for the participants to engage in gossip or *pakikipagtsismis*. In addition, the researchers also seek to see the advantages and disadvantages of engaging in the said activity. The researchers are particularly interested in this topic as it is a long-standing phenomenon seen in many circumstances and stages in life. It has been witnessed throughout Filipino society again and again with a lack of understanding as to why they happen so often. Furthermore, most studies in regards to the phenomena are from international sources, and may not apply to the Filipinos due to differences in cultural norms and practices. This stands to reason that despite the prevalence of the phenomena throughout history and in everyday life, little to no studies are conducted within the country that are up to date on the current social status of the Philippines. Conclusively, exposure to what the majority may term the “*Marites* culture” yields curiosity and awakens the inner *Marites* in them.

2.0 Methodology

2.1 Research Design

The researchers employed phenomenological research, an approach that is beneficial in describing the experiences of an individual (Prakash Srivastava, 2021). Since this study's primary aim was to explore and comprehend the phenomenon of gossiping in the Filipino community, this method was best suited because it focuses on people, experiences, and phenomena.

2.2 Research Participants

The research was conducted primarily in Mandaluyong, Manila, and Quezon City. The researchers explored different barangays and social media for participants who managed to meet the study's pre-determined criteria. Face-to-face interviews were conducted, particularly in the households of the participants. The researchers had eleven participants for this study who were specifically chosen based on the study's pre-determined criteria. The researchers also concluded that they had reached saturation of the study after the 11th participant.

Participants were chosen based on the following criteria for this study: a) The participants must be Filipino housewives residing in the National Capital Region (NCR) who can speak the Filipino language, b) Participants must gather in a certain place where researchers can sense the amount of gossip that is probably happening, c) To fit the pre-determined criterion, the participants must be self-proclaimed (optional) and/or observed by

multiple people (two or more) in the community to frequently engage in gossip or “pakikipag-tsismisan”, d) According to previous studies, there is no specific age for the participants who often engage in gossip (Regala and Gorospe, 2015). As a result, the participants must be between the ages of 20 and 40, according to the researcher's preference, e) Participants must have a life partner or significant other, as well as children or someone they consider as their child, f) Participants must be unemployed or self-employed, and g) housewives who are working must be working from home without a formal job or an employer.

2.3 Research Instrument

The researchers utilized an interview guide for the researcher's initial data collection technique. The questions were composed of open-ended questions as specified in the data-gathering procedure. The researchers also used pen and paper throughout the interview with the participants to take note of important information shared within the conversation. In addition, the researcher also used recording devices such as phones, laptops, etc., during the interview to capture what transpired in the whole session and help to fill in the holes in the notes that were taken. This made it easier for the researchers to return to the information needed for the study's data analysis.

2.4 Data Gathering Procedure

In this study, in order to develop knowledge that is contextualized within indigenous concepts, it is critical to examine and understand the local language and describe the phenomenon through the lens of the native Filipino. Thus, the indigenous methods of pakikipagkuwentuhan (exchanging stories), pakapa-kapa (groping), and pakikipagpalagayang-loob (being-in-rapport) was employed for this study (Pe-Pua and Marcelino, 2000). The study utilized pakapa-kapa to look for participants who met the study's predetermined criteria. In pakapa-kapa, a characterized suppositional approach to a social scientific study by groping, exploring, and probing through an unorganized mass of social and cultural facts to find order, significance, and research directions. Moreover, before the interview, the researchers also tried to establish rapport with the participants by engaging with them in conversation. Pakikipaglayang-loob is critical, especially in Sikolohiyang Pilipino, to bridge the gap between researchers and participants and establish a comfortable interaction. While in pakikipagkuwentuhan, the researchers encouraged the participants to share their thoughts on the subject. Pakikipagkuwentuhan seeks to use systematic techniques, including a semi-structured, predefined interview protocol. Moreover, flexibility in the questions was still allowed. The researchers looked for participants who met the study's predetermined criteria. The participants then received a consent letter asking for their approval to be part of the study. Following the participants' approval, the researchers scheduled a time that was most convenient for them. Participants were also informed that the interview would be audio recorded. The researchers then asked each participant for some basic information and their background to build rapport before they proceeded with the interview. The interview consisted of open-ended questions that aimed to explore the experiences of Filipino housewives who frequently engage in gossip.

2.5 Data Analysis Procedure

The qualitative data collected in this study were hand-coded. A qualitative codebook was utilized to list predetermined clustered themes and then analyzed using thematic analysis. To provide a broader, more expansive analysis of the entire body of data, an inductive approach to thematic analysis was employed to determine the themes in this study. Moreover, in identifying the core patterns or clustered themes, also to compare with the existing body of literature, there was a six-step process that was utilized: (1) researchers' familiarization with the data; (2) generating initial clusters; (3) searching for themes; (4) reviewing themes; (5) defining and naming the formed themes; and lastly, (6) producing the report.

2.6 Ethical Considerations

The researchers gave a consent agreement form providing participants with information about the nature and goal of the research study. The participants also received assurances of confidentiality to make them feel more at ease when sharing and clarifying their own opinions. The informed consent statement explains the study's main objective and methods, including the participant's time commitment of one (1) session, benefits, and the confidentiality of their data to the potential subject of study. The participants were given the option of participating in the study or declining at any moment. Before the interview, the participants signed an informed consent form that guaranteed the confidentiality of their responses. Their names were asked optionally and the

researchers used code names to refer to them in the paper for anonymity. Audio recordings, photographs, and hard copies of the transcripts were obtained along with the written consent form and instrument paper, including participant feedback, which will be maintained and accessible only to the researchers. Before, during, and even after the study, participants have the chance to access further information, as well as their answers to the questions in the study. The participants were also given the researchers' phone numbers and email addresses. Participants can contact the researchers if they have any questions or concerns regarding the study. The researchers took care to limit any harm to the participants by ensuring that they understood the statements included in the informed consent form, determining whether they had any objections to participating in the study prior to the session, and emphasizing their ability to withdraw at any point of the study if they anticipate any negative consequences as a result of their participation, and/or they feel reluctant to participate any longer.

3.0 Results and Discussion

In learning more about the Psychology of *Tsismis*, the researchers were able to identify common themes or patterns in the participants' perspectives, experiences, and knowledge, which are supported by clustered themes derived from the responses of the participants in the study. These themes are interrelated with each other, especially in answering the research problems of the study.

Theme 1: *Tsismis is Part of Filipino Culture*

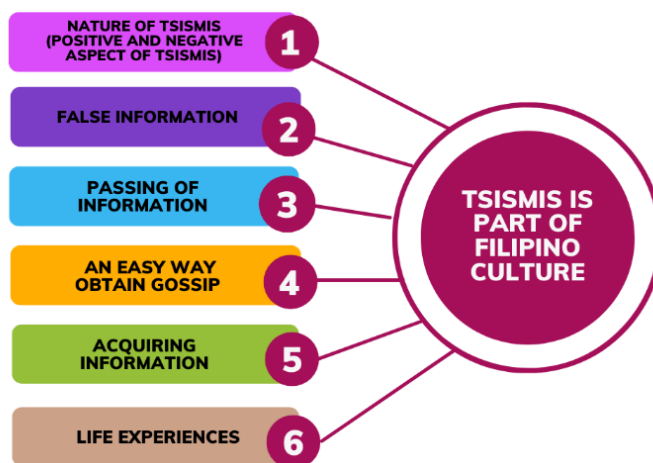


Figure 1. *Tsismis is part of Filipino culture*

To move forward in the theme of '*tsismis is part of Filipino culture*', there were five clustered themes that have been identified. The first one, the *nature of tsismis*, is seen as a positive and negative aspect that has already been attached to the word *tsismis*. The participants acknowledge that the word *tsismis* does not only pertain to the negative aspect but has also some positive aspects. In accordance with this, according to Beck (2014), a study published in the late October issue of *Personality and Social Psychology Bulletin*, people profit from gossip as well. Not only because a timely piece of information could save people from being exploited, but also because understanding others can also help people evaluate themselves. Additionally, Ro (2018) stated that most of the gossip is positive or neutral, rather than bad. According to one prominent study of British talk, only 3-4% of the gossip samples were malevolent.

The next clustered theme talks about the *false information* that the participants are experiencing when they engage in gossip or "*pakikipag-tsismisan*". This could be further supported by Gallego (2022) who states that "*tsismis*" or "*tsismosas*" (a common term used to refer to those who indulge in *tsismis*) are frequently thought to be liars and people who make up stories or, if the narrative is true, embellish specific portions of it. In short, *tsismis* is a blend of truth and deception. Gossip is when you take rumors, those unsubstantiated pieces of information—and share them, perhaps disseminating "false news" (Anander, 2022).

Third, the *passing of information* is also seen as attached to the word *tsismis*. The majority of the participants have stated that the word "*tsismis*" comes from person to person spreading personal or private affairs of others or

someone who repeats stories about other people. Daskal (2014) stated that being social creatures, humans naturally engage in "*pakikipag-tsismisan*," or the act of gossiping, which is a type of communication through the sharing of information and stories.

Next, the fourth clustered theme pertains to *easy ways to obtain gossip*. Participants see gossip as available access everywhere they go. And, as mentioned by Maresca (2020), one of the things that distinguish Filipinos is that they spend long hours chit-chatting or, in Filipino, indulging in *kuwentuhan*. Filipinos are gregarious people who prefer to be extroverts rather than introverts. They grow up in house compounds where the entire extended family lives and people come and go throughout the day, with the typical Filipino invitation of "*halika, kuwentuhan tayo*" ('come in, let's talk'). This explains why most of these housewives can readily access or acquire *tsismis* just by leaving their front door or minding their own business.

Moreover, the researchers were able to identify themes that intermingle with each other. These themes include a couple of clustered themes under '*tsismis is part of the Filipino culture*', and clustered themes under '*engaging in tsismis is a source of entertainment and pastime*,' '*tsismis is a means to get close to others and share sentiment and resources*,' '*too much tsismis wastes people's productivity and time*,' '*tsismis is used as defense mechanism*,' and lastly, '*being subjected to tsismis hurt people's feelings and reputation*.'

In *acquiring information*, according to participants, gossip can be a way to gather information and be informed about the world we live in or about a particular person. Gossip used as a method for vicarious learning can help people understand the world and alter their behavior without having first-hand experience. In addition, it has been suggested that gossip is a sort of "social grooming" that is unique to humans and is similar to physical grooming practiced by other primates to help individuals create close relationships and trust (Jolly and Chang, 2021).

Further, under the first theme is the *life experiences* of the participants. Most of the participants' responses ranged from gossiping about their or others' current life situations. Contrary to popular belief, gossip plays a crucial part in assisting us in getting to know ourselves and adjusting to our environment, noting that while some gossip may be harmful at times, most of it is said in good faith (Levine, 2015). These housewives share sentiments, share information with the people they trust, and seek validation through *pakikipag-tsismisan*. The knowledge obtained makes a person aware of their social surroundings and their role within (Martinescu et al., 2014).

Theme 2: Engaging in Tsismis is A Source of Entertainment and Pastime

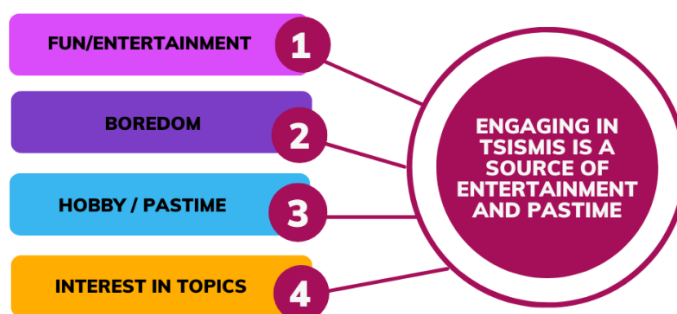


Figure 2. Engaging in tsismis is a source of entertainment and pastime

Moving on, in the theme of '*engaging in tsismis is a source of entertainment and pastime*', four clustered themes were identified: *fun and entertainment*, *boredom*, *hobby or pastime*, and *interest in topics*. To elaborate, *forms of entertainment*, *hobby*, and/or *to stave off boredom* are clustered themes that tend to show up together or followed by others. Furthermore, another clustered theme that showed up under the theme is the *participants' interest in the (topics) issues* being discussed during gossip or *pakikipag-tsismisan*. According to Hartung and Renner (2013), gossip or *pakikipagtsimismisan* appears to serve predominantly for entertainment purposes. It is a great way to

kill boredom and a source of entertainment since people involved in gossip are interested in the topics that are being discussed.

Theme 3: *Tsismis* is a Means to Get Close to Others and Share Sentiment and Resources



Figure 3. *Tsismis* is a means to get close to others and share sentiment and resources

The following clustered themes appear to show a reason for these housewives to engage in *tsismis*, and an advantage that these housewives receive from this engagement. Under the main theme of '*tsismis* is a means to get close to others and share sentiment and resources,' several clustered themes that support the main theme have been identified. Several participants are said to engage in *tsismis* as a form of "*pakikisama*". Aside from this, engaging in *tsismis* also serves to *form bonds* and *reconnect these housewives with people*. As stated by the participants, gossip or "*pakikipag-tsismisan*" drives social bonds that can strengthen ties and reconnection with other people.

Jolly and Chang (2021) stated that vicarious learning is aided by social information obtained through gossip, which directly influences future behavior and impression formation. Simultaneously, conversation partners start to influence one another, form roughly comparable impressions, and build strong social bonds. This supports the clustered theme that gossip allows the participants to form bonds or relationships and have a connection with the people they engage with.

In contrast, the opposite side of forming bonds and a healthy interpersonal relationship with others is how these housewives shared that they are *getting affected for people who are close to them* whenever these people become the subject of gossip. Moreover, the next thematic clusters that were identified within this theme is gossiping about *financial matters* or issues relating to money and *family matters*. These specific clusters include whether the person on the topic is financially stable and/or has issues relating to lending money (*utang*) and topics that focus on their family affairs. To support this, statements from participants showed that among life experiences, financial and family matters show up fairly frequently regarding the common issues and the housewives' sentiments discussed in gossiping or *tsismis*. Furthermore, according to Foster (2004), gossip can be a process of forming bonds with people. It can signal a desire to deepen a relationship and thus play an essential role in the formation of new friendships. Concerning this, when intimacy exists in gossip type of topics discussed, there could be a difference when compared to people they are not close with (Deangelis et al., 2012).

Giving way to the clustered theme of *social ties (Ibang Tao, Hindi Ibang Tao)*, this explains how participants verify the information they hear from others based on their relationship to the people who they engage with in gossiping or "*pakikipag-tsismisan*". Relating to this, having *multiple sources* as a clustered theme shows the participants' reason for engaging in gossip to verify the truthfulness of *tsismis*. According to Tegan (2023), a trusted source is unbiased and supported by facts. It should be written by or coming from a reliable individual or group. By having multiple sources, the participants in the study are examining the credibility of *tsismis* depending on how they know the other person.

Theme 4: Too Much Tsismis Wastes People's Productivity and Time

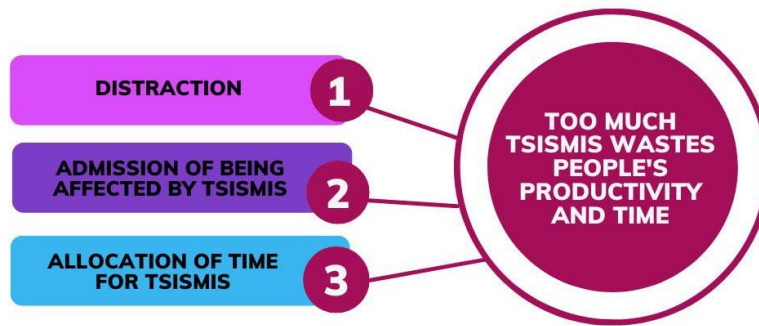


Figure 4. Too much tsismis wastes people's productivity and time

In contrast to the advantages of gossip engagement that were shared by the participants, the disadvantages of gossip engagement or *pakikipagtsismisan* are shown in the clustered theme stating *too much tsismis wastes people's productivity and time*. The first clustered theme that perfectly fits under this is *distraction*, in which, the participants' responses show that gossiping can sometimes distract them from things that they should be doing. According to Nekvapil (2021), gossip can be a massive distraction because by focusing on what people presume others are 'doing wrong' – as in most cases of gossiping – they avoid having to examine areas in their own lives that may require some scrutiny. This means that engaging in gossip too much may also prove to be a hindrance in our daily lives.

Another clustered theme that appeared related to *distraction*, particularly, how these housewives avoid being distracted by gossip, is the clustered theme of *allocation of time for tsismis*. This, in particular, pertains to how the participants divide their time for *tsismis* apart from their duties at home. Additionally, the clustered theme answering another research problem is shown by the *participants' admission of being affected by tsismis*. The participants were all hesitant at first and they kept on rejecting the notion that they are affected by *tsismis*, however, in the end, they verbally admitted to it and some even shared their personal stories.

As stated by Khamis (2018), some people engage in gossip to serve their own interests at the expense of others. This is an example of 'bad' gossip, and the responses of participants regarding this type of gossip reflect the disadvantages that gossip has on them. Moreover, according to Dr. Otilia Brown in an interview with Khamis (2018), to further one's own interests, gossip can be used to reap from others' misfortunes or circumstances and turn it against them when they are most vulnerable. This prevalent unfavorable habit can be utilized as a bullying strategy when gossip or *tsismis* circulate inside families, workplaces, or more generally, on social media.

Theme 5: Tsismis is Used as Defense Mechanism



Figure 5. Tsismis is used as defense mechanism

Next, there were three thematic clusters under the theme of '*tsismis is used as defense mechanism*.' First is *denial*, or how participants deny that they're being affected by *tsismis*. Aside from denial, *tsismis* also causes feelings of

isolation and *insecurity*. Participants have expressed feelings of insecurity, which leads to feelings of isolation – both from others and from themselves. Lastly, under this theme, *tsismis* creates anxiety.

Defense mechanisms are ways for individuals to protect themselves from excessive hurtful feelings, motives, or ideas (Kreitler and Kreitler, 2004). There are different common defense mechanisms and one of the typical types is *denial* – this type of defense mechanism happens when someone refuses to accept reality and/or facts. Some participants have also demonstrated a type of defense mechanism called regression which is a way of how individuals escape an anxious-triggering scenario (Holland, 2022). From the answers of the participants, *tsismis* leads to feelings of insecurity, isolation, and anxiousness – at the same time, *tsismis* is also used by them as a defense mechanism to protect themselves from immoderate emotions, drives, and thoughts.

Theme 6: Being Subjected to Tsismis Hurt People's Feelings and Reputation

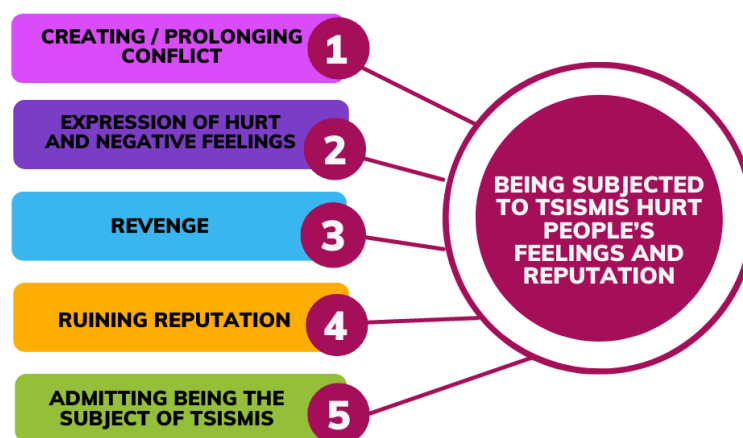


Figure 6. Being subjected to tsismis hurt people's feelings and reputation

Moving forward to the last theme that the researchers derived from the responses of the 11 participants, five clustered themes were constructed, mainly: *creating or prolonging conflict*, *expression of hurt and negative feelings*, *revenge*, *ruining reputation*, and *admitting being the subject of tsismis*. All these clusters are under the theme of 'being subjected to tsismis hurt people's feelings and reputation'.

One disadvantage seen from *pakikipag-tsismisan* through the lenses of the participants is how *tsismis* creates and prolongs the conflict. With this, participants have shared their expressions of hurt and negative feelings. Furthermore, the last three clustered themes are somewhat interconnected with each other. Participants admit being the subject of *tsismis* and with this comes the thought of revenge and ruining other people's reputations.

As seen by the responses of the participants in the interview, being subjected to *tsismis* hurt their feelings and reputation and this leads to conflict, negative feelings, revenge, and ruining someone's reputation. Through the lenses of these housewives, it has now become clearer why *tsismis* gained its negative connotation or why Filipinos often assume that *tsismis* and *tsismosas* are both negative things.

All the themes, together with the supporting thematic clusters that were derived from the responses of the participants from the study emphasize how profound their perspective is in sharing their thoughts about matters revolving around *tsismis*. This serves as a tool for the researchers to know more about the psychology of *tsismis* through the lenses of these 11 housewives based on their gossip engagement and personal experiences.

4.0 Conclusion

The following are the salient findings of this study:

- a. It was found in this study that *tsismis* has been deeply rooted in these housewives – as a culture with both positive and negative aspects. *Tsismis* played an important role in the lives of the participants and is now used by them as a tool to share sentiments and resources with others.

- b. In addition, it has been so prevalent that these housewives regarded *tsismis* as a great entertainment and pastime source. *Tsismis* has also become a means for them to get close to others and share sentiments and resources.
- c. Furthermore, this study found that *tsismis* has both advantages and disadvantages in the intrapersonal and interpersonal lives of these eleven (11) participants when they engage in gossip or *pakikipag-tsismisan*. *Tsismis*, like a spectrum, can provide benefits (such as how participants form bonds and make new friends through gossip) and drawbacks (such as how *tsismis* can cause problems that lead to the end of a relationship with other people). Relatively, it has been shown that *tsismis* can also be used as these housewives' defense mechanism, especially when they are being subjected to *tsismis* which may hurt people's feelings and reputation, particularly their own.

This study has contributed to the understanding of the psychology of 'tsismis' and housewives' gossip engagement. As the research progressed, a few areas emerged as potential future research areas. The recommendations are as follows:

- a. The settings for this study took place in the individuals' homes, and most of the gossip and stories that spread around the neighborhood revolved around their personal lives. Because more details can be learned from gossip in different settings, it is advised that future research be conducted in different locations, such as offices. This environment could provide a way to add to or contrast the diverse sorts of gossip that take place in various contexts.
- b. As this study is primarily focused on housewives and their individual experiences with gossip engagement, particularly, since housewives only include females, research about other gender groups should also be investigated. It is also beneficial to investigate how different genders—such as men's perspectives or people within the LGBTQIA+'s experiences—have contributed to our understanding of *tsismis*.
- c. Upon conducting the study, the researchers found that gossip may vary depending on a person's social standing or geographic location. Most of the participants also come from working-class and middle-class backgrounds only. Most frequently, their personal problems, debt, and family are the main subjects of their *pakikipag-tsismisan*. Examining and studying gossip contexts on different economic statuses, power, and hierarchical levels will be worthwhile.
- d. Since the researchers were only able to conduct one session with each participant, the data gathered was limited to what they were able to attain on the same day. Conducting two or more sessions of interviews with the participants may provide more data relevant to the study surrounding *tsismis*. Dividing the questions into multiple sessions with a focus on each specific objective of the study could enable participants to further analyze and accurately share their experiences with the researchers.
- e. Researchers focused on and provided a basis relating to housewives' involvement in gossip. Thus, the researchers recommend studying other individuals' potential involvement, perception, and engagement in gossip or *pakikipagtsismisan* to better provide more context and understanding of the psychology of *tsismis*. Other inputs from members of the community and/or household members can prove to be beneficial to the understanding of the phenomena.
- f. As a qualitative study, the researchers have been unable to reach more individuals for data due to time and location constraints. Thus, the researchers recommend conducting a study leaning towards a quantitative approach in studying the phenomenon of gossip or *tsismis*, and other psychological variables related to the impact of *tsismis* on individuals, groups, or communities.

5.0 Contributions of Authors

The authors confirm the equal contribution in each part of this work. All authors reviewed and approved the final version of this work together with their co-author.

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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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Radio-based Instruction (RBI) Approach to Teaching: The Lived Experiences of Teacher-Broadcasters in the New Normal Education Setting

Nelson C. Teves, Jr.

Foundation University, Dumaguete City, Negros Oriental, Philippines

Author email: nelsonjr.teves@foundationu.com

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Abstract. The COVID-19 pandemic has wreaked havoc on several sectors of society, particularly the education sector. This has caused abrupt shifts in the educational landscape and methodologies, which were manifested through the implementation of several distance learning modalities, such as online, modular, and blended learning. From these modalities, several instructional media and alternatives emerged. One of which was the implementation of Radio-based Instruction (RBI), wherein educational institutions selected teachers to play the role of teacher-broadcasters and deliver instruction on air. However, the implementation has posed many challenges on the part of these teachers. Thus, this study was conducted to investigate the issues faced by teachers in the Bayawan City Division and explore their lived experiences as broadcasters, anchors, and scriptwriters. By adopting Colaizzi's method of data analysis, one emergent theme, "Diverse Challenges Encountered," was identified, which comprises the following eleven specific problems that serve as subthemes: 1) Novelty of the Method; 2) Difficulties in Learner's Engagement; 3) Technological Divide; 4) Lack of RBI Knowledge; 5) Scarcity of Resources; 6) Uncertainty in Gauging Student's Learning; 7) Intricacies in Scriptwriting; 8) Struggles in Content Delivery; 9) Physical and Environmental Barriers; 10) Teacher's Personal and Psychological Barriers; and 11) Inevitable Time Constraints. The findings revealed that the entirety of the teachers' lived experience in the implementation of the RBI in the new normal has never been easy and mainly revolves around various challenges encountered in their pedagogical adaptations. They were forced to "adapt rapidly" and experienced several complexities and impediments, implying that educational institutions were not fully equipped and prepared for its implementation during the pandemic. Educational institutions can further investigate ways to address or mitigate these challenges and improve the overall implementation of Radio-based Instruction (RBI) as a viable alternative educational approach in basic education schools.

Keywords: COVID-19 pandemic; Distance learning; Emergency remote teaching; Radio-Based instruction; Teacher-Broadcasters' challenges.

1.0 Introduction

Kumar, Basumatary, Kumar, and Dev (2019) once reiterated that radio is one of the oldest means of communicating information and an inventive aspect that science has placed in the hands of society. Nuñez (2021) also claimed that radio has become a vital social and educational tool in almost every country worldwide and has enabled millions of students to continue their education.

The pandemic has indeed made radio one of the most viable alternative means of learning delivery that can provide learners with learning opportunities and help them achieve basic school equivalence through lesson broadcasts (Valdez, Paulican, & Adriatico, 2018). Suárez (2020) also affirmed that if people felt the radio's "days

were numbered," the pandemic came along to reinforce its role as a versatile, large, low-cost, and long-range mode of communication. Radio has now become an ICT alternative that can save the country's and the world's education.

As stated in DO No. 012 (DepEd, 2020), the Department of Education in the Philippines has implemented radio as a modality for its Blended Learning Framework. This cleared the way for the creation of the DepEd Radio, which broadcasts lessons and reaches students who lack ready access to the internet and other learning modalities by utilizing the already established local AM/FM radio stations through partnerships with the department's regional and division offices as well as schools across the nation (DepEd, 2021).

The online survey on the student's preferred learning delivery modality conducted by DepEd last June and July 2020 revealed that 900,000 students preferred Radio-based Instruction (RBI) (Magsambol, 2020). This has prepared the groundwork for the capacity building of teachers as teacher-broadcasters for both radio and television. Consequently, many teachers have undergone the audition and training, and later have performed the role as teacher-broadcasters. However, adopting this 'new normal' instructional approach has posed greater challenges on their part (Calo et al., 2021). It has required them to employ new strategies and methods to effectively perform their role and has caused abrupt changes to their regular roles or routines as teachers. Hence, the researcher decided to carry out this study to investigate the lived experiences of teachers as teacher-broadcasters, anchors, and scriptwriters in the implementation of the RBI in the new normal education setting.

Although there have been multiple studies that have investigated the various issues that educational stakeholders faced during the pandemic and the utilization of radio and other media as alternative tools in education, there is currently a scarcity of literature concentrating on the teachers' lived experiences, challenges, and coping mechanisms as teacher-broadcasters, anchors, and scriptwriters in the actual implementation of the RBI approach in basic education schools.

Therefore, the researcher, being one of the teacher-broadcasters, finds this study beneficial because it determines and explores the gaps and challenges that the teachers have encountered in the discharge of their duty as radio broadcasters, anchors, and scriptwriters. The opportunities to be learned from this undertaking are numerous. This phenomenological inquiry intends to gain an understanding of the teacher-broadcasters' experiences not only to create new knowledge, develop an intervention, and enhance the instruction, but also to make better-informed decisions for curriculum implementation with radio as a learning tool amid the pandemic.

2.0 Methodology

2.1 Research Design

This study utilized the phenomenological design which describes the participants' interpretations of their experiences (Jamon et al., 2021). This approach provides an avenue for the researcher to explore and give significance to the participants' experiences which leads to the discovery of previously unavailable insights and knowledge. Phenomenology helps in understanding people's experiences and ensures the credibility and the reliability of results. The researcher believes that this approach provides a straightforward and logical process to investigate the underlying structure of an experience. This study is qualitative as it reflects the teachers' critical viewpoints and lived experiences as teacher-broadcasters, anchors, and scriptwriters in the radio-based instruction (RBI) approach.

2.2 Research Participants

The participants are teachers affiliated with the Department of Education Schools Division of Bayawan City. They were purposefully identified and gathered based on their willingness to share their experiences of the studied phenomenon (Hirsch, 2015) and the following inclusion criteria: a) English teachers currently affiliated with the Department of Education as teaching personnel in both elementary and secondary schools under Bayawan City Division for the school year 2021-2022, b) Male or female, c) Bilingual speakers of English and Cebuano, and d) These teachers were presumed to have substantial experience in the roles of teacher-broadcasters, anchors, and radio scriptwriters. The researcher's familiarity with the entire population, as well as the pre-established standards and criteria, were used to select the study participants. They are believed to possess profound knowledge and substantial experience regarding the topic being studied (Polit & Beck, 2013).

Furthermore, recognizing the characteristics of phenomenological research, the number of participants is determined by data saturation. In this type of qualitative research approach, data sufficiency is not determined by the sample size, whether small or large, but by the redundant features and concepts in the participants' responses. When the researcher began to hear the same thoughts and experiences repeatedly, or noticed repetitive responses without gaining new information, it indicated that data saturation had been achieved (Hennink et al., 2016; Polit & Beck, 2013). After reaching the required level of data saturation, probing was conducted immediately to gain a deeper understanding of the participants' perspectives on their lived experiences of the depicted event (Legard et al., 2003; Middlemiss et al., 2015). In this study, an additional participant was interviewed to confirm data saturation.

2.3 Research Instrument

Since the study is phenomenological, significant comments about the participants' lived experiences were extracted through a semi-structured interview approach that utilized guide questions. The questions were written in English and were open-ended, however, the participants were given the prerogative to respond using the local dialect to ensure better expression of meaning. All interviews were automatically recorded via Zoom or cellular device and a journal was utilized to document pertinent notes and observations made by the researcher during the interviews.

2.4 Data Gathering Procedure

Before the conduct of the interview proper, the researcher did a bracketing, which was followed by a mock interview with at least two participants. He identified and held in suspension his preconceived beliefs and opinions about the phenomenon and kept an up-to-date journal of these beliefs. The study participants were asked through call, text, or chat about their preferred interview mode either virtually via Zoom or in person. For the virtual mode, the researcher arranged with the participants a schedule to conduct the interview followed by the sharing of the meeting link. For the in-person interview, the researcher asked the participants to identify a convenient setting for them to be interviewed.

Before the beginning of the interviews, the participants were briefed on the study's purpose, assured of confidentiality, and asked to sign informed consent forms. They were likewise informed about the recording process and their freedom to withdraw at any point in time without repercussion. The participants' verbal and non-verbal cues were recorded alongside demographic information in a journal. The interview typically lasted between 10-30 minutes depending on the participant's extent of engagement. The recordings and transcriptions were cross-referenced to ensure the accuracy of the data transcribed.

2.5 Data Analysis

Colaizzi's method was utilized for data analysis. Themes and recurring patterns were identified from the participants' answers.

2.6 Ethical Considerations

Throughout the entire investigation, the researcher demonstrated all required ethical concerns and followed the ethical guidelines established by an Ethics Committee. Since humans were selected to participate in the study, information confidentiality was strictly adhered to. Ensuring the safety and protection of the participant's rights, dignity, and privacy is a must. It is also critical to minimize potential risks in the process of extracting significant information from their statements (Denzin & Lincoln, 2005).

3.0 Results and Discussion

Lived Experiences of the Teacher-broadcasters in the Radio-based Instruction Approach to Teaching

After an exhaustive analysis of the participants' transcripts, as well as the extraction of the significant statements and formulated meanings, the researcher was able to arrive at an emergent theme encapsulating the teachers' experiences as teacher-broadcasters, anchors, and scriptwriters in the radio-based instruction (RBI) approach to teaching at the height of the COVID-19 pandemic, with emphasis on the various challenges that they encountered along its implementation during the pandemic.

Emergent Theme: Diverse Challenges Encountered

This major theme discusses the various challenges encountered by teachers in the discharge of their new role as teacher-broadcasters, anchors, and scriptwriters in the implementation of Radio-based Instruction (RBI) during the pandemic. This encompasses all the difficulties they faced along the way. After conducting a series of interviews with the participants, the researcher came up with the realization that the teachers were facing multiple impediments, which greatly affected their roles as teacher-broadcasters. They were so sacrificial and remained optimistic that the new method would gain profitable results despite its deficiencies and insufficiencies. The teachers also experienced both environmental and personal or psychological distress while adopting the new instructional method. These barriers created a huge impact on their lived experience with RBI as an instructional modality during the pandemic.

Under this emergent theme are eleven (11) sub-themes, namely: a) (Theme 1) Novelty of the Method; b) (Theme 2) Difficulty in Learner's Engagement; c) (Theme 3) Technological Divide; d) (Theme 4) Lack of RBI Knowledge; e) (Theme 5) Scarcity of Resources; f) (Theme 6) Uncertainty in Gauging Student's Learning; g) (Theme 7) Intricacies in Scriptwriting; h) (Theme 8) Struggles in Content Delivery; i) (Theme 9) Physical and Environmental Barriers; j) (Theme 10) Teacher's Personal and Psychological Barriers; and k) (Theme 11) Inevitable Time Constraints.

Theme 1: Radio-based Instruction (RBI) Approach as a Novel Method

Table 1 shows the first subtheme, Novelty of the Method, which discusses the participants' experiences with the challenges in dealing with radio-based instruction as a new teaching method during the pandemic.

Table 1. Radio-based Instruction (RBI) approach as a novel method

Subject Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences in dealing with RBI as a new teaching method	• Technical problems encountered due to unfamiliarity with the method. • Struggles in the adjustment of pedagogical approaches. • Lack of necessary preparation and time • No prior exposure to training and capacity-building activities • Faced with an "adapt rapidly" reaction	• Struggles due to unfamiliarity. • Insufficient time in the preparation • Abrupt changes in the pedagogy	Novelty of the Method

This theme describes the challenges that teacher-broadcasters encountered due to their unfamiliarity with the use of RBI. The participants revealed that they have been struggling with this new instructional method as it requires them to employ pedagogical approaches and techniques they have not done before. They expressed that this novel method made them consider several coping mechanisms to support its implementation.

This one is challenging because aside from the fact that this approach is brand new to us, there are different challenges that we face, but, we learn also at the same time especially in managing the program, in writing the script most specifically, and aligning it with our most essential learning competencies (P1).

(For me, it's quite ano siya...challenging, sa akua nga case because I'm a neophyte pa in ano siya...sa mga ing-ani nga kind of instruction, the Radio-based Instruction. Though I'm familiar with radio-based or broadcasting, lahi ra man gud siya sa ano jud siya...sa Radio-based nga Instruction. So, medyo at first, lisud-lisud siya.) For me, this kind of instruction is quite challenging especially in my case because I'm a neophyte. Though I'm familiar with radio-based broadcasting, radio-based instruction is far different. That's why it's not easy at first (P3).

Teachers were challenged during that time cause we have to...you have to adjust yourself from teaching first...you have to adjust yourself from teaching face-to-face to teaching via radio. So, that's the very challenging part for the teachers (P4).

These statements imply that RBI as a novel instructional method has posed multiple struggles on the part of the teachers. This notion is explained by literature. Boholano and Jamon (2021) reported that public school teachers acknowledged their unfamiliarity with the current state of the Philippine educational system. Since no one prepared them for these unprecedented circumstances, even college faculty members with greater experience in online and remote instruction are finding it difficult to teach in the new normal (Hew, Jia, Gonda, & Bai, 2020). Toquero and Talidong's (2020) study emphasized the fact that educators are not fully equipped to teach in the new normal. Teachers, educators, and legislators encounter a great deal of difficulty in adapting to the sudden shift from in-person instruction to new learning modalities. Furthermore, since radio instruction is a novel approach, it has been a challenge for both educators and learners. This has required them to 'adapt rapidly' response to the new normal instruction amidst the pandemic (Tanhueco-Tumapon, 2020).

Theme 2: Difficulty in Learner's Engagement in the Radio-based Instruction (RBI) Approach

Table 2 represents subtheme 2, Difficulty in Learner's Engagement, which tells the participants' challenges in ensuring learner's engagement in the implementation of the radio-based instruction at the height of the pandemic.

Table 2. Difficulty in learner's engagement in the radio-based instruction (RBI) approach

Subject Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences with the difficulty in engaging learners with RBI	• Uncertainty whether the learners are interacting during instruction • Teachers' inability to physically see if students are paying attention • Cluelessness whether the learners are getting meaning from the session	• Difficulty assessing learners' engagement • No clear indication of participation • Little to no response from the learners	Difficulty in Learner's Engagement

This theme deals with the problems faced by the teacher-broadcasters, anchors, and scriptwriters in engaging their learners in the discussion via radio. The participants generally felt clueless about whether their students were able to meaningfully participate in the discussion or not. They were in doubt if the medium was effective and sufficient to engage the learners in the lesson broadcast since they could not see them physically.

(The challenge there man gud was dili nimo makit-an ang learner but the instruction is just delivered on through radio frequency.) The challenge there was that, you couldn't see the learner because the instruction was just delivered through radio frequency (P1).

And some, there are times that there are no reactions, and there are no interactions from the students. So, there are very big changes and adjustments to the overall teaching and learning process (P6).

These responses indicate the participants' disappointment due to the lack of interaction or engagement from the students. Teacher-broadcasters were left in the radio room talking without any guarantee that their students were indeed following them throughout the discussion.

This concern is also depicted in literature. Another issue that is closely related to student conditioning is the level of participation by students in class activities, as stated by Rasmitadila et al. (2020). Student enthusiasm for learning, data package issues, and mobile phone or laptop ownership can restrict students' participation in class activities. Also, it is imperative for teachers to continue conditioning students during Study from Home (SFH). To make sure that learning proceeds without a hitch, teachers must carry out conditioning exercises in the online classroom. This significantly affects students' enthusiasm and readiness to learn.

Thus, a teacher needs to be able to guarantee that every student is ready to learn and come up with creative strategies to keep them interested (Rasmitadila et al., 2020). Empirical researchers offered their results regarding educators' attempts to engage students, particularly the challenges they faced with monitoring, feedback, and evaluation (Kaden, 2020; Aliyyah et al., 2020). Another study revealed a substantial difference in achievement

and school attendance, along with a decline in the caliber of students' work as the remote learning period grew (Cullinane & Montacute, 2020).

Theme 3: Technological Divide as Impeding Factor in the Implementation of the Radio-based Instruction (RBI) Approach

Table 3 shows subtheme 3, Technological Divide. This theme is all about the instructional concerns encountered by both the study participants and the learners due to limited or unavailable technological devices such as cell phones which served as impediments in the successful implementation of radio-based instruction.

Table 3. Technological divide as impeding factor in the implementation of the radio-based instruction (RBI) approach			
Subjects Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences in dealing with the technological divide in adopting the RBI	- Students have limited devices to connect with their teachers and to the radio. - Unavailability of the necessary technological devices - Students' incapability to provide the necessary technological tools. - Technological devices are generally costly.	- Necessary technological devices are not readily and sufficiently available - Devices needed are not affordable or procurable to most participating learners	Technological Divide

The pandemic has exposed multiple realities in various sectors, especially in the education sector. One of the most conspicuous realities is the immense technological divide among students. This has been a detrimental factor since it could hinder students from continuing school.

I think that we also need to consider the resources available for the learner because when you say online...not all of them have internet access. Not all of them have a computer or cellphone (P1).

(We chose to have a printed modular distance learning kay lisud man sa mga bata ang online learning. And, dili accessible para nila ang online learning due to the lack of necessary technological devices.) We chose to have printed modular distance learning because it's difficult for the students to do online learning due to the lack of necessary technological devices (P3).

These statements indicate that the participants are fully aware of the technological divide among students. The teachers believe that online classes are not for everyone since laptops, desktop computers, and smartphones are generally costly. Thus, radio is one of the viable technologies that can help support and continue the country's education amidst school closures.

According to Nuñez (2021), the pandemic and confinement brought to light the technological inadequacies that other nations have encountered during prolonged school closures. This condition jeopardizes everyone's right to an education, particularly in African, Asian, and Latin American countries (CIRT, 2020). This situation was further explained by Valdez, Paulican, and Adriatico (2018) who emphasized that the present pandemic has made radio one of the most viable alternative learning delivery means to conduct classes and provide learners with learning opportunities and help them achieve basic school equivalence through lesson broadcasts.

Magsambol (2020) also showed a clear divide between those who can and cannot afford to use the new educational platform. Considering the department's motto of "no child left behind," this situation sends a message of injustice to the majority of students enrolled in public schools.

Theme 4: Lack of Knowledge on the Implementation of the Radio-based Instruction (RBI) Approach

Table 4 shows the fourth subtheme, Lack of RBI Knowledge, which discusses the participants' struggles with the implementation of the radio-based instruction due to deficiency in knowledge and lack of prior exposure on it.

One of the major problems that teachers experienced was their deficiency in knowledge about RBI. They had a hard time using and implementing the method because they lacked prior exposure to it. Teachers who were selected as teacher-broadcasters, anchors, and scriptwriters were lost during its first implementation and

developed feelings of fear and hesitation which adversely affected their overall performance in the program implementation.

Table 4. Lack of knowledge on the implementation of the radio-based instruction (RBI) approach

Subjects Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences in adopting RBI with no sufficient knowledge of its implementation	- Teachers have a hard time implementing due to a lack of prior knowledge and experience. - Teachers were lost at its first implementation. - Teachers were totally confused with the technicalities posed by the RBI	Faulty implementation due to inadequate technical knowledge and skills	Lack of RBI Knowledge

(The teachers at first, my fellow teachers at first were quite hesitant tungod kay dili man ta kabalo mo operate but since we are very committed to helping the learners and still deliver instruction even if there was a pandemic at that time.) My fellow teachers were quite hesitant at first because we didn't know how to operate, but since we were very committed to helping the learners, we need to still deliver instruction even if there was a pandemic at that time (P1).

I will be very honest that it is not easy to do Radio-based Instruction knowing that there are technicalities that you have to learn (P2).

From these responses of the participants, it is safe to conclude that the RBI as a new instructional method has posed a great challenge to the participants, especially in terms of learning the technicalities of the method itself. This was described by Conrad and Donaldson (2011), Ko and Rossen (2017), and Watson (2020), who asserted that Study from Home (SFH) necessitates that teachers become proficient with a variety of apps, making it challenging for those who have never taught online before or who struggle with technology and information resources to implement online learning. Using software and tech tools can be challenging for even seasoned educators and senior teachers. Because of this predicament, teachers find it challenging to put lessons into practice, which hinders learning.

When utilizing Study from Home (SFH), online learning can be a helpful teaching approach for educators who are comfortable with computers, software, and other digital resources. The new normal education landscape poses innovative and complicated problems to both education leaders and school teachers, particularly in terms of decision-making procedures aimed at delivering high-quality instruction to students. Teachers were challenged with changes in the usage of techniques and strategies from their teachers' toolboxes, the exploitation of collected resources, and the application of adaptive knowledge in their professional lives (Ross-Hain, 2020).

Theme 5: Scarcity of Resources as Detrimental Factor in the Implementation of the Radio-based Instruction (RBI) Approach

Table 5 presents the fifth subtheme, Scarcity of Resources, wherein the participants' struggles in the implementation of the radio-based instruction amidst the scantiness of the critical resources are emphasized.

Table 5. Scarcity of resources as detrimental factor in the implementation of the radio-based instruction (RBI) approach

Subject Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences with RBI implementation amidst scarcity of resources	- Unavailability of radio transmission lines and limited signal coverage. - Insufficient number of radio transistors distributed among learners	- Absence of the key radio resources - A limited number of radio transistors - Signal interference	Scarcity of Resources

The limited resources made the RBI implementation even more challenging for both the teacher-broadcasters and the students. The participants needed to find alternative technological tools and devices to address this problem.

(The major challenge there was kanang availability of resources at first katong unsaon man na namo pagkadungog sa inyung lessons, Sir, nga wala man me radio. Ana nga mga concern sa mga bata.) The major challenge there is the availability of resources. At first, our students were concerned as to how they could listen to the lesson broadcast if they didn't have a radio in the first place (P1).

For the students the challenging part was that most of them didn't have a radio or what we call this... transistor, they don't have that device, so they are having...they were having a hard time accessing the radio or the lessons from the radio so we had to cater to that one... that those needs from the students (P4).

Participants 1 and 4 statements depict the insufficiency of resources that the participants experienced amidst RBI implementation. This aligns with the findings of Nuñez (2021), who stated that the pandemic and confinement revealed the technological inadequacies that other nations had encountered during prolonged school closures. This condition jeopardizes everyone's right to an education, particularly in African, Asian, and Latin American countries (CIRT, 2020).

Theme 6: Uncertainty in Gauging Student's Learning in the Radio-based Instruction (RBI) Approach

Table 6 bears theme 6, Uncertainty in Gauging Student's Learning, which highlights the difficulties that the teachers encounter in terms of assessing their students' learning and the lack of assurance the former experience in determining the latter's extent of progress over distance and time.

Table 6. Uncertainty in gauging student's learning in the radio-based instruction (RBI) approach

Subject Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences with the difficulty in assessing student's learning through RBI	- Getting little to no response from the participating learners - Feedback from the learners is almost impossible to obtain. - The veracity and validity of test results and outputs are questionable	- Incognizance in the effectiveness of lesson delivery - One-way instruction - Doubtable assessment results	Uncertainty in Gauging Student's Learning

The participants are expected to assess their students' learning. During the implementation of the RBI, however, the teacher-broadcasters were uncertain if students were learning or were able to develop the most essential learning competencies. They encountered doubts as to the effectiveness of radio as a tool for measuring and determining students' learning and progress over distance and time.

(When it comes to instruction, siguro kuan, kanang monitoring the progress of the learners whether they are grasping the lesson or not.) When it comes to instruction, probably monitoring the progress of the learners whether they are grasping the lesson or not (P1).

We've raised a lot of questions though upon starting like, will we be able to reach most of our students? Or will they be able to understand the discussion? And a lot more things to be considered (P5).

These responses reflect the teachers' struggles in assessing students' learning in a distance learning modality such as the RBI. According to Barron et al. (2021), teachers' functions are changing quickly and are now more complex than at the time when instruction was limited to in-person interactions. They discovered that the pandemic has modified two critical factors: teachers' educational modifications and the recalibration they use in attending to their obligations and responsibilities. Teachers' pedagogical modifications have shown to be crucial, as the transition from traditional face-to-face lecturing does not or no longer translate equally to a remote learning delivery and atmosphere. Every household has essentially become a classroom without a conducive learning environment, so teachers now need to adapt their practices and be creative to keep students engaged. These adaptations manifest themselves through the use of various channels, such as radio, television, mobile phones, online platforms, and so on.

Conversely, teachers' recalibration describes how they allocate their time between teaching, interacting with students, attending to administrative duties, and following the guidelines set forth by UNESCO, UNICEF, and the World Bank (2020). These guidelines stress the significance of giving students structured feedback, staying in

constant contact with caregivers, and reporting to local education units to monitor learning. In addition, empirical researchers offered their results on educators' attempts to engage students, particularly the challenges they faced with monitoring, feedback, and evaluation (Kaden, 2020; Aliyyah et al., 2020).

Theme 7: Intricacies in Scriptwriting in the Radio-based Instruction (RBI) Approach

Table 7 presents theme 7, Intricacies in Scriptwriting, which stresses the complexities that the participants encounter in writing their scripts to be delivered via radio. Teacher-broadcasters craft their scripts based on the self-learning modules and ensure that the contents are simplified to produce comprehensible inputs for the learners.

Table 7. Intricacies in scriptwriting in the radio-based instruction (RBI) approach

Subject Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences with the complexities in scriptwriting for RBI	- Contextualization of the learning content for relatability - Adjustment of the language's level of difficulty - Making the lesson delivery as conversational as possible - Reasonable chunking of broad concepts	- Modifications for better relevance - Language simplification to facilitate better understanding. - Interactive delivery - Unpacking of competencies	Intricacies in Scriptwriting

Drafting the scripts to be delivered on air has never been easy for the teacher-broadcasters. Several considerations have to be done such as adjustment of the language, interactivity or conversational mode of discussion, and contextualization of content which are difficult for some teacher-broadcasters.

With regards to scriptwriting, at first, it's challenging (P1).

What's the challenging part of having Radio-based Instruction is the making of the content of the broadcast especially the scripts it's because it's not the same as our lesson plan and that's the thing that I see as a big challenge in the part of the teacher not just only in writing but also in making or recording yourselves knowing that we don't have enough gadgets (P2).

Yes, so much adjustment because we were still printing modules, and then we still needed to give time or extra time for scriptwriting (P6).

These responses prove that the new normal education landscape poses complicated problems to both education leaders and school teachers, particularly in terms of decision-making procedures aimed at delivering high-quality instruction to students. Teachers were challenged with changes in the usage of techniques and strategies from their teachers' toolboxes, the exploitation of collected resources, and the application of adaptive knowledge in their professional lives (Ross-Hain, 2020).

In addition, the necessity to significantly alter the curriculum's content and delivery in order to make it more accessible and understandable for students through the adoption of new typical pedagogies is an issue raised by instructors in the literature (Gewin, 2020; Jamon et al., 2021), with primary concerns centered on student learning engagement (DeWitt, 2020), and assuring support from their families (Fontanos et al., 2020; Daniel, 2020).

TV/Radio-based Instruction is used by Self-Learning Modules (SLMs) writers who translate video courses for television-based teaching, generate radio scripts, and support radio-based instruction, according to Zafra (2020). This method is suited for students who are self-sufficient and only need occasional parental or guardian supervision. It can also be evaluated in places or communities where online distance learning is not available.

Theme 8: Struggles in Content Delivery in the Radio-based Instruction (RBI) Approach

Table 8 presents theme 8, Struggles in Content Delivery, which encompasses the difficulties that the participants experience in delivering their lessons over the radio. Teacher-broadcasters are doubtful about the effectiveness of their instructional approaches, methods, and techniques when employed with radio as their instructional tool.

Table 8. Struggles in content delivery in the radio-based instruction (RBI) approach

Subject Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences with the difficulties in content delivery in the RBI	• Uncertainty in the appropriateness of methods, techniques, and strategies to be used • Limited range of ways to deliver instruction • Unexpected technical problems encountered during lesson broadcasts	• Utilization of a single teaching method • RBI is not a "one size fits all" approach • Disruption of sessions due to a technical glitch	• Struggles in Content Delivery

Aside from the intricacies in scriptwriting that teacher-broadcasters encountered in the implementation of the RBI, the participants also struggled with delivering the content of the scripts.

(Lahi ra gyud ang lesson nga i-deliver na on air using a script no, because sometimes, you cannot say nga unsa man ni iyahang content nakasabot ba kaha ang bata?) Delivering the lesson on air using our script was a different and challenging one because you cannot exactly tell whether or not the students understand the lesson (P1).

(Katong so far sa delivery sa competencies medyo challenging jud siya, dili gyud cya ingon nga ma deliver gyud cya.) The delivery of the competencies so far has been challenging. We cannot deliver them fully (P4).

These utterances can be interpreted that the participants have encountered difficulties and uncertainties with content delivery. They were doubtful if the radio was sufficient to bridge instruction and if the scripts were comprehensible enough to facilitate seamless delivery of the content. The findings of Toquero and Talidong (2020), which emphasized that teachers are not fully prepared to teach in the new normal, are relevant to this. Teachers, educators, and legislators encounter a great deal of difficulty adapting to the sudden shift from in-person instruction to new learning modalities. Anxiety and dread about how to teach kids in the new normal were brought on by the new pedagogical tendencies. According to the teacher participants' responses, in order to better capacitate them, instructors need to be retrained and equipped with the new standard teaching pedagogies, such as online or remote learning (Yorgancioğlu, 2020).

Yorgancioğlu (2020) further posited that new approaches, resources, techniques, and learning opportunities are necessary in the current context. Another issue that teachers have raised in the literature is the necessity of making substantial adjustments to the curriculum's content and delivery in order to adopt new standard pedagogies and make them more accessible and understandable for students (Gewin, 2020; Jamon et al., 2021), with primary concerns centered on student learning engagement (DeWitt, 2020), and assuring support from their families (Fontanos et al., 2020; Daniel, 2020).

Theme 9: Physical and Environmental Barriers in the Radio-based Instruction (RBI) Approach

Table 9 presents theme 9, Physical and Environmental Barriers, which covers the disturbances that the participants experience in their physical environment when delivering their lessons via radio. Teacher-broadcasters struggle with the building fixtures where the radio booth is located, the physical noise from the surroundings, and the inconveniences caused by radio equipment failure.

Table 9. Physical and environmental barriers in the radio-based instruction (RBI) approach

Subject Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences with physical and environmental barriers in the RBI	• Weather disturbances that affect the radio signal • Noise coming from the vehicles passing by • Power service interruptions • Interferences from equipment glitch	• Natural calamities and disturbances • Noise barrier • Electrical and equipment issues	• Physical and Environmental Barriers

This barrier was frequently described by the study participants as a huge factor in the discharge of their new role as teacher-broadcasters. Both teachers and students encountered several noise interferences in their physical environment such as hissing, vehicular noise, disruptions by calamities, power service interruptions, and equipment issues.

The environmental barrier, and the noise are present so, you have to deal with these (P2).

One factor that we considered was the reception 'cause our radio antenna that we are using is not that...the radio antenna that we are using...all the equipment that we are using in our RBI is not that strong and is not able to reach wider audience (P4).

These statements express that external problems, such as interruptions from other students, occur when learning is implemented through online programs, such as virtual classrooms and broadcasts. Students often talk with one another about topics unrelated to the course material. Because of this, learning is taking place in less conducive, louder, and virtual/radio classrooms (Rasmitadila et al., 2020). Valdez, Paulican, and Adriatico (2018) added that the implementation of RBI is impacted by the following factors as well: the venue's suitability (with noise being the primary issue), the radio equipment's quality (transistor vs. branded radio), and the stability of the radio broadcast signal.

The primary concern is the quality of the radio signal, which is determined by measuring the transmitter power output at a distance from the transmitting antenna using a reference antenna. The quality of the radio being used, which is the second concern, can be affected if there is crackling or hissing, which is a common occurrence. Usually, the radio station is located in a weak signal area. It may not easily pick up a clear signal or its signal may be cut off at irregular intervals. Cheap radios, such as the old transistors, which are small portable radio receivers with transistor-based circuitry, are to blame. In the Philippines, these transistor radios are pocket-sized, allowing owners to take the devices with them wherever they go. These were eventually superseded by better, higher-quality audio devices, such as portable CD players and cellphones (Valdez, Paulican, & Adriatico, 2018). However, CD players are costly, and so implementers still use transistors, which are sometimes battery-powered. Battery-operated radios are the best alternative in situations where there is no electrical outlet in the learning center. The third concern, according to Valdez et al. (2018), is the learning centers' suitability as far as location for the ALS-RBI is concerned. Since some of the spaces are old structures that the Local Government Units (LGUs) have designated as ALS-RBI centers, participants have reported that these venues are noisy and are non-conducive for educational radio broadcasts.

Theme 10: Teacher's Personal and Psychological Barriers in the Implementation of the Radio-based Instruction (RBI) Approach

Table 10 presents the tenth subtheme, Teacher's Personal and Psychological Barriers, wherein the participants' experiences with fear, anxiety, and hesitations in the discharge of their new role as teacher-broadcasters, anchors, and scriptwriters are explored.

Table 10. Teacher's personal and psychological barriers in the implementation of the radio-based instruction (RBI) approach

Subject Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences with personal and psychological barriers in the RBI implementation	- Teachers becoming anxious and hesitant to deal with the new method. - Dealing with the technical complexities instills fear in the participants. - Some participants are nervous about speaking over the radio. - Teachers fear the possibility of contracting the COVID-19 virus	- Personal and psychological distress due to "adapt rapidly" reaction. - Technical complexities are stressful to the participants. - Participants not inclined to public speaking are struggling. - Fear of COVID-19 infection.	Teacher's Personal and Psychological Barriers

As newbies to the RBI method, teacher-broadcasters also experienced personal and psychological dilemmas. They encountered fear, hesitations, and anxieties when carrying out the new method along with their routine as teachers during the pandemic.

I'll be a hypocrite if I say that I never experienced those anxieties. We cannot deny of course that we experienced that but as a teacher, we have to be innovative and flexible. We are used to dealing with new things that come our way (P4).

(But I was so excited to try and honestly, at first, I was skeptical if it would work knowing the attitude of some learners towards education but yeah, we got to try uhm... para sa kabataan.) But I was so excited to try and honestly, at first, I was skeptical if it would work knowing the attitude of some learners towards education but yeah, we got to try...for our learners (P5).

Because that's the only choice we had since we cannot somehow home visit because we are afraid that we will be infected with the virus (P6).

These statements can be interpreted as teachers having experienced personal and psychological dilemmas in adopting the RBI approach to their teaching practice. This idea was backed by Toquero and Talidong (2020), who emphasized that educators are not fully equipped to teach in the new normal. Teachers, educators, and legislators encounter a great deal of difficulty in adapting to the sudden shift from in-person instruction to new learning modalities. Anxiety and fear about how to teach students in the new normal were brought on by the new pedagogical tendencies (Yorgancioğlu, 2020).

Yorgancioğlu's (2020) posits that these participants' answers suggest that in order to better capacitate teachers, they need to be retrained in the new normal teaching pedagogies, such as online or remote learning. Yorgancioğlu (2020) went on to say that new approaches, resources, techniques, and learning opportunities are necessary in the present context. Nonetheless, he proposed that the new pedagogies be "technology-driven." This is referred to as "digital pedagogies" by Peters et al. (2022).

In addition, the pandemic forces policymakers and educators to explore novel pedagogical, digital, and online opportunities in order to consistently provide students with high-quality instruction (Peters et al., 2022). It has compelled educators to get prepared and equip themselves to maintain successful learning even in the face of the COVID-19 pandemic (Motala & Menon, 2020).

Meanwhile, teachers and other workers are increasingly concerned about becoming infected with the COVID-19 virus (Jamon et al., 2021). People in communities become wary of one another as the sickness spreads. They are afraid of contracting the virus and becoming sick or even dying from it (Khan, Mamun, Griffiths, & Ullah, 2022). Due to the constant dread of contracting COVID-19, frontline employees, especially teachers, have developed anxiety, sadness, and insomnia (Nabe-Nielsen et al., 2021).

Mertens, Gerritsen, Duijndam, Saleminck, and Engelhard (2020) claim that COVID-19 is the fear that public school teachers face and endure in the workplace. Social media use, health anxiety, and threats to loved ones are all well-known indicators of COVID-19 viral dread. Serafini et al. (2020) recommended implementing strategies to support teachers who are psychologically sensitive during the COVID-19 pandemic.

Theme 11: Inevitable Time Constraints as a Challenge in the Implementation of the Radio-based Instruction (RBI) Approach

Table 11 reveals the subtheme 11, Inevitable Time Constraints, wherein the participants' experiences with conflicts in their strict alternative work arrangement and RBI schedules, including the inadequate time spent in the lesson preparation are delved into.

Table 11. Inevitable time constraints as a challenge in the implementation of the radio-based instruction (RBI) approach

Subject Probed	Core Ideas	Code	Essential Themes
Teacher-broadcasters' lived experiences with time constraints in their alternative work, RBI schedules, and lesson preparation	• Inflexible work arrangement and rigid RBI schedules of the participants. • Insufficient time spent in the preparation of the lesson. • Limited time allocated to learn and navigate the radio equipment.	• Problems encountered with fixed schedules • Inadequate time for lesson preparation and equipment exploration	• Inevitable Time Constraints

Teachers were adherent to their Alternative Work Arrangement (AWA) Schedules during the pandemic. The AWA schedules must be followed to minimize close contact among employees in the workplace. The RBI implementation has required the teacher-broadcasters to report to school even in their work-from-home schedules, causing conflicts with their AWA schedules. They were also obliged to extend time to learn and navigate the radio equipment while preparing their lesson.

I will be very honest that is not easy to do Radio-based Instruction knowing that there are technicalities that you have to learn. So, you need to go to school though you're in a work-from-home setup to be able to explore the technicalities (P2).

Since we have our AWA or Alternative Work Arrangement, so even though we are not entitled or we are not scheduled to be in school that time or day, we need to go (P6).

These utterances prove that the impact of COVID-19 on everyone's daily life is enormous. Still, as the world grapples with the global health crisis, teachers without capes stand on the front lines of blended learning during the pandemic, doing everything they can to guarantee that no learner is left behind (Bondoc, 2020). Regardless of the circumstances, teachers are expected to extend their time and patience just to meet the needs of their students. Because of this, the government is also required to provide instructors with aid in the form of subsidies for school operations, with the aim that doing so will enhance the long-term viability of education and eliminate any technological obstacles.

4.0 Conclusion

Based on the findings discussed above, it is safe to conclude that the participants' lived experiences as teacher-broadcasters, anchors, and scriptwriters revolve around the various challenges that arise along the implementation of the Radio-based Instruction (RBI) approach in the new normal. Teachers go through drastic changes in their roles and abrupt modifications in their routines with the introduction of the RBI. These emerge because of the method's novelty in general since all the participants are neophytes along the course of its implementation. Furthermore, the challenges are mainly manifested in the new pedagogical adaptations, inadequacy of technical knowledge and skills, unavailability of necessary radio equipment and other technological resources, script preparation, assessment of student's learning, personal-psychological barriers, physical-environmental impediments, and inevitable time constraints, all of which are contributory to its overall implementation. Broadening stakeholders' engagement, encouraging community and governmental support, and establishing innovative partnerships with other educational institutions are seen as potential initiatives to improve the solutions' feasibility particularly in resource-limited settings. Moreover, incorporating specific examples of successful RBI implementations can provide practical models for emulation, addressing the digital divide through cutting-edge benchmarking can help expand access to essential resources, and establishing systematic evaluation and feedback mechanisms of RBI practices, are also viable ways to ensure the improvement and sustainability of the approach while aligning with the needs and realities of educational interventions.

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Predicting Academic Performance in Mathematics through Online Learning Constructs and Content Proficiencies

Keith A. Madrilejos

Jose V. Palma Senior High School, Quezon City, Philippines

Author email: keith.madrilejos001@deped.gov.ph

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Abstract. This study explores the evaluation of online distance learning as a significant alternative to traditional education, specifically focusing on its application in Grade 11 mathematics education. The research, conducted in six public senior high schools in Quezon City District IV, employs a descriptive-correlational design and involves 873 Grade 11 students attending online classes. Constructs of online learning, including motivation, access and use of technology, perception, self-directed learning, and online teaching approaches, were examined to understand their impact on mathematics academic performance. The findings revealed that students strongly embraced self-directed learning in the online environment, demonstrating high motivation. Positive feedback was observed towards technology use, online teaching approaches, and the overall perception of online learning. Academic performance was generally satisfactory, with diverse achievements in content-based competencies like Functions and Their Graphs, Mathematics of Investment, and Math Logic. Significant low positive relationships were identified between mathematics academic performance and online learning constructs, as well as content-based competencies. Key predictors of mathematics academic performance included motivation, technology access and use, and online teaching approaches. However, the perception of online learning and self-directed learning did not significantly predict academic performance. These findings contribute to a multiple linear regression model explaining 24% of the variance, highlighting the need to optimize online learning for enhanced mathematics academic performance. Recommendations include students enhancing technology skills and self-directed learning, considering specialized mathematics classes, teachers intensifying instruction in crucial areas, and the Department of Education sustaining the Open High School program while simplifying essential learning competencies in General Mathematics. Future research should explore additional online learning factors for a comprehensive understanding of the subject.

Keywords: Online learning constructs; Content proficiencies in Mathematics; General Mathematics; Academic performance; Descriptive-correlational.

1.0 Introduction

The immense impact of COVID-19 compels the education sector with the need to shift from the traditional classroom to distance education for continuity of learning. The global outbreak of COVID-19 has not only impacted the economic and health sectors but has also significantly affected the education sector. The shift to online learning has also stressed the importance of teacher training and support for effective online instruction (Van Wart et al., 2021). Additionally, concerns have been raised about digital equity and the need for innovative solutions to ensure all students have equal access to quality education. Even though it is a mainstream education, various reported challenges and problems encountered by teachers and students are inevitable. In Southeast Asia, Basar et. al. (2021) discussed in their paper that the implementation of online learning must examine its effectiveness and the challenges that learners experience in terms of participation, accessibility,

stable internet connection, and motivation to learn. It is of paramount importance to consider various factors in the online learning environment to determine its effectiveness and empirically understand its influence on student learning and achievement. The term "constructs" is used by the researcher to denote factors, dimensions, or domains of the online learning modality, as this has been proven by several related empirical studies to be a multidimensional variable (Rahayu et. al., 2021; Kamaruzaman et al., 2022). Moreover, Pham et al. (2021) explored and assessed six significant factors that affect online learning outcomes: learner characteristics, perceived usefulness, course content, course design, ease of use, and faculty capacity. This study adopted the framework of Kamaruzaman et al. (2022) which consists of dimensions of online modality such as motivation, access and use of technology, perception of online learning, self-directed learning, and online teaching approach.

In the local context, the Department of Education Philippines implemented the Basic Education Learning Continuity Plan enforcing the adoption of alternative delivery modes of teaching and learning (DepEd, 2020). Online distance learning becomes one of the alternative modalities that consists of latent constructs or dimensions to evaluate its effectiveness based on students' perspectives. In the current situation in Philippine public schools, online and modular learning emerges as a crucial alternative during unforeseen disruptions to face-to-face classes, such as weather disturbances, extreme temperatures, and transport strikes. Hermosisima et al. (2023) and Nord Anglia Education (2021) stressed that online teaching provides accessibility, flexibility, and continuity of learning. Access and use of technology is an indispensable factor of e-learning which needs to be assessed based on the learner's skill in using online platforms and gadgets as well as a strong internet connection (Al Rawashdeh et al., 2021). Self-directed learning is considered an important skill to attain better academic performance because this remote set-up requires students, especially the senior high school and college level, to be independent and responsible for their learning. Hua et al. (2024) recently found that self-directed learning skills had positive effects on the online learning satisfaction of students. The Teaching Approach in Online set-up and the Motivation of learners to attend online classes and participate in distance learning tasks play an important role in achieving effective learning (Mazhar et al., 2020; Ozer & Badem, 2022). The students' Perception of Online Learning reflects their remote learning experience and how they interact and adjust to this new learning setup (Purwadi et al., 2021).

Mathematics holds a crucial position in the education of senior high school students, particularly as they prepare for their chosen fields within the existing Basic Education Curriculum. The academic performance in mathematics serves as a gauge of how effectively students achieve content-based competencies and skills. Challenges in attaining improved mathematics achievement have been persistent concerns for both teachers and students, both before and during the pandemic. Numerous related studies have assessed the implementation of the Senior High School (SHS) curriculum, focusing on General Mathematics, and examining the scenario before, during, and after the pandemic (Del Rosario & Medina, 2022; Pagaran et al. 2022; Mamolo & Sugano, 2020; Jaudinez, 2019). These highlighted the importance of considering the Most Essential Competencies as integral features of the Basic Education Learning Continuity Plan 2020. It is critical for assessing effectiveness and monitoring the content knowledge, skills, and academic progress of senior high school students. In the school year 2019-2020, Herrera (2019) conducted a descriptive study in four DepEd-managed senior high schools in Luna, Apayao, Region 1. The findings revealed that out of 156 Filipino senior high school students, 37.82% achieved grades between 75 to 79, and 41 students achieved grades ranging from 80 to 84. Further investigation into the mathematics academic performance of senior high school students was carried out by Capinding (2021) during the school year 2020-2021 at Nueva Ecija University of Science and Technology. The study unveiled that out of 211 students, 27.49% received final grades ranging from 75 to 79, while 28.91% attained final grades falling within the satisfactory level.

In Congressional District IV of Quezon City, the locale of this study where the majority of students choose online as their modality, school overall data of final grades from teachers indicated that student's Mathematics performance has oscillating trends in three public schools such as Final Grades of 85 to 89 during SY 2019-2020, Final Grades of 75 to 85 in SY 2020-2021, and Final Grades of 80 to 84 in SY 2021-2022. At Jose V. Palma Senior High School in Quezon City, the public high school where the researcher is currently employed, the average General mathematics grades in SY 2019-2020, SY 2020-2021, and SY 2021-2022 are 84.25, 79.74, and 80.83, respectively. The observed disparities in schools on the fluctuating trend on average Mathematics academic performance may be attributed to the influence of the factors, constructs, or dimensions of online distance

learning such as Motivation, Access, and Use of Technology, Self-Directed Learning, Perception of Online Learning, and Online Teaching Approach. Engaging in synchronous remote classes could potentially impact students' success positively or negatively, depending on these factors.

In light of the provided information, concerns, difficulties, and the absence of a statistical model explaining mathematics academic performance in a remote setup, a quantitative study is necessary to explore the predictive associations between the elements of online learning methods, proficiency in mathematical content knowledge and skills, and academic achievements in mathematics.

2.0 Methodology

2.1 Research Design

This present study utilized descriptive correlational design as it aimed to further investigate the predictive relationship between the online learning constructs, assessment of most essential learning competencies, and General Mathematics academic performance. The researcher included the online learning dimensions as a potential group of variables that affect the academic performance of the respondents in General Mathematics in the online learning context. According to Chiang et al. (2020), the research design is appropriate as it involves the measurement of several independent variables that may be influencing a single dependent variable. Furthermore, this study utilized an observational research design. It gathered and observed online learning variables and the mathematics proficiencies of the respondents in their natural settings, without manipulation. Observational design is appropriate for observing, collecting, and measuring variables in their natural settings without manipulation (Creswell, 2009).

2.2 Research Participants

The respondents of this study were 873 out of 1531 Grade 11 students under the online modality of SY 2021-2022 from six randomly selected public SHS in Congressional District IV of Quezon City. The selected schools with a corresponding number of respondents are Krus Na Ligas High School (109), Carlos L. Albert High School (110), Quezon City High School (122), Ramon Magsaysay Cubao High School (315), Eugenio Lopez Jr. Center for Media Arts SHS (149), and Flora A. Ylagan HS (68).

Cluster Random Sampling was employed for respondent selection, as it is a suitable technique for quantitative studies seeking to perform statistical inference (Mananghaya, 2020). The researcher randomly chose six (6) public senior high schools out of the twelve (12) in District IV. The sample included all learners in the online modality. Employing Statistical Power Analysis with GPower Software with a specified statistical test in A Priori Type, a minimum sample size of 146 was calculated at a 0.15 effect size and 95% confidence level. The actual sample size exceeded the minimum required.

2.3 Research Instrument

The researcher developed the Online Learning Assessment Scale (OLAS) to gather the necessary data on respondent's agreement on mathematics online learning. The following dimensions were adapted and used in the initial steps of item development: Motivation (8 items), Access and Use of Technology (7 items), Opinion on Online Learning (6 items), Self-Directed Learning (8 items), and Online Teaching Approach (8 items). The indicators of this instrument were based on the study of Sharma et. al. (2020) and Kamaruzaman et al. (2022). The other questionnaire is the researcher-made test which is the Most Essential Learning Competencies Assessment Tool (MAT) in the form of a 30-item multiple choice test. Domains of this instrument are Functions and their Graphs (14 items), Math of Investment (6 items), and Math Logic (10 items). The online learning assessment scale is a Likert scale instrument with four options to determine the level of agreement of the respondents in each indicator: 4 - Strongly Agree, 3 - Agree, 2 - Disagree, and 1 - Strongly Disagree.

The Online Learning Assessment Scale (OLAS) was assessed in terms of face validity and content validity by seven (7) experts (master teachers, principals, and subject area coordinators from Quezon City and Valenzuela City) in Mathematics, Statistics, and language. The instrument was evaluated with an overall Scale Content Validity Index of 0.85 which was verbally interpreted as an accepted value (Yusoff, 2019). The questionnaire was pilot-tested for testing the reliability and conducting the item analysis at Manuel A. Roxas High School (17 participants) and Jose V. Palma SHS (18 participants). As a result, the scale was considered to be internally

consistent based on Cronbach's Alpha Coefficient of 0.745 for motivation, 0.70 for access and use of technology, 0.70 for perception of online learning, 0.745 for self-directed learning, and 0.846 for online teaching approach. Each reliability index was interpreted to be internally consistent since each computed value is at least 0.70 (Adamson & Prion, 2013). The Content validity was checked by the validators for the alignment of the test items in the learning competencies in the MELC Assessment tool for General Mathematics. Table of Specifications (TOS) was drafted and used by the researcher for this instrument to relate the instructional objectives to the course content (SAGE Research Methods, 2018). Item Analysis was conducted by the researcher and the results showed that the difficulty index ranged from 0.44 to 0.63 which means the items are moderately difficult while the discriminant index ranged from 0.31 to 0.44 which is interpreted as very good items (Calmorin, 2004).

2.4 Data Gathering Procedure

The researcher employed Google Forms to streamline the collection of responses from the designated participants. Both online and in-person orientations were carried out to elucidate the research objectives and anticipated outcomes, ensuring the precision and comprehensiveness of the responses. Before the pilot testing and actual administration of the online validated instrument, a written communication for approval was sent to the Department of Education - Schools Division Office of Quezon City to conform to the necessary protocol and procedures. After the approval, two letters (approval and consent form) addressed to the school heads, math teachers, and parents were sent to the randomly selected schools to virtually administer the survey. The responses were checked consistently and gradually to determine the degree of completion of submitted answers. Follow-up on the responses was done through virtual communication, email, phone calls, and personal visits to the SHS Math teachers, the Head Teacher of the Mathematics Department, and SHS focal persons. After the data screening and inspection of responses in Google Forms, the researcher tabulated and processed the Likert Scale data using MS Excel and SPSS (Statistical Package for Social Sciences). Data screening was done to avoid missing values. The data set was organized and analyzed.

2.5 Data Analysis

Weighted mean was used by the researcher to determine the Grade 11 students' responses regarding their level of agreement in Mathematics online learning. This was used to describe the online learning dimensions of the respondents. The average of responses in each indicator per online learning dimensions was computed using this type of mean. The arithmetic mean was used to compute the average academic performance (final grades) in General Mathematics and average scores in the assessment of content proficiencies in General Mathematics of the respondents. Standard deviation was employed to find out the degree of variances of the scores in the assessment of content proficiencies in General Mathematics.

Frequency counts and percentage distributions were employed to summarize the mathematics academic performance of the respondents. The descriptive rating based on the School Form 9 (Report Card) was used. The researcher used Spearman's Rho correlation to assess the relationship between online learning dimensions and mathematics academic performance, as well as the assessment of content-based competencies and mathematics academic performance. This statistical procedure was deemed appropriate because the data set did not meet the assumptions of parametric tests. Spearman's Rho is preferred over Pearson correlation when dealing with Likert Scale variables measured on an ordinal scale (Abordo, 2023).

Multiple Linear Regression, a statistical modeling procedure, was utilized since this is aligned with the research design. If there are a series of values for two or more correlated variables under study, then it is possible to predict or estimate the value of one variable from the knowledge of other variables (Espinola, 2021).

2.6 Ethical Considerations

Charlesworth Author Services (2017) discussed specific key principles of ethical standards in conducting research. These key principles enable the present study to be well-guided in terms of regulations and restrictions. The principle of recruiting participants was followed as the researcher observed the privacy of the information from the respondents and was not pressured to participate. The researcher adhered to the principle of obtaining informed consent by providing a parent's consent form to each respondent during both the pilot testing and the actual administration of the survey.

To highly protect the data and information in the Google Form Survey, the researcher required only all Grade 11 students with DepEd Quezon City Gmail Accounts to answer the electronic survey form. After obtaining all the necessary information last May 30, 2022, the researcher closed the Google Form for responses by changing the privacy settings. Only the Excel File of the organized data set remained as the original copy of all responses because after performing the data analysis and producing results and findings, the researcher deleted the Excel File and the survey to ensure that other persons would not be able to access the information. Respondents' information and actual answers in the survey were not archived in any public data storage. Scored assessment data, materials, and score sheets were deleted after one year of conducting the study.

3.0 Results and Discussion

3.1 Description of the Online Learning Constructs

Description of the Online Learning Constructs in Terms of Motivation

Table 1. Description of the online learning constructs in terms of motivation

INDICATORS	WEIGHTED MEAN	VERBAL INTERPRETATION
1. I am optimistic about the use of technology in learning mathematics online.	3.52	Strongly Agree
2. I embrace learning new things regarding online learning in mathematics.	3.42	Strongly Agree
3. I am updated with the latest technology in learning mathematics.	3.39	Strongly Agree
4. I used my significant time, effort, and energy to learn mathematics in online classes	3.38	Strongly Agree
5. I am certain that I understand the math concepts being taught in synchronous classes.	3.37	Strongly Agree
6. I have a wide interest in ICT about learning mathematics online.	3.36	Strongly Agree
7. I like what I am learning in mathematics online.	3.36	Strongly Agree
8. I am not confident in using online distance learning as my modality to learn mathematics.	2.79	Agree
Overall Weighted Mean	3.32	Strongly Agree

Presented in Table 1 were the weighted mean and corresponding interpretation of the description of the online learning constructs in terms of motivation. As gleaned from the table, the top 3 indicators of Motivation in rank are "I am optimistic about the use of technology in learning mathematics via online" with a weighted mean of 3.52 or Strongly Agree, "I embrace to learn new things regarding online learning in mathematics" with a weighted mean of 3.42 or Strongly Agree, and "I am updated with the latest technology in learning mathematics" with a weighted mean of 3.36 or Strongly Agree. The Grade 11 respondents strongly agreed that they are motivated to engage in learning mathematics using online modality. This implies that respondents have achieved a certain level of motivation in studying mathematics online despite the pandemic.

The results on Motivation were contradicted in the study of Fulgencio et al. (2021) as well as the investigation made by Mamolo (2022) which showed those students in mathematics were less motivated in their studies online. On the other hand, Cabansag et al. (2021) had the same findings that students were broadly motivated to attend and participate in their online classes.

Description of the Online Learning Constructs in Terms of Access and Use of Technology

Shown in Table 2 were the weighted mean and the corresponding verbal interpretation of the description of online learning constructs in terms of access and use of technology. Based on the results, the respondents agreed that they were knowledgeable in the basic functions of the gadgets used in online modality based on the highest weighted mean of 3.50 which is described as "Strongly Agree." Other indicators show that respondents used video lessons and tutorials to learn Mathematics and they have devices to use in their synchronous and asynchronous classes in Mathematics as numerically shown in the weighted mean of 3.37 and 3.34 which are both described as "Strongly Agree." On the other hand, indicators about not being aware of netiquette and not being aware of the web browsers when doing research were both disagreed by the respondents. The respondents agreed that accessibility of technology, internet connection, online learning resources as well as being well-equipped to use gadgets and asynchronous tools are indispensable in learning mathematics online.

Table 2. Description of the online learning constructs in terms of access and use of technology

INDICATORS	WEIGHTED MEAN	VERBAL INTERPRETATION
1. I know the basic functions of my gadget (cellphone, tablet, laptop, or desktop computer).	3.50	Strongly Agree
2. I used video lessons and tutorials as a reference in my mathematics lessons.	3.37	Strongly Agree
3. I have a device (cellphone, tablet, or computer) to access synchronous classes in mathematics.	3.34	Strongly Agree
4. I know how to access online educational resource sites and libraries.	3.22	Agree
5. I know how to utilize asynchronous tools for my mathematics subject.	3.19	Agree
6. I am not aware of the netiquette when engaging in learning mathematics online.	2.46	Disagree
7. I do not know how to use web browsers when doing research activities.	2.42	Disagree
Overall Weighted Mean	3.07	Agree

The findings discussed above aligned with those of Eze et al. (2020), who investigated the relationship between technology-related factors such as accessibility, ease of use, and internet service, and students' adoption of ICT learning facilities.

Description of the Online Learning Constructs in Terms of Perception of Online Learning

Table 3. Description of the online learning constructs in terms of perception of online learning

INDICATORS	WEIGHTED MEAN	VERBAL INTERPRETATION
1. I find myself saving money since the start of online classes because I do not spend transportation costs.	3.40	Strongly Agree
2. Online learning improves and simplifies the learning in mathematics.	3.33	Strongly Agree
3. Online learning provides flexibility in terms of studying time in mathematics subjects convenient to the learner.	3.30	Strongly Agree
4. Online learning can make studying mathematics accessible to people regardless of their location.	3.22	Agree
5. The setup of the online learning modality is not compatible with the way I learn mathematics.	3.20	Agree
6. Online modality is not effective an alternative form of learning.	2.63	Agree
Overall Weighted Mean	3.18	Agree

Table 3 displays the weighted mean and the corresponding verbal interpretations of the description of the online learning constructs in terms of perception of online learning. As observed from the matrix, an overall extent of agreement of 3.18 which is verbally described as "Agree," implies that respondents in general had positive perceptions of using online modality in learning Mathematics. Respondents highly rated the indicator "I find myself saving money since the start of online class because I do not spend transportation costs" as indicated in the weighted mean of 3.40 which is verbally described as "Strongly Agree." The second in rank indicator is "Online Learning improves and simplifies the learning in Mathematics," with a weighted mean of 3.33 which is verbally interpreted as "Strongly Agree." The third in rank among the indicators is "Online learning provides flexibility in terms of studying time in Mathematics subject convenient to the learner," with a weighted mean of 3.30 which is described as "Strongly Agree." The perceptions of online learning of the student-respondents were positive as they agreed that online modality effectively helps students to learn Mathematics in terms of time, flexibility, accessibility regardless of location, and budget saving in transportation costs.

These findings are consistent with the research conducted by Baczek et al. (2021), which highlighted the perceived advantages of online learning, including the ability to study from home, continuous access to online materials, the opportunity to learn at one's own pace, and the comfort of one's surroundings. On the contrary, the findings were contradicted by the study of Harefa and Sihombing (2022) which revealed negative perceptions of online learning being less effective in remote areas due to network and communication issues.

Description of the Online Learning Constructs in Terms of Self-Directed Learning

Table 4. Description of the online learning constructs in terms of self-directed learning

INDICATORS	WEIGHTED MEAN	VERBAL INTERPRETATION
1. I carry out my study guide and plan in mathematics subject.	3.43	Strongly Agree
2. I repeatedly use uploaded mathematics modules in Google Classroom based on my needs.	3.40	Strongly Agree
3. In this online learning modality, I expect high learning performance in mathematics.	3.37	Strongly Agree
4. I study my math lessons in advance using supplementary video tutorials on YouTube and e-books.	3.37	Strongly Agree
5. I can complete my assignments in mathematics online even if there are distractions.	3.36	Strongly Agree
6. I ask for assistance when dealing with difficult mathematics learning tasks via online.	3.35	Strongly Agree
7. I can discipline myself and organize my time to avoid the bulk of work.	3.35	Strongly Agree
8. I feel online learning makes me aware of my study plan in mathematics subject.	3.27	Strongly Agree
Overall Weighted Mean	3.36	Strongly Agree

Shown in Table 4 were the weighted mean and corresponding verbal interpretation of the online learning constructs in terms of self-directed learning. Based on the results, among the five online learning dimensions, Self-Directed Learning has the highest weighted mean of 3.36 which is verbally described as "Strongly Agree." The students "strongly agree" that they create their study guide and plan for the Mathematics subject (weighted mean = 3.43) and that they frequently use uploaded Mathematics modules in Google Classroom based on their needs (weighted mean = 3.40). These two indicators rank first and second, respectively. Lastly, third in rank are the indicators "In this online learning modality, I expect high learning performance in Mathematics" and "I study my math lessons in advance using supplementary video tutorials on YouTube and e-books," with a weighted mean of 3.37 which is verbally interpreted as "Strongly Agree." The student-respondents strongly agreed that they possess self-directed learning characteristics which are vital to succeed in remote learning set-up. This level of agreement on self-directed learning implies that respondents were independent learners.

The results on Self-Directed Learning were also confirmed by the study by Van Der Vleuten et al. (2020) that the perception of students in self-directed learning has increased during the academic year 2020. Moreover, the findings stated in the previous text were supported by Sun et al. (2022) which indicated that having a self-directed learning attitude has a positive effect on learning engagement provided that the learners have the perceived value of knowing the learning goals.

Description of the Online Learning Constructs in Terms of Online Teaching Approach

Table 5. Description of the online learning constructs in terms of online teaching approach

INDICATORS	WEIGHTED MEAN	VERBAL INTERPRETATION
1. My mathematics teacher gives online assessments that are relevant to the objectives of our lessons.	3.67	Strongly Agree
2. My mathematics teacher provides feedback during and after doing the asynchronous tasks.	3.40	Strongly Agree
3. My mathematics teacher stimulated my interest in learning mathematics online.	3.29	Strongly Agree
4. The teaching approach of my mathematics teacher online is enjoyable.	3.21	Agree
5. My mathematics teacher uses instructional videos as supplementary materials which are integrated into our online discussion.	3.18	Agree
6. My mathematics teacher is well-versed in using techniques in teaching online classes.	3.15	Agree
7. My mathematics teacher gives clear and specific directions during synchronous and asynchronous classes.	3.10	Agree
8. My mathematics teacher does not use online games or interactive activities that make learning enjoyable.	2.78	Agree
Overall Weighted Mean	3.22	Agree

Presented in Table 5 were the weighted mean and corresponding verbal interpretation of the online learning constructs in terms of self-directed learning. As observed from the matrix, the respondents strongly agreed that their Mathematics teachers provide relevant online assessments based on the learning objectives. The respondents rated the indicator “My Mathematics teacher gives online assessments that are relevant to the objectives of our lessons,” as “Strongly Agree” based on a weighted mean of 3.67. Providing feedbacks from their Mathematics teachers were observed by the respondents based on the weighted mean of 3.40 which verbally describes “Strongly Agree.” Respondents also strongly agreed that their mathematics teachers stimulated their interest in learning Mathematics via online as they had a 3.29 level of agreement. The online teaching approach was positively perceived by the student-respondents as they strongly agreed that their Mathematics teachers effectively deliver synchronous and asynchronous lessons, provide feedback, give relevant online assessments, and stimulate their interest in learning Mathematics in an online set-up.

These findings were confirmed also in the study of Van Wart et al. (2021) which found that Teaching Presence and Instructional Support are among the top seven explored factors of online learning success based on students’ perspectives. In addition to this, the related study of Gopal et al. (2021) is aligned with the results as they included the quality of online instruction and prompt feedback of teachers as independent factors that positively affect student satisfaction.

3.2 Performance of the Respondents Based on the Assessment of Content Proficiencies in General Mathematics

Table 6. Performance of the respondents in general mathematics

AREAS OF MOST ESSENTIAL LEARNING COMPETENCIES	NUMBER OF ITEMS	MEAN	SD	INTERPRETATION
Functions and Their Graphs	14	13.00	2.33	Outstanding
Mathematics of Investment	6	2.00	0.66	Did not meet expectations
Math Logic	10	6.00	2.03	Satisfactory
Total Items/Overall Mean Score	30	21.00		Very Satisfactory

Table 6 shows the mean and standard deviation of the performance of the respondents based on the assessment of content proficiencies in three areas of General Mathematics. As noticed from the matrix, the data revealed that the overall average score in the 30-item assessment of the most essential learning competencies (MELCs) in General Mathematics is 21.00 being rated as very satisfactory. With the highest average score of 13 out of 14 points in Functions and their Graphs, these results suggest that most students have achieved a desirable level of mastery based on the transmuted scores in Table 2. However, students are still developing their skills in the areas of Mathematics of Investment and Math Logic, with average scores of 2 out of 6 points and 6 out of 10 points, respectively. Based on the transmutation matrix in Table 2, these scores indicate that the respondents did not meet the expected competencies in Mathematics of Investment and had a satisfactory level of performance in Math Logic. The test results show that there is an ongoing need to enhance the most essential competencies of learners in the two areas of General Mathematics which are typically covered during the second quarter of the first semester.

Mamolo and Sugano (2020) had related findings as their investigation resulted in fair assessment levels in each area of General Mathematics based on actual scores of the Grade 11 students. This can be also aligned with the detailed analysis made by Refugio et al. (2021) and Jaudinez et al. (2019) which found various challenges in the teaching and learning of the said core subject such as the length of time to cover all the lessons and the bulk of topics in General Mathematics. The overall average score of 21 out of 30 items can be paralleled in the study of Mamolo and Sugano (2020) which revealed that the actual learning competency in General Mathematics was fair based on most scores obtained fall under 17 to 32 out of 80 summative items test.

3.3 Academic Performance of the Respondents in General Mathematics

Table 7 shows the ranking of the academic performance of the respondents in General Mathematics. As gleaned from the table, it was observed that among the 873 Grade 11 respondents, 302 (35%) had final grades ranging from 80 to 84 which is rated as “Satisfactory.” Aside from this, 252 (29%) out of 873 respondents were rated as “Very Satisfactory.” Lastly, the third in rank is the total of 118 (14%) out of 873 respondents who had final grades rated as “Outstanding.” It is also noticed that 14 respondents did not achieve the learning competencies.

Based on the feedback of the Math teachers in the selected schools, these respondents were still in the process of remediation through modular set-up. Based on a random sample of 873 respondents, the overall final grade of 83.82 indicates that Grade 11 respondents had a satisfactory level of academic performance in General Mathematics.

Table 7. Academic performance of the respondents in general mathematics

INDICATORS	f	%	RANK
Outstanding (90 – 100)	118	14	3
Very Satisfactory (85 – 89)	252	29	2
Satisfactory (80 – 84)	302	35	1
Fairly Satisfactory (75 – 79)	187	21	4
Did Not Meet Expectations (74 and Below)	14	1	5
Total	873	100	
Overall Average Final Grade	83.32		

This result of having a large proportion of students in satisfactory Mathematics academic performance was also evident in the study of Capinding (2021) which indicated that 64 (30.33%) out of 211 Grade 11 students had Mathematics grades ranging from 85 to 89. However, the related study by Herrera (2019) revealed that the majority of the 156 respondents during the pre-pandemic school year had final grades in General Mathematics between 75 to 79.

3.4 Test of Relationship between Online Learning Constructs and Mathematics Academic Performance of the Respondents

The Spearman rank correlation coefficient was utilized due to the assessment of online learning constructs being determined through a Likert scale instrument. Additionally, the academic performance was assumed to be non-normally distributed, as indicated by p-values greater than 0.05 obtained from the Shapiro-Wilk Test.

Table 8. The extent of the relationship between online learning constructs and mathematics academic performance

VARIABLES	ρ	P-VALUE	INTERPRETATION	DECISION
Motivation and Academic Performance	0.328	< 0.001	Significant	Reject Ho
Access and Use of Technology and Academic Performance	0.356	< 0.001	Significant	Reject Ho
Perception of Online Learning and Academic Performance	0.351	< 0.001	Significant	Reject Ho
Self-directed Learning and Academic Performance	0.305	< 0.001	Significant	Reject Ho
Online Teaching Approach and Academic Performance	0.334	< 0.001	Significant	Reject Ho

Table 8 presents the extent of the relationship between the online learning domains and the academic performance in General Mathematics of the respondents. The matrix shows that all variables were positively and significantly correlated with the mathematics academic performance of the respondents. However, it was noticed that each correlation coefficient is verbally interpreted as a low positive association which urges further recommendations. Motivation in online learning and Mathematics academic performance were significantly and positively correlated based on the computed correlation coefficient of 0.328 and p-value of <0.001. However, the low positive association of 0.328 between the variables under study encourages teachers to create action plans. It indicates a relatively weak association between these variables. This means that while there is a positive relationship, other factors may also be influencing Mathematics academic performance. Math educators need to consider these additional factors when seeking to improve student performance in Mathematics, even if motivation in online learning is high. Access and use of technology and mathematics academic performance were significantly correlated with a positive correlation of 0.356 and a p-value of <0.001. Similarly, having an outcome of a low correlation coefficient even if it is significant calls for the creation of online learning enhancement programs. Perception of online learning and Mathematics academic performance were significantly associated based positive correlation coefficient of 0.351 and a p-value of <0.001. Since the correlation coefficient is low, this can be attributed to the various challenges, and problems that students experienced. Self-directed learning and Mathematics academic performance were significantly and positively associated based on the computed correlation coefficient of 0.305 and p-value of <0.001. Online teaching approach and Mathematics academic performance were significantly correlated based on the p-value of <0.001 and positive correlation coefficient of 0.334.

The results on motivation confirm the study of Capinding (2021) which unveiled that student motivation is a determinant of Mathematics academic success. In terms of access and use of technology, this was supported by Maheshwari (2021) who found out that ICT infrastructure and access to the internet were associated with student's online learning intentions. The result obtained in the case of perception of online learning is related to the studies of Purwadi et al. (2021), Baczek et al. (2021), and Pinar (2021) which resulted in different findings of having positive perceptions and negative perceptions in online learning.

In terms of self-directed learning, this affirms the study of Pepito and Acedan (2022) which found that online learning success and self-directed learning were significantly correlated. Lastly, the findings on the online teaching approach were parallel to the findings of Bhowmik and Bhattacharya (2021) who investigated instructional factors, student factors, and teacher factors as variables of online learning. Before the pandemic, Herrera (2019) had empirical evidence which did not support the current findings. According to Herrera (2019), teacher-related variables such as teaching strategy, mastery of the content, use of instructional materials, and teaching attitude were not significantly correlated with mathematics academic performance.

3.5 Relationship Between Content Proficiencies and Mathematics Academic Performance

Table 9. The extent of relationship between content proficiencies and mathematics academic performance

VARIABLES	ρ	P-VALUE	INTERPRETATION	DECISION
Content Proficiencies and Academic Performance	0.352	< 0.001	Significant	Reject Ho

Table 9 reveals the association between the online learning dimensions and the mathematics academic performance of the respondents. The assessment of respondents' content proficiencies in General Mathematics and academic performance had a significant association based on the coefficient of 0.352 and p-value <0.001. It implies that as the mathematical content knowledge and skills of students enhance, their academic performance improves.

The findings on content knowledge and skills contradict the study of Cordova and Tan (2018) conducted at Valencia, Bukidnon which found that the mathematics proficiency of students was not correlated with academic performance. On the other hand, the current result confirms the study of Callaman and Itaas (2020) which revealed that mathematical skills and academic performance were significantly correlated.

3.6 Testing of the Assumptions for a Multiple Linear Regression and Utilization of the Findings

Before conducting multiple linear regression, a series of diagnostic tests were done to determine whether there are potential violations of the assumptions such as multicollinearity, heteroscedasticity, and normality of residuals, ensuring the reliability and validity of the regression model. It helps assess the robustness of the model, enhances the accuracy of predictions, and informs adjustments or transformations to improve the overall quality of the regression analysis (Amora, 2023).

Normality of the Residuals and Presence of Multivariate Outliers

Table 10 presents the residual statistics consisting of the standard residuals, Mahalanobis distance results, and Cook's distance values. The standard residuals in the interval of -2.953 to 2.156 is a good indication since the values lie in the standard residual interval of -3 to 3 . The result of the Cook's Distance at 0.000 which is not greater than 1 indicates that the data set has no multivariate outliers. Mahalanobis values ranging from 0.636 to 5.729 underwent examination and testing through the Chi-square distribution, yielding non-significant results. Consequently, no significant multivariate outliers were observed in the dataset.

Table 10. Normality of the residuals and presence of multivariate outliers

	MINIMUM	MAXIMUM	MEAN	SD	N
Residual	-12.96	17.53	0.000	4.37	873
Standard Residual	-2.953	2.156	0.000	0.997	873
Mahalanobis Distance	0.636	5.729	5.993	3.762	873
Cook's Distance	0.000	0.068	0.001	0.003	873

Figure 1 depicts the scatter plot of the residuals (error terms). As noticed from the graph, data points being plotted did not fall beyond -3.0 and 3.0 , which indicates a relatively well-behaved and homoscedastic pattern of

residuals. This suggests that the variability of the errors remains fairly constant across the range of predictor values. The limited spread of residuals within the -3.0 to 3.0 range indicates that the model's predictions are generally consistent and that there are no significant outliers or systematic patterns of deviation from the expected values. This homoscedasticity is a positive characteristic in regression analysis, contributing to the reliability of the model's predictions and the validity of statistical inferences drawn from the data.

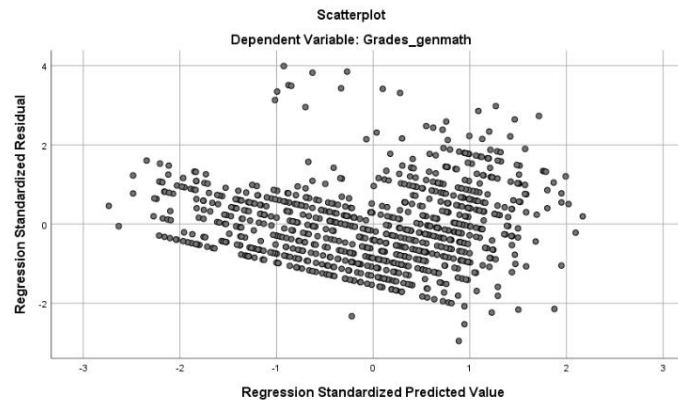


Figure 1. Scatter Plot of the Residuals

Figure 2 presents the normal p-p plot of the residuals of the regression line. One of the requirements of performing multiple linear regression is the normality of the error terms or residuals (Yambot, 2020). As noticed from the graph, the points lie closer to the straight line which is an indication that the error terms were assumed to exhibit an approximate normal distribution.

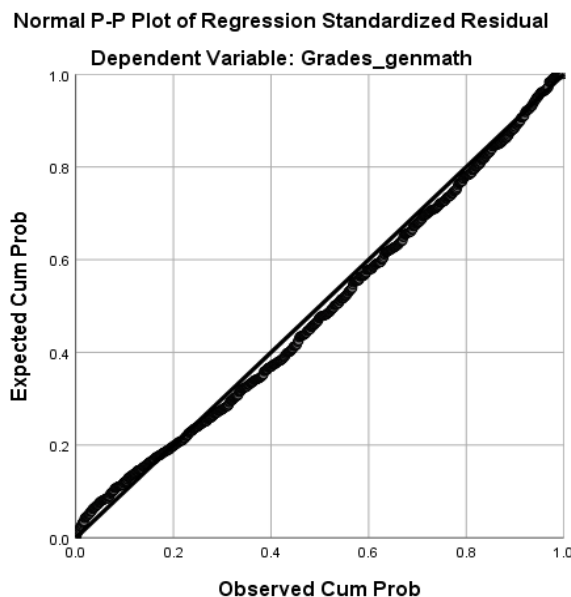


Figure 2. Normal P-P Plot of the Residuals

Regression Analysis of Variance (ANOVA)

The findings from another assumption test, as illustrated in Table 11, ascertained whether the slope of the regression line is equal to zero. Given the test was significant at $p < 0.001$, it can be inferred that the slope of the regression line is not equal to zero, indicating that the line is not horizontal.

Table 11. Regression analysis of variance

	SUM OF SQUARES	DF	MEAN SQUARE	F	P-VALUE
Regression	5295.46	4	1323.87	68.64	< 0.001
Residual	16740.87	868	19.29		
Total	22036.33	872			

Coefficients and Collinearity Statistics

Table 12. Coefficients and collinearity statistics

VARIABLES	β	STD. ERROR	STANDARDIZED COEFFICIENTS	t	P-VALUE	TOLERANCE	VIF
Constant	68.366	0.954		71.628	< 0.001		
Content Proficiencies	0.186	0.021	0.275	9.074	< 0.001	0.937	1.068
Motivation	1.045	0.293	0.119	3.572	< 0.001	0.742	1.348
Access and Use of Technology	1.195	0.232	0.178	5.156	< 0.001	0.333	2.999
Perception of Online Learning	0.036	0.346	0.005	0.103	0.918	0.314	3.188
Self-Directed Learning	0.510	0.295	0.060	1.726	0.085	0.730	1.370
Online Teaching Approach	1.001	0.232	0.151	4.315	< 0.001	0.675	1.481

Table 12 reveals the coefficients of the regression equation with their corresponding p-values and the variance inflation factor per variable. The coefficients of the regression model served as the average change in the mathematics academic performance for every unit of change in each independent variable. As observed from the table, each variance inflation factor (VIF) is less than 4 which indicates that there was no evidence of serious multicollinearity among the predictors (Yambot, 2020). This shows that the predictors were not highly correlated to each other. Based on the results, the test is significant as evidenced by each computed p-value of less than 0.05 for the following independent variables: content proficiencies in mathematics, motivation, access and use of technology, and online teaching approach.

Content proficiencies in General Mathematics were revealed as a significant positive linear predictor of mathematics academic performance as shown in the p-value less than 0.001 and positive coefficient of 0.186. Motivation in online learning was found to be a significant positive linear predictor of Mathematics academic performance based on the p-value of <0.001 and a positive coefficient of 1.045. This shows that as the students become motivated to study mathematics online, it results in better academic performance. Access and use of technology were revealed as significant positive linear predictors of Mathematics performance as indicated in the p-value of < 0.001 and a positive coefficient of 1.195. This implies that a more extensive use of technology is associated with improved mathematics performance. Similarly, the online teaching approach demonstrates its significance as a positive linear predictor, supported by a highly significant p-value of <0.001 and a positive coefficient of 1.001. This underscores the effectiveness of the online teaching methodology in contributing to favorable mathematics academic outcomes. On the other hand, the perception of online learning and self-directed learning were found to be not significant linear predictors of Mathematics academic performance of the respondents based on the p-values of 0.918 and 0.085. While these variables are significantly correlated with mathematics academic performance, they have limited ability to predict the academic performance of the respondents in the subject due to the computed weak correlation coefficients. This suggests that these factors may not play a substantial role in influencing mathematics performance among the respondents.

The results on content proficiencies and academic performance of the students confirmed the findings in the study of Callaman and Itaas (2020) which unveiled that mathematical skill is a predictor of students' academic performance. However, the results were different from the study of Cordova and Tan (2019) before the pandemic as they revealed no relationship between mathematical proficiency and academic performance. The findings on motivation and Mathematics academic performance were supported by the empirical results made by Capinding (2021) which pointed out that students' Mathematics motivation is a determinant of academic performance. As compared to the study of Mamolo (2022), student's Mathematics motivation has decreased significantly in synchronous classes which differs from the result of having a positive trend in motivation and final grades. Furthermore, the findings regarding access to and use of technology and Mathematics academic performance are consistent with Garcia et al. (2020), who found that the availability of ICT resources in schools positively influences students' mathematics academic performance. In contrast, the results of the model contradict the study of Aumentado (2021), which found no correlation between technological domains and

Mathematics academic performance. The lack of dependency of academic performance on perceptions of online learning and online teaching approach differs from Gopal et al. (2021), which indicated that the quality of online instruction influences student satisfaction in online learning, leading to improved class performance.

Model Summary

Table 13. Model summary

R	R ²	Adjusted R ²	Standard Error of the Estimate	R Square Change	F-Change	df 1	df 2	Sig. F-Change	Durbin-Watson
0.493	0.243	0.238	4.39	0.243	68.64	4	868	0.000	1.268

Table 13 shows the substantiality of the model based on the coefficient of determination R^2 and the result of the Durbin-Watson test. While Table 12 presents noteworthy findings, the overall robustness of the regression model is somewhat limited, given the coefficient of determination of 24.3%. This suggests that only a quarter of the variability in mathematics academic performance is accounted for by the independent variables in the model. The proportion of 76% of unexplained variances may be attributed to factors not considered in the analysis, underscoring the need for exploration of additional predictors.

Additionally, the Durbin-Watson test statistic of 1.268 assures that the error terms within the model exhibit independence. The Durbin-Watson statistic should be within the range of 1.5 to 2.5 (Azami et al., 2020). This suggests that there is no systematic pattern of correlation among the residuals, reinforcing the reliability of the model's assumptions and highlighting its ability to provide unbiased estimates. However, the relatively low coefficient of determination emphasizes the importance of further research to uncover and incorporate additional variables that might contribute to a more in-depth and profound understanding of the dynamics influencing mathematics academic performance.

The estimated multiple linear regression model is given by: $\hat{Y} = \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_0 + \varepsilon$ is shown below:

$$\hat{Y} = 0.186x_1 + 1.045x_2 + 1.195x_3 + 1.001x_4 + 68.366$$

Where:

$\hat{Y}$ = Predicted value of Mathematics academic performance

x_1 = Observed value of Content – Based Competencies,

x_2 = Observed value of Motivation

x_3 = Observed value of Access and Use of Technology

x_4 = Observed value of Online Teaching Approach

ε = Error Terms or Residuals

4.0 Conclusion

Despite the challenges posed by the pandemic, the student respondents displayed impressive motivation and enthusiasm for online mathematics education, highlighting the potential of online platforms in facilitating effective learning even in difficult circumstances. Moreover, their proficient technology usage demonstrated their adaptability and competence in utilizing digital tools for learning, ensuring a seamless integration of technology in education. The students' positive attitudes towards online learning further emphasized their favorable perception of this mode of education, fostering increased engagement and improved learning outcomes. Additionally, their self-directed learning traits showcased their ability to take ownership of their learning, a valuable skill in remote learning environments.

It can be inferred from the findings that the respondents demonstrated an outstanding level of performance in the domain of Functions and their Graphs, likely due to sufficient instructional time dedicated to these lessons during the first quarter. However, there is room for improvement in the competencies associated with Mathematics of Investment and Math Logic. These results emphasize the importance of targeted interventions and focused instruction to strengthen these specific areas of General Mathematics, typically covered in the second quarter of the first semester. By addressing these competencies, educators can effectively support students in achieving enhanced performance and a comprehensive understanding of the subject.

The satisfactory academic performance of Grade 11 students in General Mathematics, with a notable proportion achieving grades between 80 and 84, embarks the effectiveness of teaching strategies resulting in students' developing phase of learning. The presence of students who attained a very satisfactory level further validates the success of the teaching methodologies and instructional materials used. However, it remains important to provide ongoing support and vigilance for students who may require additional assistance in their continuous development and success. Additionally, it is necessary to acknowledge that a minority of respondents did not meet the required learning competencies, prompting the implementation of remedial interventions through a modular approach.

The positive significant association of the online learning dimensions and mathematics academic performance infer that when students demonstrate high levels of motivation, have adequate access to technology, hold positive perceptions of online learning, exhibit self-directed learning behaviors, and experience effective online teaching, they are more likely to perform well in mathematics. The observed relationship among these variables was unlikely to have occurred by chance. However, the low correlation coefficients indicate that additional challenges and issues experienced by students may have influenced the outcomes. Thus, there is a call for the development of online learning enhancement programs and the implementation of effective strategies to address these challenges and improve overall academic performance in General Mathematics.

A multiple linear regression model of academic performance was derived based on the significant results of the stepwise method. The model implies that several independent variables, including content-based competencies, motivation, access and use of technology, and online teaching approach, were found to be significant linear predictors of mathematics academic performance indicating that higher levels of these variables can lead to better academic outcomes. This formulated a linear model that can explain academic performance will serve as the basis for creating academic policies, guidelines, and development of the curriculum in mathematics education in a remote learning context.

In light of the study's findings and conclusions, the researcher presents the following recommendations:

Students are encouraged to enhance their technological skills by actively engaging with educational software, watching tutorials on platforms like YouTube, and enrolling in short computer courses. Improving self-directed learning skills is also crucial, achieved through better study habits, understanding learning goals, and creating study guides. Special Mathematics classes can further enhance competencies for senior high school, preparing students for the National Achievement Test and their chosen tertiary education track.

For senior high school mathematics teachers, intensified teaching efforts through enrichment classes and back-to-basics lessons are advised, focusing on areas like Mathematics of Investment and Logic. Action research on variables of online learning and open high school programs is also recommended. Developing a Mathematics Learning Enhancement Program (MLEP) for Grade 11 students can cater to both advanced and developing learners, saving time in covering competencies. Proposing teaching innovations and online learning intervention programs can enhance student learning effectiveness and positive online experiences.

Parents should create a home monitoring system to support their children's online learning and study habits. They should also participate in training to understand student learning psychology and their role in boosting academic performance. School leaders should develop online programs that enhance self-directed learning skills, while initiatives like the Mathematics Learning Enhancement Program can benefit students in both STEM and non-STEM schools. The Department of Education should evaluate the effectiveness of the Open High School program, which offers distance learning through online and modular approaches, and simplifies essential learning competencies in General Mathematics. Future research should explore factors affecting mathematics academic performance in online learning, considering the unexplained variances in current regression models.

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The authors confirm the equal contribution in each part of this work. All authors reviewed and approved the final version of this work.

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7.0 Conflict of Interests

All authors declare that they have no conflicts of interest

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Teaching Strategy and Mathematics Performance of Maritime Students in the New Normal

Allyn Mae D. Rubio

Davao del Sur State College, Digos City, Davao del Sur, Philippines

Author email: allynrubio02@gmail.com

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Abstract. The COVID-19 pandemic has abruptly changed educational paradigms, especially in maritime education. Online learning has presented unprecedented difficulties to instructors' instruction quality and student results. This study examines how maritime education professors' teaching strategies affect students' math performance. The research examines the domain of teaching strategies of college instructors that significantly influence the mathematics performance of maritime students. The descriptive correlational non-experimental design was employed, and the study involved 100 maritime students enrolled in Math 1 during the 2021-2022 academic year, selected via random sampling. Student perceptions were collected using a standardized questionnaire to gain data on instructional practices. Academic grades were used to evaluate mathematics performance. The data was analysed using statistical methods such as mean calculations, Pearson correlation coefficients, and linear regression to assess the importance of correlations between variables. Results revealed that the teaching strategies of college instructors in teaching mathematics as perceived by the maritime students were very high. Also, the findings revealed that teaching strategies and mathematics performance of maritime students have no significant relationship. Although it may appear unexpected that there is no direct correlation between teaching strategies and mathematics performance, the role of affective strategies underscores the need to cultivate a pleasant emotional environment in maritime education. The implementation of strategies that target the enhancement of student motivation, engagement, and emotional well-being has been identified as crucial in the improvement of mathematics performance in the face of the difficulties associated with online learning. Based on the aforementioned findings, it is recommended that educators and institutions give precedence to the advancement and execution of affective teaching methodologies specifically designed to cater to the requirements of maritime students. Furthermore, it is necessary to conduct additional research to investigate the effectiveness of particular instructional interventions and student support systems in maximizing academic achievements in the context of online maritime education.

Keywords: Maritime education; Mathematics performance; Teaching strategies; New normal.

1.0 Introduction.

The concept of the new normal, which was formerly unusual, has now become the norm in nearly all schools and institutions where lessons are predominantly conducted online. Currently, the current phase in education is characterized by significant challenges and key moments, primarily attributed to the unforeseen global crisis. The COVID-19 epidemic has significantly affected individuals, notably in the field of education, where the conventional method of in-person instruction is disallowed. Online learning is significantly transforming the maritime education sector in the country because of the ongoing COVID-19 pandemic, which poses a hazard to all individuals. Within the realm of maritime education, this learning delivery strategy is considered groundbreaking. The mathematical idea of maritime is distinct from regular computing since many maritime

students are unable to compute while performing something. To understand concepts, relationships between ideas, and relationships between concepts and different subjects, students need problem-solving skills.

Moreover, Germany's lockdown schools closed in March 2020 and only partially reopened in May because of the COVID-19 pandemic. Teachers were faced with the challenge of adapting to online learning (König et al., 2020). In most parts of the world, schools and universities closed because of this proclamation, necessitating the necessity for remote learning. According to UNESCO (2020), the COVID-19 pandemic has resulted in a lack of education for over 1.5 billion students, which accounts for 90 percent of the global population of registered learners. In light of these worldwide difficulties, the purpose of this study is to provide insights into the effectiveness of teaching strategies and the mathematics performance of maritime students in the context of the new normal in education. In addition, research conducted in the United States has reported on the influence that teaching and learning had during the pandemic (Hamilton et al, 2020) and (Reich et al, 2020) conducted interviews with forty educators from all throughout the United States. Describe their professional experiences during the pandemic when they were working in a variety of educational sectors during the year 2020. The research findings unveiled three key challenges encountered by educators: difficulties in effectively involving students, burnout and erosion of professional identities among instructors, and the exacerbation of disparities among students with special needs or those from underprivileged districts.

The education sector in the Philippines has experienced significant impacts as a result of the ongoing pandemic. In research conducted by Tria (2020), various new normal scenarios were identified in the educational environment. Nevertheless, certain obstacles and issues arose while proposing various techniques to adapt to the new normal. Consequently, educational institutions at every level must confront these challenges and meticulously assess strategies and protocols for executing the new standard. In the current challenging circumstances, collaboration emerges as a key factor. It is imperative to contribute to the establishment of post-COVID-19 education, adapting to the emerging paradigm. In the new normal, teaching and learning mathematics is extremely difficult. There will be doubts, concerns, and anxieties. Erroneous beliefs may arise, along with a disdain for the topic or the instructor. Students' critical thinking and problem-solving skills, which are the main objectives of K-12 arithmetic, may not be effectively developed by math teachers (The Philippine Star, 2020). The myth that math is the most difficult subject to learn should be debunked. The basis for teaching and learning arithmetic at the elementary school level must be solid. Its real-world applications should be practical and useful. Even in the new normal, such efforts should begin with math professors themselves, so that students will begin or continue to enjoy and enjoy learning the subject. Based on the objective of this study it provides insights into effective approaches for teaching and learning mathematics in the new normal, ultimately contributing to the improvement of mathematics education in the Philippines. According to Villegas (2021), there were pre-pandemic warning signs of an education crisis in the Philippines. The 2018 assessment conducted by the Organization for Economic Co-operation and Development (OECD Program) for International Student Assessment (PISA) garnered significant attention due to its findings. The assessment revealed that Filipino students exhibited the lowest performance among 79 countries in the subjects of mathematics, science, and reading. The math and science scores of Filipino 15-year-old children were 353 and 357 points, respectively, which is lower than the average score of 489 in both categories among OECD countries. It is realistic to predict that the public health situation resulting from the ongoing pandemic will increase Filipino pupils' low performance. Many lockdowns have resulted in no face-to-face interaction under the new normal, forcing students to rely on learning resources to finish their education. As a result, there is a learning crisis, with low-quality content in modules and distance-learning resources.

A school in Davao del Sur reported that teachers have difficulties when using the online-blended learning strategy as they adapt to the new teaching paradigm. Educational institutions continue to have difficulties in adequately addressing the deficiencies in resources and capabilities for both educators and learners as they adapt to the transformative changes in pedagogical approaches. Contemporary educational initiatives aim to cultivate teachers' proficiency in various pedagogical approaches, particularly in adapting to the evolving landscape of education. This is to provide insights into overcoming challenges and improving the effectiveness of online-blended learning in Davao del Sur schools, ultimately contributing to the enhancement of pedagogical delivery in the new normal.

With the literature presented on the teaching strategies and mathematics performance of maritime students, the researcher feels that there is a need for better and more effective teaching strategies. Schools are formed with the purpose of imparting knowledge and skills to their students, with the ultimate goal of improving academic performance. This study will also help to determine the strengths and weaknesses of the students in mathematics. In addition, this will be the backbone of the department to improve the performance of the students and it seeks to identify areas for improvement and inform the development of strategies aimed at enhancing the academic performance of maritime students in Davao City maritime schools.

2.0 Methodology

2.1 Research Design

This study used a quantitative research design utilizing a descriptive-correlational non-experimental research design. The data was subjected to statistical analysis to examine the relationship between teaching strategies and mathematics performance and ascertain their relevance. The perceived success of teaching strategies was using descriptive statistics, which included mean calculations. To evaluate the magnitude and level between teaching strategies and mathematics performance, the Pearson correlation coefficient was calculated. According to Kirch (2008), The Pearson correlation coefficient (r) is a statistical measure used to quantify the degree of linear relationship between two variables. The proposed study employs a correlational research design method to examine the relationship between teaching practices and the mathematics performance of maritime students. Furthermore, the researcher performed linear regression analysis to ascertain the particular teaching strategies that had a substantial impact on mathematics performance.

2.2 Research Respondents

The respondents of the study were the maritime schools in Davao City. A maritime school is a technical school that teaches practical skills that can be applied to the ocean or in ocean-related sectors. Graduates of such a school are equipped for professions in shipping, merchant marine, or any other maritime industry. The researcher had 100 respondents. The researcher employed a simple random sampling technique to choose a sample of 100 marine students from the total population of 2,359 currently enrolled students. According to Lavrakas (2008), random sampling plays a crucial role in the overall design of survey research.

2.3 Research Instrument

The researcher employed a survey questionnaire that was adopted due to its alignment with the study's aims. A study was conducted to examine the instructional approaches employed by a group of mathematics educators in Amman, Jordan, who are employed in public schools (Hamzeh, 2014). For the independent variable, which is the teaching practices, the researcher has a total of 30 items. Before the researcher distributed the survey questionnaire to the respondents, it went on first to undergo validation and pilot testing.

Also, the researcher used the class record to get the scores of the respondents. For the independent variable, which is the mathematics performance, the researcher used their final grade in Math 1, which indicates their performance in written work, performance tasks, and quarterly assessment scores based on their class record with the help of the School Registrar.

2.4 Data Gathering

To conduct a study on the teaching performance and mathematical performance of maritime students, the researcher sought an endorsement letter from the dean, with the approval of the thesis adviser. The researcher sent a formal request letter to the Office of the School President, facilitated by the Chairperson of Maritime Studies, in conjunction with the endorsement letter, in order to obtain permission to perform the study. As a result, the researcher sought the initial consent of the program dean at the aforementioned educational institution. Under the guidance and endorsement of the Chairperson of Maritime Studies and Program Deans, the researcher provided comprehensive instructions to the students and teachers on how to complete the questionnaires using Google Forms. The researcher distributes the survey questionnaires to the respondents via Google Forms during the administration phase. The school asked all maritime students to complete the instrument. Once the respondents had supplied comprehensive and truthful responses, along with all the requisite data outlined in the questionnaire, the researcher proceeded to collect all the completed questionnaires.

2.5 Ethical Consideration

The researcher assured that the Research Ethics Committee adhered to the nine components of ethical considerations. The aforementioned factors encompass societal value, informed consent, risks and rewards, safety considerations, privacy and confidentiality of information, principles of justice, transparency, researcher qualifications, appropriateness of facilities, and community involvement.

3.0 Results and Discussion

Table 1. Summary of the level of teaching strategies of college instructors in teaching mathematics

TEACHING STRATEGIES	MEAN	DESCRIPTION
Behavioral Strategies	4.27	Very High
Cognitive Strategies	4.36	Very High
Affective Strategies	4.40	Very High
Overall Mean	4.34	Very High

The mean scores indicate consistently positive ratings with an overall mean score of 4.34 or very high levels of teaching strategies of college instructors in teaching mathematics (Table 1). This further implies that the teacher's strategy is always manifested in the new normal. All indicators under the teaching strategies of college instructors have a verbal description of very high. Consequently, the college educators implemented affective techniques in response to the current circumstances, encompassing learning strategies aimed at effectively managing emotions, encompassing both positive and negative states.

The correlation between affective strategies and learning remains ambiguous; nevertheless, a favorable emotional environment often enhances the process of learning. The respondents perceived that the affective strategy has the highest mean. Based on the data given, the affective strategies get a mean of 4.40, or very high. This means that the teacher's affective approach is always observed in the new normal. This further implies that teachers show a very high level of effective teaching strategies in teaching college mathematics. A cognitive strategy is the second-highest indicator with a mean score of 4.36 or very high. In teaching college mathematics, instructors have a high level of teaching strategies in terms of cognitive strategies. This further implies that the teacher's cognitive strategy is always manifested in the new normal.

This finding supports the notion proposed by Pishghadam (2012) that the affective domain is a significant indication for enhancing quality of life. Therefore, it is recommended that instructional efforts prioritize the affective domain. British Council (2020) also justifies this strategy during the pandemic, that in the classroom, teachers can play an active role in the development and use of emotional strategies by creating a generally positive atmosphere in the classroom. This can be done by encouraging and counseling learners, identifying achievable goals, and working towards autonomous learning through personal activities and pair and group work. The findings of Costley's (2020) study indicate that the use of cognitive methods moderates the link in question. This exemplifies the efficacy of employing cognitive techniques in addressing ambiguous instruction, thereby leading to enhanced levels of student learning.

In addition, ScholarChip (2020) mentioned that daily, teachers must strike a delicate balance in the classroom. In addition to teaching, grading, supporting students, and doing administrative responsibilities, teachers must also handle student conduct. Classrooms can become unruly and chaotic if proper behavior management is not taken into account. This results in an environment that is unsuitable for learning or academic performance. And, Sharp (2021) stated that in the new normal views, students' behavior and attitude have an impact on their learning. It supports the influence of new normal classes and learning perspective development while also contributing to self-determination in the new normal classes and framework theory of learning engagement. Lastly, Open Colleges (n.d.) mentioned in her article that there are pros to online learning but also comes with its unique challenges. Teachers and Instructors need to be the primary force driving this change and promoting engagement. Amidst the epidemic, universities need to understand and recognize the ramifications of this phenomenon on teaching, learning, student experience, infrastructure, operation, and people in the medium and long term. As stated by Dayagbil et al. (2021), it is imperative to employ scenario analysis and possess a

comprehensive awareness of the unique environment of each university in order to effectively tackle the existing difficulties they encounter.

Table 2. Level of teaching strategies of college instructors in teaching mathematics in terms of affective strategies

INDICATORS	MEAN	DESCRIPTION
My Instructor...		
1. Allows students to have more clarifications and explanations on a certain stimulus.	4.47	Very High
2. Supports students' sympathy towards others.	4.38	Very High
3. Helps students have confidence in themselves.	4.42	Very High
4. Encourages students to interact positively amongst themselves.	4.40	Very High
5. Teach students the way to identify their points of strength and weakness.	4.41	Very High
6. Makes students take part in different roles in the teaching-learning situation.	4.38	Very High
7. Let students have their conversations positively.	4.37	Very High
8. Teach students how to change their negative reactions into positive ones.	4.29	Very High
9. Trains students to solve their problems comfortably.	4.43	Very High
10. Strengthens leadership in his students.	4.46	Very High
Overall Mean	4.40	Very High

Table 2 displays college instructors' impactful math teaching strategies. Of the three indications of college instructors' teaching strategies, respondents rated affective strategies the highest, with a mean score of 4.40 or very high. This suggests that the new normal always reflects the teacher's emotive approach. With a mean score of 4.47, respondents scored the first item as the highest, saying the instructor "*Allows students to have more clarifications and explanations on a certain stimulus*". This means that instructors always allow students to get further clarification on a math issue in the new normal. As stated in the British Council (2020), that the instructor can promote affective methods by creating a favorable classroom environment. Let students ask clarifying questions to eliminate negative variables and develop positive ones. However, item eight, which stated that the instructor "*Teaches students how to change their negative reactions into positive ones*," was rated the lowest with a mean score of 4.29 and was also described as very high. This implies that the teacher always instructs students on how to turn negative responses into positive ones. In line with the result, Garay (2012) stated that Affective learning strategies control happy and negative emotions. While the relationship between affective methods and learning is uncertain, a favorable affective environment improves learning. Emotional variables affect learning. They can be good or bad. Second language acquisition models emphasize negative affective components or affective filters.

Table 3. Level of teaching strategies of college instructors in teaching mathematics in terms of cognitive strategies

INDICATORS	MEAN	DESCRIPTION
My Instructor...		
1. Begins with presenting the main ideas of the topic at the beginning of the class.	4.49	Very High
2. Encourages students to verify information and facts before giving judgments.	4.48	Very High
3. Begin the teaching-learning situation by presenting a problem to students.	4.36	Very High
4. Guides students to references such as dictionaries, encyclopedias, internet sites, ...etc.	4.26	Very High
5. Uses cognitive teaching strategies to harmonize with students' learning strategies.	4.27	Very High
6. Encourages students to generate as many alternatives as they can for the problem discussed.	4.29	Very High
7. Facilitates for students to make use of the procedures that organize memory potentials (symbolizing information)	4.25	Very High
8. Gives students enough time to question and investigate the desirable objective.	4.41	Very High
9. Allows the students to generate new information by making comparisons between their previous knowledge and new one.	4.35	Very High
10. Begins with examples up to the concept in the teaching-learning situation.	4.40	Very High
Overall Mean	4.36	Very High

Table 3 presents the data pertaining to the cognitive methods employed by the respondents. This indicator ranks second in terms of verbal description, with all items receiving very high ratings. College instructors employ a significantly high level of cognitive strategy in mathematics instruction, as indicated by the indicator's mean value of 4.36. This further implies that the instructor's cognitive strategy is always observed in the new normal. The first item stating that college instructors "*Begin with presenting the main ideas of the topic at the beginning of the*

class” obtained the highest mean of 4.49, described as very high. This implies that at the beginning of the lesson, teachers always introduce the main concept of the topic in this new normal.

According to Anderson (2011), the cognitive domain includes expertise, comprehension, application, analysis, synthesis, and evaluation. The learner's ability to analyze records is knowledge. Comprehension tests the learner's capacity to recognize knowledge's means. Students can explain an idea in their own words. Better to present the lesson's primary topic before addressing it. On the other hand, the lowest item in this indicator with a mean score of 4.25 but still a very high verbal description is item seven, in which the instructor “*Facilitates their students to make use of the procedures that organizes memory potentials*”. This implies that college teachers always guide their students in the new normal by using processes that arrange cognitive potentials such as symbolizing information.

Based on the results, Costley (2020) suggested using cognitive methods to clarify instruction and improve student learning. Repetition, organizing new language, summarizing, context guessing, and imagery-based memorization are examples. All of these tactics use language manipulation to increase learning. Online learning performance is affected by student motivation and cognitive load. Students who can regulate their learning in difficult settings surpass those who can't. Cognitive methods improve cognitive processing and help students handle challenging teaching situations.

Table 4. Level of teaching strategies of college instructors in teaching mathematics in terms of behavioral strategies

INDICATORS	MEAN	DESCRIPTION
My Instructor...		
1. Provide the student with information regarding his answer’s accuracy all the time.	4.37	Very High
2. Use specific questions to have specific answers.	4.39	Very High
3. Uses direct presentation to provide students with information.	4.42	Very High
4. Eliminates any undesirable stimuli after the student does correct behavior.	4.11	High
5. Trains his students on distinguishing between characteristics of the same concept.	4.36	Very High
6. Cares about rectifying students’ undesired behaviors.	4.24	Very High
7. Dissembles the teaching-learning material into specific tasks that need specific responses.	4.19	High
8. Helps his students imitate desired models.	4.28	Very High
9. Give awards to students for their right answers.	4.26	Very High
10. Neglects undesired behaviors in the teaching-learning situations.	4.04	High
Overall Mean	4.27	Very High

Table 4 shows the behavioral strategies were rated as the least indicator among the others with a total mean score of 4.27 or very high, which means that the college instructor’s behavioral strategy is very high in teaching mathematics. This further implies that the teacher’s behavioral strategy is always manifested in the new normal. The second item in which teachers use specific questions to have a specific answer was rated as the highest with a means core of 4.42 and described as very high. This further implies that in the new normal, their college instructors “*Use the direct presentation to provide students with information*”. Research related to behavioral approaches This inquiry aims to elucidate the importance of employing behavioral strategies by both trainers and learners in order to appreciate and analyze the fundamental aspects of improving, structuring, and recognizing preferred behaviors, as well as the methods of comparing outcomes.

Direct instruction is one of the best teaching methods, according to Renard (2019). Direct instruction, often misunderstood, outperforms other methods. Direct instruction uses lectures or demonstrations to teach new topics. Teachers now teach directly when suitable for the skill being taught. Example: The step-by-step problem-solving procedure is best learned directly, whereas demonstrating how to is more engaging and hands-on. On the other hand, the lowest was the tenth item stating that their instructor “*Neglects undesired behaviors in the teaching-learning situations*”, with a mean score of 4.04 described as high. Although this statement had the lowest mean it is still described as high. This implies that teachers often ignore undesirable behavior in the new normal during teaching-learning circumstances.

Sharp (2021) believed that behavioral strategies were powerful strategies or precisely directed behaviors that could be evaluated and observed. Such tactics aim to rectify bad habits and teach good ones. According to the

new normal, students' conduct and attitudes affect learning. It supports new normal classrooms, learning perspectives, self-determination, and the framework theory of learning engagement.

Table 5. Level of mathematics performance of maritime students in the new normal

VARIABLES	MEAN	DESCRIPTION
Mathematics Performance	1.68	High

According to the statistics provided in Table 5, the mathematics performance of maritime students is characterized by a mean score of 1.68, indicating a satisfactory level of achievement. This implies that the group of participants satisfies the minimum level of proficiency, as evidenced by their score above the average. This further implies that students have a very satisfactory academic performance in mathematics.

Based on Montondo (2020), the evolving impact of mathematics on our daily lives necessitates a more thorough reconsideration of mathematics education. The skills required to design and construct a secure vehicle vary significantly from those necessary to operate the same vehicle safely. Similarly, we need to differentiate between the minority, who are the target audience for numerous mathematical curricula, and the majority, who must be knowledgeable users of mathematics without necessarily comprehending all of it.

This research shows how good mathematics teaching and learning approaches can help teachers, school leaders, and policymakers solve current and future difficulties. Students with poor learning autonomy are likely to have inferior mathematical aptitude, according to Bringula et al. (2021). Students who doubt their math skills do worse. Students say asynchronous session activities including reading, assignments, practice exercises, and quizzes are difficult to assess, teach, and consult. Problems like this explain test anxiety in students. These problems caused uncertainty or low-grade perceptions. The quantitative data suggest that children should be gradually introduced to learner autonomy to improve their math ability.

Table 6. Correlation analysis between teaching strategies and mathematics performance of maritime students in the new normal

TEACHING STRATEGIES	R	P-VALUE	DECISION ON HO	INTERPRETATION
	0.093	0.359	Failed to Reject	There is no significant correlation

The findings shown in Table 6 demonstrate that there exists a positive association between teaching strategies and the mathematical performance of maritime students in the context of the new normal. However, it is important to note that this correlation is not statistically significant. The correlation coefficient (r value) in the table is 0.093, indicating a minimal positive link between the degree of teaching strategies and the mathematics performance of marine students in the current learning environment. Moreover, the r -value is close to zero, which pertains to no correlation. This implies that teaching strategies and mathematics performance have almost no relationship. Given that the p -value of 0.359 exceeds the predetermined alpha threshold of significance of 0.05, it may be concluded that the observed association lacks statistical significance. There is no substantial correlation between instructional methods and the mathematical achievement of marine students in the current circumstances. It can be concluded that the null hypothesis has not been rejected. The data imply that in the new normal, the instructor's teaching strategies and the mathematics performance of maritime students are not significantly related at all.

This further means that teaching strategies are not a factor in maritime students' academic performance in learning college mathematics. The teaching approaches of the college instructors of a particular maritime school do not significantly contribute to their maritime students' learning or academic performance in learning mathematics. Despite the long-standing existence of online learning, a significant number of faculty members and students fail to recognize the inherent benefits associated with totally online learning. During the ongoing health crisis, numerous educators have been compelled to devise expedient online learning strategies (Hodges et al., 2020). While online approaches have proven to be efficient in providing knowledge, their effectiveness in promoting active learning and fostering engagement is limited.

Table 7. Test of significance on the influence of teaching strategies on mathematics performance

TEACHING STRATEGIES (TS)	UNSTANDARDIZED COEFFICIENTS		STANDARDIZED COEFFICIENTS				
	B	SE	Beta	t	Sig.	Decision on Ho	Interpretation
(Constant)	1.892	0.206		9.164	0.000		
Behavioral Strategies (BS)	0.004	0.013	0.085	0.305	0.761	Failed to Reject	Not Significant
Cognitive Strategies (CS)	0.023	0.017	0.498	1.347	0.181	Failed to Reject	Not Significant
Affective Strategies (AS)	-0.031	0.014	-0.685	-2.296	0.024	Reject	Significant

R = 0.237; R² = .056; F-value = 1.912; p-value = 0.048

The results show (see table Table 7) that the teaching strategies of maritime college instructors as regards affective strategies (B, 0.031; $p < 0.05$) significantly predict the mathematics academic performance of maritime students at a 0.05 level of significance. The results further show that for every unit increase in the teaching strategies of maritime college instructors as regards to affective strategies, the academic performance of students in mathematics would significantly increase by -0.031 as represented in the Regression Model: TS = 1.892 -0.031 (AS) at a 0.05 level of significance (F, 1.912; $p < 0.05$). A coefficient with a negative sign indicates that there is a tendency for the dependent variable to drop as the independent variable increases. The coefficient value represents the extent to which the average of the dependent variable is altered when the independent variable is shifted by one unit while keeping all other variables in the model the same. This implies that the null hypothesis will be rejected and the affective strategies are statistically significant. Furthermore, using Linear Regression Analysis, the data results from Table 4 revealed an F-value of 1.912 and a p-value of 0.048, which means that the data fit the model. Also, the model summary showed an R-square, which suggests that the model explains 5.6 percent of the variation in the dependent variable; Mathematics Performance can be explained by the variation in the independent variables; Behavioral, Cognitive, and Affective Strategies. Additional factors not included in the model account for the remaining 94.4 percent. Furthermore, the findings suggest that the regression model explains a maximum of 1.912 (R², 0.056; $p < 0.05$) of the variations or fluctuations in the academic achievement of maritime students in mathematics, with a significance level of 0.05.

4.0 Conclusion

The findings of this study shed light on several key aspects of maritime education in the context of the new normal, particularly regarding teaching strategies and mathematics performance. While the study identified very high levels of teaching strategies among college instructors, it's crucial to interpret these findings within the broader landscape of online education and maritime studies. These findings underline the need for educators to analyze and refine teaching strategies to meet online learning obstacles. Professional development in online pedagogy and technology-enhanced teaching can improve education and student engagement. Additionally, policymakers can help educators and students transition to online learning. Infrastructure, technology, and professional development can help maritime students embrace remote teaching and learning best strategies, enhancing educational outcomes. Future researchers could explore additional factors influencing mathematics performance among maritime students, such as socio-economic background, access to technology, and student motivation. Longitudinal studies tracking student progress over time can provide deeper insights into the sustained impact of teaching strategies on academic achievement. Lastly, comparative research across maritime institutions and locations can also reveal the efficacy of different teaching strategies and uncover maritime online education best practices.

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There is only one author for this research.

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7.0 Conflict of Interests

The author declares that they have no conflicts of interest.

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English Teachers' Readiness for Home-Based Learning: Its Relationship to Teachers' Performance

Mary Cecille C. Arciaga

La Consolacion University Philippines, Malolos City, Bulacan, Philippines

Author email: maryceccille.arciaga@email.lcup.edu.ph

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Abstract. The researcher aimed to determine the relationship between English teachers' readiness for home-based learning and their performance. The study's presumed hypothesis was tested using a descriptive correlational design with a significance level of 0.05. The data were analyzed using a variety of statistical measures, including frequency count, mean, and multiple regression analysis, to answer the study question. Furthermore, the researcher used a reliable and valid instrument designed by Mansor et al. (2021) to measure the level of readiness for home-based learning among teacher respondents. Meanwhile, a documentary analysis was used to evaluate the English teachers' performance. The study was evaluated and approved for implementation by the LCUP-REC. To assure consistency, the researcher asked 252 teachers from nine (9) schools in one of Bulacan's educational districts to complete the standardized surveys using Google Form while maintaining rigid anonymity. The data were examined and handled statistically using Statistical Packages for Social Sciences (SPSS). The results indicated a value larger than the predetermined 0.05 threshold of significance. The researcher failed to reject the null hypothesis, which states that there is not a significant relationship between English teachers' readiness for home-based learning and their performance. Furthermore, the study proposed a faculty development program concentrating on English language competency as part of teachers' ongoing professional development to improve their level of readiness for home-based learning, particularly in terms of subjective norms.

Keywords: English teachers; Level of readiness; Home-based learning; Teachers' performance; IPCRF; Descriptive-correlational.

1.0 Introduction

According to the World Bank Education Global Practice (2020), extended school closures have resulted in a lack of learning and may lead to a bigger loss of human resources and, as a result, a decline in economic potential. According to UNESCO (2020), this pandemic has caused the greatest disruption to the education system in history, affecting 94% of the student population in over 190 nations around the world.

The Department of Education (DepEd) intends to continue teaching in the face of the pandemic's threat and uncertainty, while also taking into account the health security, safety, and well-being of all learners, educators, workers, and Department stakeholders. Department of Education Secretary Briones (2017) stated that "education must continue regardless of what is going on in the country or the issues we face. Education and our students must wait. We will continue the process so that we can provide hope and continuity, as well as contribute to the normalization of the country's operations," she stated in her remarks at the High-Level Social Development Goals Action Event on Education in New York City at the United Nations on June 28, 2017. The development of the Basic Education-Learning Continuity Plan for the school year highlighted the possibility of interrupted learning across the country.

Thus, DepEd has developed the Basic Education - Learning Continuity Plan (BE-LCP) to allow basic education learners to continue studying while also allowing teachers to offer instruction in a safe working environment in the face of the COVID-19 danger. Given the epidemiological picture shown in Table 7 of the BE-LCP, the general government response, as well as the DepEd Secretary's instructions, is to develop solutions for learning to continue in a safe and healthy environment in the middle of Covid-19. Moss et al. (2020) discovered that the COVID-19 scenario has underlined the vital role that schools play in both caring for children and aiding them with learning. The BE-LCP adheres to the following principles: (1) protect the health, welfare, and well-being of students, teachers, and staff; (2) ensure learning sustainability; (3) facilitate the safe return of teaching and non-teaching personnel and students to workplaces and classrooms; (4) be open to equity issues and concerns; and (5) link and bridge the BE-LCP to DepEd's pivot to consistency and into the future.

During the COVID-19 epidemic, distant education emerged as the most practical and commonly utilized educational tool among schools and teachers worldwide (Sali, 2020). Distance learning has been the primary mode of learning delivery in the preceding and next school years. According to the UNESCO proceedings from their COVID-19 Education Response Webinar titled Supporting Teachers to Maintain Continuity of Learning During School Closures, Home-Based Learning (HBL) is preferable above online learning or remote teaching. It is also the mode of delivery in which the teaching and learning process takes place at home.

Prior to COVID-19 pandemic, HBL or remote teaching has been widely used in higher education and isolated areas of the Philippines. The implementation of HBL is not new but during this pandemic, this form of learning has become essential. It is crucial for the Philippine education system to quickly hinge to home-based learning or remote teaching and learning. It results to significant changes from conventional instructional practices of traditional face-to-face classes to learning to home settings utilizing blended modality of printed modules and online classes.

However, it has been shown that HBL hinders students' capacity to learn and become self-directed learners, and parents are under added pressure to closely monitor their children's ability to study and become self-directed learners in HBL (Gan & Bilige, 2019). Teachers must be able to engage both students and parents during HBL, which is only possible if they get adequate assistance from both the school and the Department. Without such comprehensive digital media regulations, educational institutions have "left countless children without the resources they need to navigate and profit from remote learning" (Turvey & Pachler, 2020). Many instructors expressed dissatisfaction with the weight that had been placed on them (Comanducci, 2020).

Home-Based Learning (HBL) is an inescapable alternative in the midst of the COVID-19 worldwide epidemic. The epidemic has caused a shift in society's approach to student outreach, and educational institutions must adapt to this culture through remote learning (Westine et al., 2019). Whether the consequences of emergency remote teaching are unfavorable or beneficial, educational systems throughout the world are left with little option but to experience and embrace the huge and quick changes (Hung et al., 2020) that come with implementing emergency remote education principles (Bozkurt & Sharma, 2020).

The Kingdom of Saudi Arabia and the United Arab Emirates governments have initiated distance learning awareness campaigns for parents, teachers, administrators, and students (Chang & Yano, 2020). It is about critically and objectively examining best practices in our own and other nations to obtain insight into what works (Reimers & Schleicher, 2020). In a developed nation such as Finland, students get teaching and assistance via a digital learning environment, and the Chinese Ministry of Education has initiated an endeavor to provide flexible online learning to its pupils. Despite the short notice and some initial technological and logistical challenges, home-based learning was widely embraced and adopted across Singapore (Davie, 2020). Meanwhile, in developing countries like ours, teachers locally create Self-Learning Modules (SLMs) to make learning more relevant and meaningful to students.

According to Irene (2021) in her study entitled "Using Communicative Approach in Teaching Speaking Competence of Young Learners through Home-based Learning", materials designed by the teacher do impact in stimulating young language learners to improve their communication skills in English, which agrees with the result of the study of Tay et al. (2021) entitled, "Implementation of Online Home-Based Learning and Students'

Engagement During the COVID-19 Pandemic: A Case Study". Despite variances in education implementation, governments throughout the world have taken rapid efforts that reflect shared aims, which include not just reducing the spread of the disease but also providing continuous learning. According to the study of Johnson (2021) "Homeschooling During Covid-19: A Case Study" research, both participants loved working with their children and felt it enjoyable when their children excelled. In China, the research "The Effects of Online Homeschooling on Children, Parents, and Teachers of Grades 1-9 During the COVID-19 Pandemic" by Zhao et al. 2020 reported that 76% of respondents considered the homeschooling approach was appropriate. Teachers were afraid that pupils' attention, focus, and academic performance would suffer.

As a result, Jamaludin (2015) of Turkey did a research titled "Research and Trends in the Studies of Homeschooling Practices: A Review on Selected Journals", and concluded that homeschooling has provided flexible learning for children who may struggle in regular schooling. However, there are still areas that may be improved, such as utilizing government-provided assistance materials and other educational resources. Furthermore, information and communication technology has a greater capacity to foster a strong learning community and provide access to appropriate materials for homeschooling learning. Furthermore, in Tereshchuk (2021) study, "Homeschooling and the COVID-19 Crisis: The Insights of Parents on Curriculum and Remote Learning", found that parents strongly questioned the popular reliability of online education, claiming that online tools were unsuitable for promoting independent learning among young children. The study may give useful insights on how to effectively assist learning from home during this current epidemic. Overall, the examination of this literature provides a lot of evidence that homeschooling is fairly successful in terms of goal execution; yet, there are still reservations about its trustworthiness as a long-term educational system.

According to Bhamani et al. (2020), in their study titled "Home Learning in Times of COVID: Experiences of Parents", it was discovered that the entire nation and scholars around the world have come forward to support learning at home by providing a variety of free online avenues to assist parents in facilitating home-learning. To successfully promote learning in HBL, teachers are given tools to help them grasp the many online pedagogies, various methods of course delivery, virtual environments, and potential educational technology. Using a range of media, such as film, text, and screenshots, enhances the possibility that all individuals involved in the teaching and learning process understand how the curriculum works (Snelling and Fingal, 2020). The procedure might take place via radio, television, mobile apps, or internet channels. Teachers can also get instruction through these channels (Chang & Yano, 2020).

The papers cited above supports the hypothesis that the pandemic had an impact on the Philippine school system. Home-based learning has proven crucial across the country. The evaluation also emphasized the importance of instructors as key individuals in this new teaching practice, as well as parents as co-facilitators of learning in this new regular educational setting. A greater understanding of teachers' readiness as the lead characters in the context of existing changes is critical to the effective and long-term implementation of HBL. However, if Filipino teachers are not prepared to accept this change, they may have a more negative attitude toward the new educational system; if they are not resistant to this pedagogical shift, it will limit their own involvement in the teaching-learning process and detract from students' long-term positive outcomes. Teacher preparation for change and distant education received little attention, particularly in the context of a pandemic or while dealing with technology during school closure. Thus, little is known about teachers' readiness to move from traditional classroom-based instruction to home-based learning with technological integration. As a result, the purpose of this study was to assess English teachers' readiness for home-based learning in English teaching, as well as how it relates to teacher performance. This research study contributed to the existing body of knowledge by implementing a faculty development program focused on English language teaching proficiency.

2.0 Methodology

2.1 Research Design

The aim of this research is to study the relationship between English teachers' readiness for home-based learning and their performance as the foundation for a faculty development program focused on English language teaching proficiency. The descriptive-correlational research design was used in the study because it is designed to offer a picture of the current situation, and correlational because it is intended to discover links between variables and allow for the prediction of future occurrences based on current information. The aforementioned

study technique was chosen because it is concerned with describing the independent variable, which is English teachers' readiness for home-based learning, and it has to do with the dependent variable, teachers' performance. This research approach is appropriate for providing a view of the current situation, since it provides a rather full image of what is going on at the time and allows for the formation of questions for future investigation.

2.2 Research Participants

The study used the universal sampling approach to choose a sample from a particular population of teacher responders. The study's respondents were two hundred fifty-two (252) English teachers from nine (9) schools in one of Bulacan's public elementary educational districts during the 2020-2021 school year.

2.3 Research Instrument

The study used a standardized instrument. To assess English teachers' readiness for home-based learning, the study adopted the HBL Teacher Readiness Scale developed by Mansor et al. (2021). It is a 26-item questionnaire with four subscales: ICT self-efficacy, attitude, perceived behavioral control, and subjective norms. It is a five-point Likert-type measure ranging from 1 (not ready) to 5 (completely ready), with Cronbach's alpha coefficients of 0.84 for ICT self-efficacy, 0.84 for attitude, 0.87 for perceived behavioural control, and 0.77 for subjective norms. The overall dependability of the scale was 0.83. These figures indicate that the resultant factor is exceptionally strong, while the dependability value is extremely high. On the other hand, a documentary analysis of the teachers' performance was conducted using the teachers' final rating in the Individual Performance Commitment and Review Form, which is a computerized tool for measuring the Results-based Performance Management System of public elementary school teachers. It ranges from one (poor) to five (outstanding).

2.4 Data Gathering Procedure

The data was gathered using a survey questionnaire utilizing the online platform Google Forms. Each respondent received a link to an online questionnaire that assessed their preparedness for home-based English instruction. The researcher performed the following procedures to acquire data:

- a) An email was sent to the authors of the Teachers' Readiness Scale, which was used in the study, requesting permission to distribute the questionnaire to assess English teachers' readiness for home-based learning.
- b) The researcher drafted a request letter to perform the study, which was signed by both the researcher's adviser and the Dean of Graduate Studies at La Consolacion University Philippines.
- c) A permission letter is written to Bulacan's Schools Division Superintendent, requesting permission to conduct a study and distribute online surveys to teachers.
- d) With survey authorization, respondents were informed that the information collected would be kept confidential and used strictly for research reasons.
- e) The link to the questionnaires online was sent to the participants.
- f) The researcher verified to see if all things were answered religiously.

2.5 Data Analysis

The acquired data was tabulated and analyzed with statistical software for social sciences (SPSS). To examine the results, the following statistical procedures were used:

- a) Frequency and percentages. This statistical method was used to evaluate teachers' performance.
- b) Mean score. This statistical tool assessed the level of readiness for home-based learning.
- c) Standard deviation. This statistical tool indicated how much each individual's responses to each indicator "deviate" from the mean.
- d) Multiple Regression Analysis. This statistical tool was used to assess the strength of the relationship between the subscales of home-based learning and teacher performance.

2.6 Ethical Considerations

The researcher obtained institutional approval and consent from the Graduate Studies Department. The following ethical considerations were put in place for this study undertaking:

- a) The dignity and well-being of teachers who respond are preserved. They were not harmed in any way or placed in a stressful circumstance.

- b) The researcher received informed consent from the teacher-respondents, which included the important information given in previous sections of the study. They were informed that their participation in the study is entirely voluntary, with no compulsion or fraud involved.
- c) The research data was kept private during the course of the investigation.
- d) The researcher followed the guidelines established by Republic Act 10173, also known as the Data Privacy Act of 2012, which broadly promotes the "free flow of information to promote innovation and growth" (Chapter 1, Section 2) while respecting the user's fundamental privacy rights.

3.0 Results and Discussion

3.1 Assessment of English Teachers' Readiness for Home-based Learning

Legality hinges on the art. XIV; Section 2 of the 1987 Constitution states that the state must preserve and promote all citizens' right to a decent education at all levels. It promotes self-learning, independent and out-of-school study programs, especially those that address community needs. Policy Guidelines for the K-12 Basic Education Program, Order 021, s. 2019, the phrase "Flexible Learning Options" included "alternative delivery modes (ADM)," which are modalities that do not closely match the traditional structure of normal classroom instruction but do follow the official K-12 Curriculum in content.

Home-based learning is one of the ADMs provided by the Department of Education (DepEd). It allows students to receive formal education while remaining outside of the classroom setting. Teachers are highly aware of the presence and repercussions of the COVID-19 pandemic, which has significantly impacted the educational sector. It is critical to assess teachers' readiness to adopt HBL in the context of a pandemic in four recognized dimensions: ICT self-efficacy, attitude, perceived behavioral control, and subjective norms.

ICT Self-Efficacy

Table 1. Home-based learning (ICT Self-Efficacy)

INDICATORS		MEAN SCORE	DESCRIPTIVE EVALUATION
1.	I can carry out my lessons using live streaming (Microsoft Teams, Skype, Google Meet, etc.)	3.64	Considerably Ready
2.	I can have a variety in terms of the applications and resources used when conducting classes online.	3.35	Moderately Ready
3.	I can use different kinds of applications to share teaching and learning content.	3.38	Moderately Ready
4.	I can create a variety of learning resources with online applications (gamification, videos, clips, e-books, etc.)	3.08	Moderately Ready
5.	I can upload and download learning content in various forms from different sources (such as video, audio, slides, notes, and exercises).	3.68	Considerably Ready
6.	I can communicate with online audio and visual comfortably.	3.70	Considerably Ready
7.	I can deploy various teaching and learning strategies when using ICT.	3.54	Considerably Ready
AVERAGE MEAN		3.48	Considerably Ready

Legend: Score Interpretation Guide = Completely Ready - 4.21-5.00, Considerately Ready - 3.41-4.20, Moderately Ready - 2.61-3.40, Slightly Ready - 1.81-2.60, Not Ready - 1.00-1.80.

Table 1 shows the assessment of English teachers' readiness for home-based learning using ICT self-efficacy. The use of self-efficacy in academic studies is clearly useful in terms of boosting educational quality. According to Bandura (1997), as referenced by Ikhrom (2020), perceived academic self-efficacy refers to personal assessments of one's ability to plan and carry out courses of action to achieve specific sorts of educational outcomes. The belief in self-efficacy is an important aspect in the origin of human activity; what individuals think, believe, and feel influences how they behave. The efficacy of beliefs in shaping how individuals think, feel, motivate themselves, and behave. It reveals that it has an average weighted mean of 3.48 which has a descriptive evaluation of *Considerably Ready*. Among the seven (7) indicators, number 6 *I can communicate with online audio and visual comfortably* ranked as the highest with a mean score of 3.70 which has a descriptive evaluation of *Considerably Ready* while indicator number 4 *I can create a variety of learning resources with online applications (gamification, videos, clips, e-books, etc.)* placed the lowest having a mean score of 3.08 which is interpreted as

Moderately Ready. On the other hand, the remaining statements have a description evaluation of either *Considerably Ready* or *Moderately Ready*.

The data implies that during the implementation of HBL, still, teachers were able to communicate to pupils even without face-to-face interaction. The integration of ICT on their teaching practices plays a vital role as means of communication in teaching English and increases their skills in using English as language whether orally or in written. According to Kareem's (2017) study, "*The Importance of Using Information Communication Technology for Learning and Teaching the English Language in Kurdistan of Iraq*," teachers in Kurdistan find ICTs highly valuable for enhancing their English language competency. Because ICT encompasses a wide range of devices and apps, teachers use a variety of ICTs both in the classroom and at home. Kareem proposed that teachers' efficacy in incorporating ICT into English instruction adds to the improvement of abilities such as reading, writing, speaking, and listening.

However, teachers failed to maximize the ICT-related applications and resources to develop various learning materials such as gamification, videos, and the likes to share variety of learning and teaching contents while conducting online classes that could be some sort of innovation in the new normal environment. Teachers' ICT efficacy still has a room for improvement in exploiting the entire technology world has to offer in order to deliver more relatable and unique learning experience to learners.

It contrasts the study of Ghavifekr et al. (2018) entitled "*Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools*", which found that well-prepared teachers with ICT tools and facilities are one of the most important factors in the success of technology-based teaching and learning. In Malaysia, ICT is regarded as one of the most important aspects in altering the country for future growth. They also stated that teachers with high ICT effectiveness might give high-quality education to their students.

Attitude

Table 2. Home-based learning (Attitude)

INDICATORS	MEAN SCORE	DESCRIPTIVE EVALUATION
1. I can accept comments and suggestions for improving my teaching and learning practices.	4.04	Considerably Ready
2. I can collaborate with my colleagues in implementing HBL.	3.83	Considerably Ready
3. I am willing to be guided by my colleagues in producing effective lessons for HBL.	3.99	Considerably Ready
4. I can help my colleagues to carry out effective HBL.	3.55	Considerably Ready
5. I am willing to attend related courses and workshops to improve my ICT competency.	3.99	Considerably Ready
6. I can follow the HBL schedules and timetables prepared by my school.	3.75	Considerably Ready
AVERAGE MEAN	3.86	Considerably Ready

Table 2 displays an assessment of English teacher readiness for home-based learning based on attitude. Individual attitudes and social behavior define how they participate in certain applications, rules, and principles for planning and executing home-based learning (Ngai et al., 2018). It is critical to evaluate the attitudes of teachers regarding HBL when schools transition to home-based mode because of the COVID-19 pandemic. It shows that among the six indicators, number 1 *I can accept comments and suggestions for improving my teaching and learning practices* obtained the highest mean score of 4.04 which has a verbal interpretation of *Considerably Ready* while indicator number 4 *I can help my colleagues to carry out effective HBL* gained the lowest mean score of 3.55 yet still having the same descriptive evaluation of *Considerably Ready*. In general, *Attitude* has an average weighted mean of 3.86 which can be interpreted as *Considerably Ready*. It indicates that teachers are willing to accept constructive criticisms through comments and suggestions which can be in the form of classroom observation as part of the RPMS cycle. In the hierarchy of position, master teachers are assigned to provide technical assistance to teachers I-III for improvement of teaching and learning practices.

This implication corresponds to the result of the study of Panhoon and Wongwanich (2018) entitled *An Analysis of Teacher Feedback for Improving Teaching Quality in Primary Schools* which revealed that teachers who got feedback on their lesson produced superficial results. Simple suggestions could not increase teacher

performance. Feedback is a strong effect on teaching. They further suggested that teachers should be given immediate and appropriate feedback on their teaching practices, methods, and techniques whether during instruction or when giving assessment to enhance their teaching performance and the quality of learning among students.

Perceived Behavioral Control

Table 3. Home-based learning (Perceived Behavioral Control)

INDICATORS		MEAN SCORE	DESCRIPTIVE EVALUATION
1.	I can increase my work productivity when doing HBL.	3.49	Considerably Ready
2.	I can boost students' motivation when using various technologies during HBL.	3.41	Considerably Ready
3.	I encourage my students to practice self-learning by using technology.	3.45	Considerably Ready
4.	I can increase parents' participation as facilitators when doing HBL.	3.30	Moderately Ready
5.	I can use various forms of communication to communicate with parents in order to support their children's learning.	3.64	Considerably Ready
6.	I can communicate with my students actively when doing HBL.	3.45	Considerably Ready
7.	I can adapt my learning content depending on my students' situation and condition.	3.58	Considerably Ready
8.	Preparing learning materials during HBL is much easier than normal face-to-face lessons.	3.07	Moderately Ready
9.	I can do formative assessment by using suitable applications and software.	3.27	Moderately Ready
AVERAGE MEAN		3.41	Considerably Ready

Table 3 illustrates the assessment of English teachers' readiness for home-based learning on perceived behavioral control. Wallston (2019) defined PBC as "perceived self-efficacy," which means that "expectations of personal efficacy determine whether coping behavior will be initiated, how much effort expended, and how long it would be sustained in the face of difficulties and unpleasant conditions or experiences". It is a person's self-evaluation of the potential repercussions of carrying out a certain conduct with the necessary level of ability or competence. It exposes that it has an average weighted mean of 3.41 which has a descriptive evaluation of *Considerably Ready*. Given the nine indicators, number 8 *Preparing learning materials during HBL is much easier than normal face-to-face lessons* rated the lowest with a mean score of 3.07 that is interpreted as *Moderately Ready* whereas number 5 *I can use various forms of communication to communicate with parents in order to support their children's learning* graded with a mean score of 3.64 which has a verbal interpretation of *Considerately Ready*.

It denotes that teachers are moderately ready in preparing learning resources during HBL and prefer making and developing instructional materials during face-to-face classes as it conforms to the result of ICT Self-Efficacy wherein teachers are not maximizing the ICT applications in teaching. A certificate of authorship is given to teachers, who developed localized material hereby validated by the Division Office, is an attachment to the IPCRF. Unfortunately, most of the teachers failed to provide this which resulted to insufficient number of learning materials within educational institutions due to several factors such as budget, lack of interest, and awareness.

It is further shown in Bukoye (2019) study "*Utilization of Instruction Materials as Tools for Effective Academic Performance of Students: Implications for Counselling*", which stated that there is insufficient use of instructional materials in most schools, and the majority of teachers did not recognize the importance derived from developing instructional materials, and those who adapted the materials did not use them properly. Nevertheless, it revealed that teachers utilized various forms of communication with parents whether it may be either through text messages, letters, social media platform, or home visitation with adherence to the strict health and safety protocol in order to convey school instructions, communicate learners' academic progress, and community-related concerns to ensure public information dissemination and uninterrupted learning.

It is consistent with the findings of Wal (2020) research, “*Parent-Teacher Relationships and the Effect on Student Performance*”, which found that children whose parents were recognized by teachers as more favorably invested exhibited better levels of prosocial conduct and academic performance. This highlights how educators and parents who collaborate to empower kids may increase student achievement. He was also convinced that successful collaboration between teachers who use multiple modes of communication and parents who respond appropriately has become increasingly important in meeting the basic requirements of students. A cooperation like this demands accountability from both parties in order to accomplish the necessary progress despite the hurdles posed by the epidemic.

Subjective Norms

Table 4. Homes-based learning (Subjective Norms)

INDICATORS		MEAN SCORE	DESCRIPTIVE EVALUATION
1.	I receive support and encouragement from the school administrator for doing HBL.	3.27	Moderately Ready
2.	The District and Division Offices organizes programs to enhance teachers’ competency in HBL.	3.44	Considerably Ready
3.	I get full cooperation from parents and guidance when implementing HBL.	3.60	Considerably Ready
4.	I receive feedback from parents and guidance when doing HBL.	3.16	Moderately Ready
AVERAGE MEAN		3.37	Moderately Ready

Table 4 describes an assessment of English teachers' readiness for home-based learning based on subjective norms. According to the Theory of Planned Behavior, the more influential individuals in an individual's life (e.g., parents, coworkers, or administration) believe he or she is capable of doing an activity, the more likely the person intends to do so. When a person thinks that his or her major referents believe he or she should not engage in a behavior, the individual is less inclined to engage in that conduct. It illustrates that among the four indicators, number 4 *I receive feedback from parents and guidance when doing HBL* ranked as the lowest with a mean score of 3.16 which has a descriptive evaluation of *Moderately Ready* while number 3 *I get full cooperation from parents and guidance when implementing HBL* obtained the highest mean score of 3.60 with a verbal interpretation of *Considerably Ready*. Overall, subjective norms as one of the four subscales has an average mean of 3.37 having a descriptive evaluation of *Moderately Ready*.

It submits that respondents receive full cooperation from parents because they are the ones who go to school for the distribution and retrieval of self-learning modules in accordance with the IATF's public health and safety protocol, facilitating learning by adhering to the school schedule, requiring their children to attend synchronous online classes, and participating in community extension activities. The study of Olivo (2020) entitled “*Parents' Perception on Printed Modular Distance Learning in Canarem Elementary School: Basis for Proposed Action Plan*”, confirms this implication, stating that parents mostly agreed to the strategies in the distribution and retrieval of modules, time allotment for learning activities, the learning activities in the module, assessment, and highly agreed to the observance of safety and health protocols in the distribution and retrieval. The research also advised reviewing the learning activities and holding a seminar for parents to help them support their children with their home-based learning.

However, results also revealed that parents do not involve themselves in giving feedback during the implementation of HBL. There is an existing one-way communication between teachers and parents. It can be understood that parents are not aware of the importance of feedback mechanism which can be a contributory factor to the enhancement of HBL implementation which can eventually result to academic success of their children. It is consistent with the findings of Pek and Mee (2020) study, “*Parental Involvement on Child's Education at Home During School Lockdown*”, which discovered that, while the importance of parental involvement is widely acknowledged in educational society, most parents do not participate effectively in providing feedback on their child's education, whether at school or at home. Most parents refrain from providing opinions, comments, and suggestions to the school, administration, teachers, and teaching itself, while acknowledging the necessity of such feedback as part of the evaluation process, which can lead to further progress.

Overall English Teachers' Readiness for Home-based Learning

Table 5. Overall English teachers' readiness for home-based learning

SUBSCALES	MEAN SCORE	STANDARD DEVIATION	DESCRIPTIVE EVALUATION
ICT Self-Efficacy	3.48	0.90	Considerably Ready
Attitude	3.86	1.01	Considerably Ready
Perceived Behavioral Control	3.41	0.90	Considerably Ready
Subjective Norms	3.37	0.86	Moderately Ready
AVERAGE MEAN	3.53	0.94	Considerably Ready

Table 5 explains the assessment of overall English teachers' readiness for home-based learning. It reveals that it has an average weighted mean of 3.53 which has a descriptive evaluation of *Considerably Ready*. Among the four (4) subscales, Attitude with 6 indicators ranked as the highest with a mean score of 3.86 which has a descriptive evaluation of *Considerably Ready* and a standard deviation of 1.01 followed by ICT Self-Efficacy which obtained a mean score of 3.48 which has a verbal interpretation of *Considerably Ready* and a standard deviation of 0.90 meanwhile, Perceived Behavioral Control got a mean score of 3.41 which is descriptively evaluated as *Considerably Ready* having a standard deviation of 0.90, lastly, subscale Subjective Norms ranked as the lowest having a mean score of 3.37 with a verbal interpretation of *Moderately Ready* and standard deviation of 0.86.

It entails that among the four subscales of readiness for home-based learning, teachers are considerably ready to accept technical assistance to facilitate HBL efficiently and effectively even if it comes from his/her superior or colleagues and they are considerably ready to attend and participate training courses and workshops to upskill their ICT competency. The given implication contrasts the result of the study of Razkane, Sayeh, and Yeou (2022) entitled *University Teachers' Attitudes Towards Distance Learning During COVID-19 Pandemic: Hurdles, Challenges, and Take-away Lessons* which revealed that as majority of their respondents faced both technological and non-technical difficulties, they showed negative attitude towards the COVID-19 distance teaching experience. These challenges of integrating ICT experienced by the teachers during instruction impede the good delivery of lessons. The study further suggested that they should undergo series of trainings to address their concerns on troubleshooting and highly technical matters in ICT.

3.2 Teachers' Performance

Table 6. Teachers' performance

RATINGS	FREQUENCY	PERCENTAGE	MEAN	STANDARD DEVIATION
Outstanding	91	36.11%	4.61	0.25
Very Satisfactory	155	61.51%	4.21	0.27
Satisfactory	6	2.38%	4.18	0.58
Unsatisfactory	0	0.00%	0	0
Poor	0	0.00%	0	0
OVERALL	252	100.00%	4.35	0.33

Legend: Rating Scale = Outstanding – 4.500-5.000, Very Satisfactory – 3.500-4.499, Satisfactory – 2.500-3.499, Unsatisfactory – 1.500-2.499, Poor – Below 1.499.

Table 6 illustrates the assessment of teachers' performance. Individual Performance Commitment Review Form (IPCRF) was introduced by DepEd year 2015 to Filipino public school teachers, which is a general plan of task and serves as a guide to teachers to be written before the start of classes, implemented before the school year, and rated at the end of the school year. This is a tool for assessing performance. According to Canoma (2017), the objectives listed are the real duties and obligations that each teacher must do while in service. This is a method for determining if someone is performing their tasks diligently, efficiently, and on schedule.

It can be gleaned that the lowest percentage of 2.38 or 6 out of 252 respondents have a rating of *Satisfactory* with a mean score of 4.18 and a standard deviation of 0.58 followed by 91 respondents or 36.11% of the total number of respondents obtained a rating of *Outstanding* with a mean of 4.61 and standard deviation of 0.25 lastly, the highest percentage of 61.51 or 155 respondents got a rating of *Very Satisfactory* having a means score of 4.21 with a standard deviation of 0.27. In general, the overall mean of the 252 teacher-respondents in relation to their performance in IPCRF is 4.35 which has a standard deviation of 0.33 with a rating of *Very Satisfactory*.

The result showed that vast majority of the respondents obtained a rating of *Very Satisfactory* ranging from 3.500 to 4.499 which means that most of the teachers exceed to the expectations and requirements set prior to the evaluation. They are more competent than an average worker and consistent who meet the standards and objective of the job. The results of their teaching performance can be expected as timely and accurate. Furthermore, respondents participate and adjust to changing situations and work assignments, which affirms the result of the study of Sabio and Manansala (2020) entitled “*Assessing Elementary School Teachers' Performance Using CBPAST and IPCR: A Five Year Trajectory Report*”, which states that in a five-year trajectory report (from 2013-2018) on the actual performance of elementary school teachers, findings revealed that the public school elementary teachers generally yielded.

3.3 Correlation between English Teachers’ Readiness for Home-based Learning and Teacher’s Performance

Table 7. Correlation between English teachers’ readiness for home-based learning and teachers’ performance

	UNSTANDARDIZED COEFFICIENTS		STANDARDIZED COEFFICIENTS	T	SIG.
	B	STD. ERROR	BETA		
(Constant)	4.372	0.118		37.018	0.000
ICT Self-Efficacy	0.025	0.048	0.054	-0.526	0.599
Attitude	0.016	0.051	0.040	0.314	0.754
Perceived Behavioral Control	0.054	0.055	0.119	0.982	0.327
Subjective Norms	0.051	0.040	0.114	-1.287	0.199
R = 0.096					
R ² = 0.009					
F-value = 0.575					
p-value = 0.681					
alpha = 0.05					

Table 7 shows the summary of the multiple regression analysis to test the significant correlation between teachers’ readiness for home-based learning and teachers’ performance. All the variables were correlated to the teaching performance of the teachers because they all have non-zero B-coefficient. Variables, namely ICT (0.025), Attitude (0.016), Perceived Behavioral Control (.054), and Subjective (0.51) are directly correlated to the teaching performance of the teachers. It implies that when these variables increase, the teaching performance of respondents will also increase. Conversely, as these variables decrease, the teaching performance of teachers also decrease.

All the variables were correlated to the teaching performance of the teachers because they all have non-zero B-coefficient. Variables, namely ICT (0.025), Attitude (0.016), Perceived Behavioral Control (0.054), and Subjective Norms (0.51) are directly correlated to the teaching performance of the teachers. It implies that when these variables increase, the teaching performance of respondents will also increase. Conversely, as these variables decrease, the teaching performance of teachers also decrease. It can also be gleaned in Table 7 that the variable which obtained the highest Beta coefficient is Perceived Behavioral Control (0.119). It means that it is the best predictor variable. It greatly affected the performance of the teachers followed by Subjective Norms (0.114) and Attitude (0.040). Among the four subscales, the least predictor variable is the ICT (.054).

On the other hand, the R denoted multiple correlation between English teachers’ readiness for home-based learning as a predictor of teachers’ performance. It could be noted that R is 0.096 which indicates a very low prediction while R² = 0.009 indicating the closeness of data in the regression line. It can be gleaned that the explanatory power of teachers’ level of readiness for home-based learning implies that in every 0.9 change it accounts, directly correlates to teachers’ performance in 0.9 construct as well.

However, ICT (Sig.=0.599; SE=0.048), Attitude (Sig.=0.754; SE=0.051), Perceived Behavior Control (Sig.=0.327; SE=0.055), and Subjective Norms (Sig.=0.199; SE=0.040), are all obtaining Sig. values which are greater than the set 0.05 level of significance; thus, as per decision rule, the null hypothesis which states that, “There is no significant relationship between English teacher’ readiness for home-based learning and teachers’ performance” should be accepted. These variables affect the teaching performance of the teachers but not to the significant extent.

To determine the overall correlation of English teachers' readiness for home-based learning to teachers' performance, the results revealed an F-value of 0.575 and p-value of 0.681 which is greater than the set 0.05 level of significance. It further implies that there are other potential factors that greatly affected the school performance because the English teachers' readiness for home-based learning has a trivial effect on the performance of the teacher. Still the high level of readiness of the teacher should be sustained for it has an effect teaching performance. Factors like educational attainment and local seminars attended could be possible reasons to increase the teachers' performance rate which was conformed on the study of Abarro (2018) entitled *Factors Affecting the Performance of Public School Teachers in the Division of Antipolo City, Philippines* which revealed that salary, highest educational attainment, attendance at local seminars, and academic success are all factors that influence teacher performance.

The result of the study agreed to accept the null hypothesis which inverse the conveyed concept suggested by Theory of Planned Behavior proposed by Icek Aizen stating that when the behavior is planned; hence, it predicts deliberate behavior. Technology devices are already provided to make teachers completely ready towards HBL implementation but teachers' intention to maximize the application, tools, and facilities related to ICT was not considered. Consequently, the theory does not take into account the economic factor that may influence a person's intention to perform a behavior wherein as stated above, one of the factors influencing the respondents is their salary. It implies that the theory of planned behavior may consider the inclusion of reciprocal causal relations among given variables which should be examined through mixed method for in-depth exploration of variables producing granular results.

4.0 Conclusion

In the light of the findings of the study, the following conclusions are drawn:

- a) That teachers should be acquiring more support and encouragement from the school administration while implementing HBL. Additionally, not only the full cooperation of the parents is required but also their immediate feedback when doing HBL for the teachers to have analysis on what they are to improve. Education administrators may maximize HBL delivery and guarantee that students receive quality education regardless of the learning setting by cultivating a collaborative and feedback culture. Furthermore, this strategy encourages a sense of shared responsibility for student success, resulting in a more inclusive and supportive educational environment.
- b) That most of the teachers in the nine (9) schools of one of the elementary educational districts of the Schools Division of Bulacan performed at a very satisfactory level exceeding the expectations and requirements prior to the evaluation of the school year 2020-2021 and they are considered to be more competent than an average worker whose performance can be expected as timely and accurate. It emphasizes the necessity of recognizing and promoting teacher quality in educational practice. Schools may foster a culture of continuous improvement and guarantee that all students receive a high-quality education by applauding accomplishments and offering ongoing support and growth opportunities.
- c) That the level of readiness of teachers in their ICT Self-Efficacy, Attitude, Perceived Behavioral Control, and Subjective Norms, positively affected their rating in the Individual Performance Commitment and Review Form to a varying extent. However, these two variables are not significantly correlated; it further concludes that there are other factors that may be affecting the rating of teachers on their IPCRF. It stresses the complexities of teacher assessment, as well as the significance of taking into account many elements when assessing teacher effectiveness. It advocates for a more comprehensive and nuanced approach to teacher assessment that recognizes the wide range of abilities and competences necessary for effective teaching in today's educational environment.
- d) That continuous professional development through faculty development program focusing on English language teaching proficiency should be proposed to enhance the teachers' readiness for home-based learning, which directly affect their rating in the IPCRF. The proposal for a faculty development program focused on English language teaching proficiency to improve teachers' readiness for HBL demonstrates a proactive approach to meeting education's increasing demands in the digital era. Prioritizing CPD allows educational institutions to guarantee that teachers are well-equipped to overcome the obstacles of online instruction while still providing high-quality learning experiences for students.

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Developing a Community-Based Disaster Relief Management System

Gerina Rose M. Torno

Isabela State University, Cabagan, Isabela, Philippines

Author email: gerinatorno79@gmail.com

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Abstract. This study aimed to enhance disaster relief operations in Tuguegarao City by proposing a more efficient management system framework. Utilizing interviews and thematic analysis, researchers in 2017 identified problems in emergency management, such as inadequate equipment, budget constraints, and issues with relief distribution. The study highlighted confusion and political bias in relief operations, leading to mistrust in the local government. In response, the researchers developed a community-based Disaster Relief Management System (CBDRMS) framework, inspired by Foucault's power/knowledge analytics. This framework emphasizes transparency, communication, and good relationships among LGUs, NGOs, and recipients. The proposed online system includes a portal and a Facebook Page for data storage and communication, aiming to empower stakeholders and foster discourse for effective disaster relief management. The researchers believe that this approach can overcome barriers, leading to development and improved disaster response.

Keywords: Disaster relief; Management system.

1.0 Introduction

Proper relief management has consistently posed challenges during calamities and typhoons. In 2017, researchers from Tuguegarao City conducted a case study on emergency management in the most affected barangays during Typhoon Lawin's onslaught. The study revealed an inadequacy of information dissemination about the typhoon contingency plan before its landfall. During the study, the Barangay Disaster Risk Reduction Management Councils (BDRRMCs) identified issues such as insufficient equipment and facilities, budgetary constraints, and poor implementation of the Barangay Disaster Risk Reduction Management Plan (Maguidad et al., 2017).

Interviews conducted during the study exposed confusion and misconceptions in relief operation distribution. Respondents reported a lack of awareness regarding the distribution procedures and alleged political bias favouring registered voters in relief prioritization. Limited funding prevented the BDRRMC from fully meeting the recipients' needs at the barangay level.

With this, the researcher assumes that the mismanagement of relief operations in some Tuguegarao City barangays might led to distrust in the local government, particularly in the "Palakasan System" among barangay captains. In addition, Maguidad and colleagues' 2017 study underscores the urgency of an effective relief management system in the Philippines.

Tuguegarao City is among the most vulnerable areas in the Cagayan Valley Region during the wet season, ranking among the ten most at-risk globally (Gannaban et al., 2018). The city's geography, acting as a flood-

prone catch basin, affects residents, particularly farmers and those living near riverbanks, with annual flash floods.

Given this data, Maguidad et al.'s 2017 recommendation gains relevance. Their study emphasizes the need for Tuguegarao City to establish a robust barangay-based disaster risk reduction management program and contingency plan. Furthermore, barangays should adopt a disaster management system and intensify information dissemination efforts.

Building on this recommendation, the researcher developed a community-based Disaster Relief Management System (CBDRMS) framework. Inspired by Foucault's power/knowledge analytics, this conceptual framework advocates transparency, good relationships, and communication among LGUs, NGOs, and recipients in Tuguegarao City. The proposed online system layout includes a portal and a Facebook Page, serving as a data bank and communication medium for disaster relief management. Cornerstone (2010) suggests that organizations utilize a tracking database to maintain relationships with donors, supporting the CBDRMS framework's emphasis on effective communication and transparency.

2.0 Methodology

2.1 Research Design

The researcher in this study employed a qualitative approach, which extensively explores people's beliefs, experiences, characteristics, behavior, and connections. This approach values participants' voices, allowing them to share their stories and personal experiences (Pathak et al., 2013). Qualitative methods encompass interviews, document analysis, texts, and the researcher's reactions and impressions. Qualitative researchers conduct interviews to gather in-depth insights from participants. Through open-ended questions and probes, researchers can explore participants' perspectives, experiences, and emotions related to a particular topic. Meanwhile, document analysis helps researchers uncover patterns, themes, and discourse embedded within the texts, providing valuable context into the research topic. Furthermore, qualitative research acknowledges the role of the researcher in shaping the research process and outcomes. Researchers reflect on their own biases, assumptions, and experiences that may influence data collection, analysis, and interpretation (Denzin & Lincoln, 2018).

2.2 Research Participants

The participants in this study consist of representatives from Tuguegarao City's Local Government Units (LGUs), Non-Governmental Organizations (NGOs), and private companies. Specifically, the researcher interviewed four participants from the LGUs to gather valuable insights. Additionally, the researcher conducted interviews with the five most active private organizations in Tuguegarao City involved in volunteering and relief operations.

2.3 Research Instrument

During one-on-one interviews, the researcher employed interview guide questions and utilized a phone to present various research instruments in PowerPoint format. This approach aimed to assist participants in visualizing the concept of the proposed Community-based disaster relief management system. The presentation included images depicting the layout of the designed Tuguegarao Relief Operations Facebook Page, the layout of the Tuguegarao Relief Operations Center Portal, and the developed system framework for the disaster relief management system in Tuguegarao City.

2.4 Data Gathering Procedure

To collect essential data, the researcher initiated several steps. Beginning with courtesy letters sent to the City Mayor and barangay captains for interview requests, subsequent courtesy visits were conducted to introduce the researcher and outline the research objectives. Interview schedules were then coordinated with the participants. Invitation letters, including the research objectives and title, were sent, with additional communication with key connections for efficiency. Before posing guide questions, a practical explanation of the proposed Community-based disaster relief management system was provided using PowerPoint to visualize key elements. The researcher also assessed recipients' comments on Tuguegarao City's community and government Facebook pages, suggesting widespread dissatisfaction with past relief operations and reinforcing

the need for an enhanced relief management system. Throughout the process, ethical considerations were observed during data analysis to maintain participant privacy.

2.5 Data Analysis Procedure

The data collected was analyzed thematically.

3.0 Results and Discussion

3.1 Power Forms Knowledge

The proposed Community-Based Disaster Relief Management System (CBDRMS) Portal and Facebook Page are perceived by the researcher as crucial tools for knowledge enhancement among Local Government Units (LGUs), Non-Governmental Organizations (NGOs), and recipients. This belief stems from the anticipated positive impacts of improving existing knowledge and gradually transforming negative perceptions. The CBDRMS portal, serving as a comprehensive data bank, allows Tuguegarao City barangays to easily prioritize and map recipients based on their needs. The system enables monitoring of donor assistance, required quantities, and types of relief needed. Similarly, the CBDRMS Facebook Page informs recipients about distribution details, including venues, schedules, and specific beneficiary categories.

The researcher posits that the CBDRMS has the potential to enhance the existing knowledge of key persons in barangays, a proposition supported by the Validation of Existing Knowledge Theory (Sus & Drew, 2023). As validated knowledge increases, negative perceptions toward specific groups or individuals are anticipated to decrease. The Conceptual Framework and Concepts of this Study propose that the CBDRMS portal facilitates immediate discourse between LGUs and donors to address concerns. Drawing on Michel Foucault's Theory, discourse through the CBDRMS portal is seen as a means to promote transparency, communication, and good relationships among the LGUs, NGOs, and Recipients.

Anticipating a gradual change in key players' thinking, the researcher suggests that the CBDRMS can illuminate the reasons behind the distribution quantities and priorities. Acknowledging the influential role of those in power, the researcher underscores the potential for LGUs, NGOs, and recipients to positively exercise their influence through the proposed Community-Based Disaster Relief Management System. This approach recognizes that even individuals not in formal positions can exert a significant impact, as exemplified by the considerable influence of netizens on social media platforms (Indeed, 2022).

3.2 Knowledge Forms Discourse

As individuals acquire more knowledge, their desire for a deeper understanding increases (Brunner, 2019). The researcher posits that one positive impact of the proposed Community-Based Disaster Relief Management System (CBDRMS) is its potential to gradually shift negative perspectives among key individuals actively engaged in community initiatives. This group, often exposed to crucial information, includes politicians who play a vital role in addressing current trends and issues (Bene et.al., 2023). Considering this, the researcher explores common issues experienced during relief operations in Tuguegarao City and evaluates the CBDRMS's role in facilitating discussions on these issues.

Several issues contribute to redundancy among recipients during relief operations in Tuguegarao City. LGU (A) highlights the misconception that relief goods are an entitlement, not a privilege, leading to duplication. It is important according to her to clarify that relief goods are intended per household, not per family unit in the same residence whereas, LGU (B) points out redundancy caused by residents getting married and residing in different barangays, returning to their original barangay during relief operations to receive additional aid. In discussions with representatives from the LGU and private organizations, a recurring theme emerged regarding the presence of the "Palakasan or Kamag-anak System" during relief operations. LGU (C) attributes redundancy to the "Palakasan or Kamag-anak system," where personal connections lead to individuals not on the priority list receiving aid. LGU (D) acknowledges the same system and selectively includes family members based on their financial situation. Private organizations also recognize redundancy, citing issues with data gathering and the prevalence of politics at the grassroots level.

Conversely, the head of Organization 3 claimed not to have experienced redundancy, attributing their success to a well-defined strategy. In contrast, the representative of Organization 4 asserted the presence of redundancy due to the absence of a "stub system" in some barangays, with certain barangay captains prioritizing individuals present during relief operations over the actual list of intended recipients.

Significantly, on Community and Government Facebook Pages, recipients openly express their dissatisfaction with exclusion from relief operations. Comments range from complaints about unequal distribution to claims of relief goods not reaching certain municipalities like Solana and Enrile. Phrases like "Sana all" (I hope all) are recurrent, underscoring the desire for fair distribution.

The narratives from research participants and recipient comments on social media reveal several issues during relief operations, aligning with findings from a De La Salle University student research (Abalos et al., 2014). Discrepancies in relief goods accountability, delivery, allocation, and prioritization of high-risk areas were identified due to the manual nature of the municipality's relief management process. This observation suggests a systemic problem during data gathering, susceptible to manipulation, as acknowledged by LGU (A), who lamented the presence of "dishonest people" in the broader Filipino context.

Addressing existing issues through the proposed Community-Based Disaster Relief Management System (CBDRMS) Portal can contribute to a clearer perception for all stakeholders involved in relief operations. Anticipated changes might include a shift from negative perceptions regarding the redundancy of recipients, the "Palakasan System," and the issue of "Binulsa ni Kapitan" towards more positive thinking.

The proposed community-based disaster relief management system was introduced with two channels: the portal and the Facebook page. The portal holds a pivotal role in facilitating updates and discussions among administrators (LGUs), donors (NGOs), and barangay health workers.

The Facebook Page administrators, to be represented by the City Mayor's Office (CMO) and Barangay Captains, can gain quick access to records of all affected barangays in Tuguegarao City, enabling them to identify areas in urgent need of assistance. They can monitor donor trends, identify organizations involved, and track which barangays have yet to receive relief operations. This can probably empower LGUs to anticipate additional support requirements and foster open communication with donors and barangay captains.

Barangay Captains, utilizing the portal, can gain insights into prioritized zones needing immediate response and become aware of the City Mayor's office support particularly the technical office efforts such as the City Disaster Risk Reduction Management Office and the City Social Welfare and Development Office (CSWD). Barangay Captains can also identify instances of the "Palakasan or Kamag-anak system" among barangay health workers, promoting direct and transparent discussions to address issues.

Barangay health workers, who also help with profiling at the barangay level if there are no social workers available in barangays, will play a crucial role by updating records, ensuring an accurate representation of each family head, and listing profiles in their barangay records. They are responsible for verifying which families have received assistance to avoid redundancy during relief operations. Through the portal, health workers can also track the number of recipients in a specific zone, identify potential corruption, and verify household information during profiling.

Donors, as first responders, can rely on the records provided by each barangay through the portal. They register on the portal, review which barangays still require assistance, and input their relief operation schedules. The portal's checks and balances system can help maintain transparency, detect duplicate names, categorize barangay priorities, and identify high-risk areas, preventing rumors and fostering trust among recipients and donors.

The participants complimented the researcher's idea of integrating a Facebook Page into the community-based disaster relief management system. According to them, the Tuguegarao Relief Operations Center Facebook Page will serve as a platform for relief operation updates, concerns, and announcements. Families not yet served will

be given stubs based on the schedule posted on the Facebook page, ensuring an organized and transparent distribution process. The Facebook page will also facilitate interaction with netizens, providing a space for opinions, and reactions, and addressing concerns from residents.

3.3 Discourse Produces Power

Embedded in Foucault's philosophy, which posits that power is ubiquitous and dispersed within society, the conceptualization of the Community-Based Disaster Relief Management System (CBDRMS) aims to introduce a potent relief operations strategy. This system assists donors and Local Government Units (LGUs) in identifying the most affected families, determining precise recipient numbers for each barangay, providing immediate access to donors, and facilitating communication between the mayor, donors, and barangay captains. Consequently, it becomes a productive force in society.

The LGU (A) representative acknowledges the benefits of the proposed CBDRMS, emphasizing its capacity to swiftly identify barangays in need and those yet to receive relief operations. LGU (A) notes that such a system is advantageous as it can guide donors on where to conduct relief operations, enhancing transparency and building trust in the government. This centralized system likewise has the potential to streamline the donation process, promote accountability, and ensure that effective assistance reaches those in need, fostering donor confidence in making a meaningful impact. Meanwhile, when queried about their impressions of the CBDRMS functions, both the representatives of LGU (B) and LGU (C) expressed positive sentiments. LGU (B) lauds the design, emphasizing its significance for large barangays with multiple zones. He envisions increased organization, especially in their barangay with eight zones, and expresses enthusiasm about adopting the system once available in the city. Meanwhile, LGU (C) appreciates the fixed data provided by the proposed design and the immediate communication with donors. He highlights the system's capability to dispel doubts of mismanagement, such as the common accusation of "Binulsa ni Kapitan."

Private organizations, acting as first responders during relief operations, express positive perspectives on the proposed Community-Based Disaster Relief Management System (CBDRMS). A representative from Organization 4 highlights the system's benefits, serving as a valuable support system by ensuring quick outreach to barangays (accessibility) and maintaining consistency in providing the correct number and type of donations based on community needs (convenience). Furthermore, the representative of Organization 2 commends the researcher's proposal, considering it innovative and commendable, especially given Tuguegarao City's digitization efforts to become a smart city. Organizations 1 and 3 also anticipate that the CBDRMS will contribute to an organized list, serving as a data bank for all stakeholders.

Discussions with participants underscore the significance of the system design, emphasizing communication among LGUs, donors, and recipients through the portal and a Facebook Page (discourse). This approach ensures equal opportunities for all groups to voice their opinions, discuss issues, and take collective action.

The LGU (A) underscores the pivotal role of portal data in decision-making during calamities, emphasizing the importance of accuracy and reliability. Despite hands-on visits to barangays during disasters, LGU (A) acknowledges the value of combining portal data with on-the-ground assessments for a comprehensive understanding of the real situations in the grassroots communities. Regarding Facebook's role in information dissemination and feedback, LGU (A) sees it as a valuable tool for community communication and engagement. Employing a multi-faceted approach that incorporates data from the portal, on-site assessments, and community feedback through platforms like Facebook can enhance decision-making and boost relief operation efficiency during calamities. On the other hand, LGU (B) underscores the importance of discourse in the proposed CBDRMS, emphasizing its value for direct communication with donors. This direct interaction enables strategic distribution planning, preventing aid deficiencies—an ongoing concern among recipients. He sees the system as beneficial, particularly in cases where the barangay health worker cannot conduct house-to-house visits due to the large population. The Facebook Page's active monitoring aids in responding promptly to comments from netizens.

LGU (C) acknowledges the communication platform's potential to provide an equal chance to most barangays. Hence, it can likely eliminate the practice of prioritization based on alliances. He emphasizes the need to discuss and evaluate which barangays should be prioritized, upholding transparency and fairness. The Facebook Page, according to him, serves as a platform for suggestions, recommendations, and a call to action for both recipients and barangay officials. Conversely, the LGU (D) appreciates the system's transparency and validation capabilities, highlighting the importance of sharing their side amid challenges faced during profiling. She believes the CDRMS provides a platform for them to be heard and understood, addressing complaints from individuals not included in relief operations. Lastly, Private organizations find value in Facebook discourse for evaluation, recognizing the power of netizens' comments in reflecting community situations. Their insights emphasize the impact of feedback from different perspectives, often unheard or excluded from public discourse.

Overall, participants emphasize the transformative potential of the CDRMS in promoting open communication among LGUs, donors, and recipients. By addressing issues such as redundancy and the "clientele system," the proposed system aims to reform Tuguegarao City's current disaster relief management, catalyzing social change and community empowerment.

3.4 Viability of the Proposed CDRMS in Tuguegarao City

The Local Government Units (LGUs) and Private Organizations in Tuguegarao City express their willingness to embrace the proposed Community-Based Disaster Relief Management System (CDRMS). Recognizing the limitations of the current disaster relief management in some barangays, both LGUs and NGOs see the CDRMS as a powerful tool to address these shortcomings.

According to LGUs and NGOs, implementing the CDRMS can substantially enhance the city's disaster relief management capabilities, enabling more effective responses to emergencies and disasters impacting Tuguegarao City's barangays. The proposed system is viewed as a means to save lives, alleviate suffering, and enhance overall disaster resilience within the community.

Tuguegarao City Mayor acknowledges the existing database maintained by the Department of Social Welfare and Development but emphasizes the researcher's proposed CDRMS as a community-based alternative. Noting the variation in Internal Revenue Allotment (IRA) among barangays, she expresses her readiness to seek a supplemental budget and issue an Executive Order Ordinance to support the implementation of the CDRMS. This commitment highlights the city's dedication to adopting a more community-centric and effective disaster relief management approach.

3.5 The Possible Challenges that the LGUs and NGOs can meet in the Execution of this Relief Management Design

The Internal Revenue Allotment (IRA) is the annual share of local governments out of the proceeds from national internal revenue taxes. It is estimated at forty percent (40%) of the actual collections of national internal revenue taxes during the third fiscal year preceding the current year, as certified by the Bureau of Internal Revenue (BIR). If the barangay has a population of at least 100, the share should be at least P80,000 annually. The amount shall be chargeable against the 20% share of the barangays. This only means that the bigger the population of a barangay is, the more likely its IRA is higher. In Tuguegarao City, not all barangays have a big Internal Revenue Allotment (IRA). This means that not all barangays can have their own Information Technology Officer. The City Mayor said they would depend on how much the IT developers would offer the CDRMS. Suppose the cost of the developed system is excellent and amenable. In that case, the City Mayor is willing to ask for a supplemental budget and make an Executive Order Ordinance for the proposed Community-Based Disaster Relief Management System.

4.0 Conclusion

In Tuguegarao City, grappling with recurring flooding, especially during typhoons, has prompted relief operations by the city government. Despite these efforts, issues persist due to poor disaster relief management systems in some barangays, leading to problems like redundancy of recipients and the Palakasan System. Recognizing the need for improved communication and knowledge sharing among key players, the researcher developed a Community-Based Disaster Relief Management System (CDRMS). Informed by Michel Foucault's

Power/Knowledge Analytic, the CBRMS fosters discourse among Local Government Units (LGUs), Non-Governmental Organizations (NGOs), and recipients. Through interviews and a literature review, the study identifies the presence of the Palakasan System and asserts that the CBRMS can empower stakeholders, reform relief operations, and create a more efficient system in Tuguegarao City. The LGUs and private organizations express eagerness to adopt the proposed system, envisioning it as a powerful strategy to enhance disaster relief operations. Despite potential challenges, the City Mayor is optimistic about implementing the CBRMS with a supplemental budget and executive order, highlighting its viability. The study concludes that Foucault's concept of power/knowledge aligns with the idea that power forms knowledge, emphasizing the interconnectedness of power, knowledge, discourse, and societal productivity.

5.0 Contributions of Authors

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The Persuasive Appeal of Provider-Patient Interaction in the Acceptance of COVID-19 Vaccine at a Health Service Unit in Isabela

Maria Angelyne G. Suayan

Isabela State University – Cabagan Campus, Cabagan, Isabela, Philippines

Author email: angelsuayan@gmail.com

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Abstract. The study examined the persuasive appeal of provider-patient interactions in a health service unit in Isabela, focusing on vaccine acceptance. Using the Aristotle Rhetoric triangle framework, it analyzed the effectiveness of Logos, Pathos, and Ethos in influencing vaccine acceptance across different demographic groups. A mixed-methods descriptive design was employed, with quantitative data collected through surveys and qualitative data through focus interviews. The findings indicate that vaccine acceptance and hesitancy are complex and influenced by various factors including age and education. While healthcare providers effectively employ persuasive appeals, they may not significantly influence vaccine acceptance across different groups. Post-rollout opinions on the vaccine correlate with pre-rollout health beliefs, highlighting the importance of ongoing outreach and education efforts. Tailored communication strategies are crucial, addressing concerns among younger age groups and ensuring continuous training for healthcare providers. Additionally, factors beyond provider-patient interaction should be considered, including community engagement programs and long-term follow-up studies. Implementing these recommendations can effectively address vaccine hesitancy and promote widespread acceptance of the COVID-19 vaccine.

Keywords: Provider-patient interaction; Vaccine acceptance; Persuasive appeal; COVID-19 vaccine; Isabela healthcare.

1.0 Introduction

COVID-19 has had a significant impact on individuals worldwide, particularly healthcare workers who have been at the forefront of the pandemic response. Despite the rapid development of vaccines within a year of the virus's emergence, skepticism regarding their efficacy and safety persists among some populations.

With an initial target of vaccinating 70% of the population by the end of 2021, the Philippines commenced its mass vaccination campaign in February 2021. By the close of 2021, significant progress had been made, with over 70% of the population receiving at least one dose of the vaccine, according to data from the Department of Health Philippines. The Rural Health Unit (RHU) of Cabagan initiated its COVID-19 immunization program in March 2021 to vaccinate 70% of the local population. However, the program encountered challenges, including limited vaccine supply and community hesitancy.

Even before the availability of COVID-19 vaccines, social media platforms facilitated the spread of misinformation regarding vaccines, influencing public perception and acceptance negatively (Hammad, 2023). Vaccine hesitancy stems from various factors, including concerns about long-term side effects, mistrust in

vaccine development and distribution processes, and religious beliefs. Additionally, communication gaps between healthcare providers and patients exacerbate vaccine hesitancy, highlighting the importance of effective patient-provider interactions (Razai et al., 2021b). Effective communication during medical encounters is paramount for building trust and ensuring patient understanding (Ratna, 2019). Physicians must employ clear and empathetic communication strategies to address patient concerns and promote vaccine acceptance (Johnson et al., 2020).

Provider-patient interaction encompasses the exchange of health information and services between healthcare providers and patients (Murphy, n.d.). Studies emphasize the significance of physician-patient communication in influencing patient outcomes and satisfaction (Johnson, 2019). Providers who prioritize patient-centered care and tailor their communication to address patient concerns are more likely to persuade patients to accept vaccination (Cannity, 2023).

This study seeks to investigate the persuasive appeal of provider-patient interactions in COVID-19 vaccine acceptance. By examining patients' perceptions of provider communication and their decision-making regarding vaccination, this research aims to contribute to the understanding of effective health communication strategies. While rhetorical strategies have been extensively studied in other domains, such as advertising and politics, their application in healthcare communication remains understudied. This study posits that leveraging components of persuasion, including credibility, emotional appeal, and logical reasoning, can enhance vaccine acceptance rates. By elucidating the influence of provider-patient interactions on COVID-19 vaccine acceptance, this study endeavors to inform strategies aimed at improving vaccination uptake. Understanding the role of communication in shaping health behaviors is crucial for promoting public health initiatives, particularly during global health crises like the COVID-19 pandemic.

2.0 Methodology

2.1 Research Design

The mixed-method descriptive research design was utilized in this study. The quantitative research method, specifically the survey, served as the primary tool for gathering responses concerning respondents' socio-demographic characteristics and their level of agreement on the persuasive appeal of their interaction with providers. Focused interviews were also conducted with a subset of respondents to delve deeper into their responses to the survey questionnaire. This served as a form of triangulation, providing an in-depth understanding of their experiences regarding their interaction with providers and how it may have influenced their decision to accept, become hesitant, or decline the COVID-19 vaccine during its initial rollout.

2.2 Research Participants

Purposive sampling was employed to select 90 respondents from the categories of acceptors, hesitant, and decliners. An adequate sample size for each group was determined from the list of patients who registered at the Rural Health Unit of Cabagan, Isabela, for the first rollout of the COVID-19 vaccine in 2021, as well as from the list of residents in Cabagan, Isabela, who were personally visited by barangay health workers to encourage vaccination during the same period. Respondents were selected from barangays categorized as urban, highway, and riverside. Acceptors were defined as individuals who registered and received the vaccine on their scheduled appointment. Hesitant were identified as those who initially registered but chose not to accept the vaccine on the first scheduled date, later returning to the RHU Cabagan after deciding to receive the vaccine. Decliners were chosen from the list of eligible residents who had interactions with barangay health workers regarding the COVID-19 vaccine but ultimately decided not to accept or receive the vaccine.

2.3 Research Instrument

A structured questionnaire was developed to collect data for the study regarding the persuasive appeal of the provider-patient interaction during the first rollout of the COVID-19 vaccine. The questionnaire is divided into two main parts. The first part of the questionnaire gathered information on the socio-demographic characteristics of the respondents. The second part is designed to assess the level of agreement regarding the persuasive appeal of the provider's interaction with the patients. The statements in this part measured the respondents' agreement on the logical argument presented on COVID-19 by the provider, the emotional connection of the provider with the patient, and the credibility or character of the provider as they interacted

with the respondents. Before full implementation, the questionnaire underwent a pretest to ensure clarity, relevance, and effectiveness. Adjustments were made based on the results of the pretest. Additionally, guide questions were prepared for probing purposes during the interviews.

2.4 Data Gathering Procedure

Before commencing the study, a formal letter requesting permission for the researcher to conduct the study at the identified municipality's rural health clinic was personally delivered to the Municipal Health Officer (MHO) and barangay officials. Upon approval of the request, the researcher also sought a copy of the list of patients who registered during the first rollout of the COVID-19 vaccine from March 2021 to December 2021. Additionally, the list of residents who were visited by barangay health workers was secured. A pre-tested structured questionnaire was utilized to gather data from the selected respondents. Their consent to participate was solicited through an Informed Consent Form, indicating their voluntary participation.

2.5 Data Analysis Procedure

Both descriptive and inferential statistics were employed in analyzing the data. Frequency counts and percentages were utilized to present the socio-demographic profile of the respondents. Appropriate statistical tools were then applied to analyze the relationships between socio-demographic characteristics and the level of agreement on the persuasive appeal of the provider-patient interaction. Specifically, the Chi-Square Test was employed to identify any significant differences in the level of agreement among the acceptors, hesitants, and decliners. This test was also used to determine if a relationship exists between the patient's socio-demographic characteristics and their level of agreement in the persuasive appeal of their interaction with the providers. Moreover, the Chi-Square Test was utilized to ascertain if there was a shift in the health beliefs of the respondents regarding the COVID-19 vaccine after their interaction with the providers. The Chi-Square Test is suitable for determining whether or not there is a significant association between two categorical variables, making it a suitable statistical test for this study.

3.0 Results and Discussion

3.1 Socio-Demographic Characteristics of Respondents

Table 1 displays the distribution of respondents based on their age, gender, marital status, educational attainment, and monthly income. The characteristics of acceptors, hesitants, and decliners reveal both distinct patterns and similarities. Decliners tend to be predominantly between the ages of 48 and 57, hesitants between 18 and 27, and acceptors between 28 and 37. Gender distribution among the three groups is balanced, with approximately equal numbers of males and females. Marital status among decliners and hesitants is evenly split between single and married, whereas acceptors show a balance of single and married individuals. Similar observations, Marzo et al., (2022) revealed that several socio-demographic factors, including age, residential area, education level, family economic status, employment status, and country of residence, are associated with hesitancy in COVID-19 vaccine uptake. It also demonstrates that older populations are more likely than younger populations to express reservations about receiving vaccines.

In terms of educational attainment, most acceptors have completed high school (53.33%), with significant portions also having attained high school level (23.33%) and college level (6.67%). Hesitants are characterized by a higher presence in higher educational levels, with 50.00% having attained college level and 30.00% being college graduates, indicating a higher level of education compared to acceptors. Conversely, decliners' educational distribution is diverse, with notable concentrations in elementary level (23.33%) and high school graduate (23.33%) categories. The data suggests a relationship between educational backgrounds and group preferences, with acceptors displaying a broader range of educational levels, hesitants leaning towards higher education, and decliners exhibiting a more diverse distribution. In some studies, the level of education was also identified related to reluctance to use COVID-19 according to Marzo (2022). Notably, Lee and You (2022) discovered that college students were more likely to be vaccine-hesitant.

Distinct patterns also emerge in the monthly income distribution among the three groups. Acceptors most commonly fall within the 3,000-8,698 income bracket (16.67%), while a significant portion (43.33%) prefer not to disclose their income. Hesitants show reluctance to share income details, with 50.00% opting not to disclose. Among them, a significant number fall within the 3,000-8,698 income bracket (26.67%). Decliners exhibit the

highest preference for privacy, with 76.67% choosing not to disclose their income. Overall, respondents across all groups emphasize the sensitivity of financial information in the context of vaccine decision-making by choosing "prefer not to say."

The diversity revealed in demographic aspects underscores the complexity of vaccine acceptance dynamics, highlighting the need for customized communication approaches considering factors like age, education, and individual preferences within healthcare settings. Recognizing the unique characteristics within each group is crucial for healthcare providers to devise effective communication strategies during patient interactions in the service unit of Isabela.

Table 1. Socio-demographic characteristics of the respondents

Demographic Profile	Acceptors (n=30)		Hesitants (n=30)		Decliners (n=30)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Age						
18-27	9	30.00%	14	46.67%	4	13.33%
28-37	13	43.33%	7	23.33%	5	16.67%
38-47	3	10.00%	3	10.00%	5	16.67%
48-57	3	10.00%	2	6.67%	9	30.00%
58-67	2	6.67%	1	3.33%	5	16.67%
68-77	-	-	2	6.67%	1	3.33%
78-87	-	-	1	3.33%	1	3.33%
Sex						
Male	13	43.33%	13	43.33%	15	50.00%
Female	17	56.67%	17	56.67%	15	50.00%
Marital Status						
Single	15	50.00%	16	53.33%	12	40.00%
Married	15	50.00%	13	43.33%	17	56.67%
Widowed	-	-	1	3.33%	1	3.33%
Educational Attainment						
Elementary Level	1	3.33%	1	3.33%	7	23.33%
Elementary Graduate	4	13.33%	1	3.33%	4	13.33%
High school level	7	23.33%	1	3.33%	6	20.00%
High School Graduate	16	53.33%	2	6.67%	7	23.33%
College Level	2	6.67%	15	50.00%	4	13.33%
College Graduate	-	-	9	30.00%	2	6.67%
Master's Graduate	-	-	1	3.33%	-	-
Monthly Income						
3,000-8,698	5	16.67%	8	26.67%	1	3.33%
8,699-14,397	5	16.67%	2	6.67%	1	3.33%
14,398-20,096	2	6.67%	2	6.67%	3	10.00%
20,097-25,795	1	3.33%	1	3.33%	-	-
31,495-37,193	3	10.00%	2	6.67%	1	3.33%
37,194-42,892	1	3.33%	-	-	1	3.33%
Prefer not to say	13	43.33%	15	50.00%	23	76.67%

3.2 Level of Agreement of The Respondents Towards the Persuasive Appeal of Providers Presentation of Logical Argument (LOGOS)

The respondents consistently express strong agreement regarding the allocation of adequate time by healthcare providers to explain the COVID-19 vaccine. This is reflected in consistently high levels of agreement and strong agreement across various indicators, underscoring the effectiveness of the communication strategies employed by the providers. Furthermore, the provider consistently cited enough evidence to support conclusions about the effectiveness of the COVID-19 vaccine, as evidenced by weighted scores of 4.40 from acceptors, 4.00 from hesitants, and 4.07 from decliners. The provider also presented clear and logical arguments supported by evidence and facts, such as statistical data and scientific research, earning high scores from all categories (4.37, 4.00, and 4.12 respectively).

Table 2 illustrates that the provider utilizes clear, concise, and easy-to-understand language during interaction. Scores for this aspect range from 4.63 to 4.37, indicating strong agreement across all groups – acceptors, hesitants, and decliners alike. This suggests that the communication style effectively conveyed information about the COVID-19 vaccine to a diverse audience. The provider received positive feedback regarding the description of information on the COVID-19 vaccine, its benefits, and potential hazards. Predominantly,

respondents strongly agreed with acceptors giving a score of 4.57, hesitants 4.17, and decliners 4.03. This indicates that the information provided by the provider was comprehensive and addressed patient concerns related to the vaccine's impact on health.

Furthermore, the provider's communication about the testing and safety of the COVID-19 vaccine was well-received across all groups, with scores ranging from 4.43 to 4.24. This suggests that information about the vaccine's safety and efficacy was effectively communicated, irrespective of the initial stance on vaccination. Moreover, the provider effectively emphasized the importance of vaccination as the best way to protect oneself and others from COVID-19. Scores for this aspect ranged from 4.20 to 4.14, indicating agreement from all respondents. Additionally, the provider's emphasis on the safety and effectiveness of the vaccine, the importance of herd immunity, and the collective responsibility to stop the spread of COVID-19 received high scores. Strongly agree scores across the board (4.57, 4.20, 4.50, and 4.42) suggest that the provider effectively conveyed the broader societal implications of vaccination.

The provider consistently received high scores in terms of time allocation, ranging from 4.40 to 4.28. This indicates that sufficient time was allotted to explain the COVID-19 vaccine to individuals in all three categories, contributing to a comprehensive understanding of the topic. Additionally, it was found that respondents often base their trust on a logical assessment of the qualifications and skills of healthcare workers. Follow-up questions revealed that most answers were consistent and strongly agreed. Patients acknowledged that providers, whether doctors or midwives, are well-informed due to their professional background, education, and specialization in science and health. One patient stated, "They studied medicine, so they know that the vaccine is safe." Moreover, knowing that the provider was among the first batch to receive the vaccine also provided reassurance of safety. The emphasis on healthcare providers undergoing training and orientation, especially in the context of COVID-19, reflects a logical basis for patients to trust the provider, as it implies a commitment to staying informed and competent.

Table 2. Respondents' level of agreement on the persuasive appeal (logos) of the providers based on the presentation of the logical arguments for covid-19 vaccine

Presentation of the logical argument (LOGOS)	ACCEPTORS		HESITANTS		DECLINERS		OVERALL	
	Weighted Score	Verbal Description	Weighted Score	Verbal Description	Weighted Score	Verbal Description	Weighted Score	Verbal Description
The provider cited enough evidence to support the conclusion about the effectiveness of COVID19 vaccine.	4.40	Strongly Agree	4.00	Agree	4.07	Agree	4.16	Agree
The provider provided a clear and logical arguments that are supported by evidence and facts, such as presenting statistical data, scientific research, or other forms of evidence that support the argument on the efficacy of COVID 19 vaccine.	4.37	Strongly Agree	4.00	Agree	4.00	Agree	4.12	Agree
The provider used words that are clear, concise, and easy to understand.	4.63	Strongly Agree	4.23	Strongly Agree	4.23	Strongly Agree	4.37	Strongly Agree
The provider described the information on COVID19 vaccine, its benefits and hazards which may harm my health.	4.57	Strongly Agree	4.17	Agree	4.03	Agree	4.26	Strongly Agree
The provider discussed to me that the vaccine has been rigorously tested and shown to be safe and effective in preventing COVID-19.	4.43	Strongly Agree	4.20	Strongly Agree	4.10	Agree	4.24	Strongly Agree
The provider carefully explained to me that getting vaccinated is the best way to protect oneself and others from COVID-19.	4.20	Strongly Agree	4.17	Agree	4.07	Agree	4.14	Agree
The provider emphasized the safety and effectiveness of the vaccine, the importance of herd immunity, and the collective responsibility to stop the spread of COVID-19.	4.57	Strongly Agree	4.20	Strongly Agree	4.50	Strongly Agree	4.42	Strongly Agree
Enough time was allotted by the provider to explain the COVID19 vaccine.	4.40	Strongly Agree	4.20	Strongly Agree	4.23	Strongly Agree	4.28	Strongly Agree

3.3 Emotional Connection of the Provider with the Patient (PATHOS)

Table 3. Respondents' level of agreement on the persuasive appeal of the providers based on the emotional connection of the provider with the patient

Emotional connection of the provider with the patient (PATHOS)	ACCEPTORS		HESITANTS		DECLINERS		OVERALL	
	Weighted Score	Verbal Description	Weighted Score	Verbal Description	Weighted Score	Verbal Description	Weighted Score	Verbal Description
The provider maintained eye contact with me	4.30	Strongly Agree	4.10	Agree	4.53	Strongly Agree	4.31	Strongly Agree
The provider listened actively to me and exhibit good communication counseling skills	4.47	Strongly Agree	4.13	Agree	4.43	Strongly Agree	4.34	Strongly Agree
The provider use appropriate language in talking to me	4.63	Strongly Agree	4.27	Strongly Agree	4.47	Strongly Agree	4.46	Strongly Agree
The provider encourages my participation in the interaction	4.53	Strongly Agree	4.07	Agree	4.27	Strongly Agree	4.29	Strongly Agree
The provider shows an interest in me as a person	4.37	Strongly Agree	4.10	Agree	4.23	Strongly Agree	4.23	Strongly Agree
The provider assures me of confidentiality	4.60	Strongly Agree	4.20	Strongly Agree	4.30	Strongly Agree	4.37	Strongly Agree
Provider treats me with dignity and respect	4.50	Strongly Agree	4.33	Strongly Agree	4.40	Strongly Agree	4.41	Strongly Agree
The provider listened to me actively when I shared my opinions about the vaccine.	4.53	Strongly Agree	4.20	Strongly Agree	4.50	Strongly Agree	4.41	Strongly Agree
The provider allowed me to complete my responses	4.53	Strongly Agree	4.20	Strongly Agree	4.37	Strongly Agree	4.37	Strongly Agree
The provider spoke respectfully to me when I had a different opinion and perspective on COVID 19 vaccine.	4.53	Strongly Agree	4.27	Strongly Agree	4.33	Strongly Agree	4.38	Strongly Agree

Table 3 illustrates the level of agreement regarding the persuasive appeal of healthcare providers based on the emotional connection established during interactions, which is overwhelmingly positive. The provider received high scores across all respondents, indicating a strong emotional connection with patients of various perspectives.

Maintaining eye contact was rated positively by all groups, with scores ranging from 4.30 to 4.53. This suggests that the provider effectively engaged with patients by establishing visual connections, creating a sense of trust and attentiveness. Furthermore, active listening and good communication counseling skills were highly valued by the respondents, with scores ranging from 4.34 to 4.47. This indicates that the provider demonstrated empathy and effective communication, fostering a positive emotional connection during interactions.

The use of appropriate language in communication also received strong agreement, ranging from 4.46 to 4.63. This suggests that the provider's language was respectful and considerate, contributing to a positive emotional experience for patients. Encouraging patient participation in interactions and showing genuine interest in patients as individuals were consistently rated highly, with scores ranging from 4.27 to 4.53. This indicates that the provider successfully engaged patients and made them feel valued during discussions.

Strong agreement was received in terms of assuring confidentiality and treating patients with dignity across all categories (4.30 to 4.60). This suggests that the provider prioritized patient privacy and treated individuals with dignity and respect, contributing to a positive emotional connection.

When patients shared their opinions about the vaccine, the provider actively listened and allowed them to complete their responses, earning strong agreement scores ranging from 4.37 to 4.53. This indicates that the provider created an open and supportive environment for patients to express their views. Even when patients had different opinions on the COVID-19 vaccine, the provider spoke respectfully, with scores ranging from 4.27 to 4.53. This suggests that the provider maintained a non-judgmental and respectful approach, fostering a positive emotional connection despite differing perspectives.

The emotional connection is crucial in the context of discussions about the COVID-19 vaccine, as it contributes to building trust and encouraging open communication. Some respondents expressed trust in their community's long-time midwife, emphasizing the personal relationship that develops over time. The feelings of security and safety arise from the healthcare providers' empathy, understanding, and assurance that their decisions are made with the patient's well-being in mind.

The provider demonstrated a strong emotional connection with patients by engaging in active listening, using appropriate language, encouraging participation, and treating individuals with dignity and respect, regardless of their initial stance on the COVID-19 vaccine. This finding holds valuable implications for healthcare professionals, emphasizing the importance of interpersonal skills in enhancing the persuasive appeal and positively influencing patient attitudes toward COVID-19 vaccination.

3.4 Credibility of the Provider

Table 4. Respondents' level of agreement on the persuasive appeal of the providers based on the credibility or character of the provider

Credibility or character of the provider (ETHOS)	ACCEPTORS		HESITANTS		DECLINERS		OVERALL	
	Weighted Score	Verbal Description	Weighted Score	Verbal Description	Weighted Score	Verbal Description	Weighted Score	Verbal Description
The healthcare provider led me to feel comfortable with information about COVID19 vaccine.	4.40	Strongly Agree	4.33	Strongly Agree	4.37	Strongly Agree	4.37	Strongly Agree
The healthcare provider was someone worth listening to.	4.37	Strongly Agree	4.20	Strongly Agree	4.17	Agree	4.24	Strongly Agree
The provider was well informed and genuinely interested in the topic.	4.43	Strongly Agree	4.13	Agree	4.30	Strongly Agree	4.29	Strongly Agree
The provider demonstrated familiarity with different opinions and perspective.	4.33	Strongly Agree	4.23	Strongly Agree	4.33	Strongly Agree	4.30	Strongly Agree
The provider provided a complete and accurate information about the information I wanted to know.	4.40	Strongly Agree	4.20	Strongly Agree	4.30	Strongly Agree	4.30	Strongly Agree
The provider clarified and summarized the information	4.30	Strongly Agree	4.30	Strongly Agree	4.27	Strongly Agree	4.29	Strongly Agree
The provider demonstrated good communication and counseling skills	4.33	Strongly Agree	4.20	Strongly Agree	4.23	Strongly Agree	4.26	Strongly Agree
The provider discussed with me the benefits of the vaccine.	4.43	Strongly Agree	4.20	Strongly Agree	4.20	Strongly Agree	4.28	Strongly Agree
Information about COVID19 vaccine had been discussed very well before I got vaccinated	4.40	Strongly Agree	4.33	Strongly Agree	4.50	Strongly Agree	4.41	Strongly Agree

In evaluating the credibility or character of the provider (ETHOS), the healthcare provider consistently received high scores across all categories, reflecting a strong sense of trustworthiness and credibility among patients with varying perspectives (see Table 4).

Patients across all categories strongly agreed that the healthcare provider made them feel comfortable with information about the COVID-19 vaccine, with scores ranging from 4.37 to 4.40. This suggests that the provider effectively reassured patients, fostering a sense of comfort. Moreover, the provider was perceived as someone worth listening to by all groups, with scores ranging from 4.20 to 4.37. This indicates that the healthcare provider's credibility and authority were recognized, contributing to a positive perception among patients.

Additionally, demonstrating well-informed and genuine interest in the topic, the provider received strong agreement scores across all categories, ranging from 4.13 to 4.43. This suggests that the healthcare provider's knowledge and enthusiasm positively influenced the perception of their credibility. Furthermore, the provider's familiarity with different opinions and perspectives was acknowledged by patients in all categories, with scores ranging from 4.23 to 4.33. This indicates that the provider was open-minded and receptive to diverse viewpoints, contributing to a positive perception of their character.

Patients strongly agreed that the provider provided complete and accurate information about the COVID-19 vaccine, with scores ranging from 4.20 to 4.40. This suggests that the healthcare provider was reliable in delivering comprehensive and precise information, enhancing their credibility. Moreover, clarifying and summarizing information received strong agreement scores across all categories, ranging from 4.27 to 4.30. This

indicates that the provider effectively communicated complex information, ensuring a clear understanding among patients.

Patients across all categories strongly agreed that the provider demonstrated good communication and counseling skills, with scores ranging from 4.20 to 4.33. This suggests that the healthcare provider effectively conveyed information and provided support during discussions about the COVID-19 vaccine. Additionally, discussing the benefits of the vaccine received strong agreement scores from all groups, ranging from 4.20 to 4.43. This indicates that the provider effectively communicated the positive aspects of vaccination, contributing to a positive perception among patients.

Furthermore, patients strongly agreed that information about the COVID-19 vaccine had been discussed well before they got vaccinated, with scores ranging from 4.33 to 4.50. This suggests that the provider ensured thorough communication and understanding of vaccine-related information before patients made decisions about vaccination.

The perceived credibility of healthcare professionals is a crucial factor in fostering positive attitudes and acceptance towards the COVID-19 vaccine. The findings suggest that the providers were not only well-informed but also skilled in communicating complex information clearly and reassuringly. This has significant implications for healthcare communication strategies, emphasizing the importance of building credibility and trust to enhance the overall persuasive appeal of information related to COVID-19 vaccination.

Credibility is established through the respondents' belief in the healthcare providers' professional commitment and ethical responsibility. Most of the patients interviewed acknowledged that providers study, specialize, and undergo assessments before vaccination, which contributes to their credibility. They perceive the providers as appropriate individuals for their roles, emphasizing a sense of trust built on the credibility of their education, expertise, and commitment to their profession.

As shown in Table 5, the overall positive responses to all three persuasive appeals (Logos, Pathos, Ethos) prove that the respondents are receptive to a variety of persuasive communication strategies by the providers related to the rollout of the COVID-19 vaccine. The absence of "Strongly Disagree" or low-rated responses suggests that respondents mostly support and agree with the provided appeals. Similar observations were also found in a study in Nepal, in which most of the patient find their consolation with the healthcare providers very satisfying and most doctors manage to gain the trust of their patients. Furthermore, the study revealed that all logical appeals, credibility and emotional appeals independently are proven to be effective in patient-doctor communication in a Nepali, hospital Duwadi (2019).

This implies that a combination of logical arguments, emotional appeals, and appeals to credibility are effective in influencing respondents' acceptance of COVID-19 vaccines. The findings can be a guide to communication strategies aiming to enhance vaccine acceptance by leveraging a diverse range of persuasive appeals tailored to the preferences and attitudes of the target audience.

Table 5. Summary of the level of agreement of the respondents towards the persuasive appeal of providers

Persuasive Appeal	Response Groups			Overall Average	Adjectival Rating
	Acceptors	Decliners	Hesitants		
Presentation of Logical Argument	4.45	4.15	4.15	4.25	Strongly Agree
Appeal to Pathos	4.50	4.38	4.19	4.36	Strongly Agree
Appeal to Ethos	4.38	4.30	4.24	4.30	Strongly Agree

3.5 Level of Agreement of the Acceptors, Hesitants, and Decliners on the Persuasive Appeal of their Interactions with the Providers

The Chi-Square test was conducted to investigate whether there was a significant difference in the level of agreement among acceptors, hesitants, and decliners regarding the persuasive appeals (LOGOS, PATHOS, ETHOS) employed by the providers. As shown in Table 6, the Chi-Square values for LOGOS, PATHOS, and ETHOS were 0.0607, 0.2650, and 0.4279 respectively, with corresponding p-values exceeding the significance

level of 0.05. This indicates that, within the sample of 90 respondents, there is no significant difference in the level of agreement among acceptors, hesitant, and decliners for any of the persuasive appeals used by the providers during their interactions with patients.

These findings suggest that the persuasive appeal utilized in provider-patient interactions may not be a significant factor in influencing COVID-19 vaccine acceptance among different vaccine response groups in the specified service unit in Isabela. Whether providers presented logical arguments, appealed to emotions (pathos), or emphasized ethical considerations (ethos), the observed patterns of responses remained consistent across acceptors, hesitant, and decliners. These results highlight the possibility that other factors, such as individual beliefs, cultural context, or broader societal influences, may play a more prominent role in shaping vaccine acceptance within this specific population.

Table 6. Chi-square test results for the relationship between vaccine response groups and the persuasive appeal of provider-patient interaction for COVID-19 vaccine acceptance in a service unit in Isabela

Particular	Chi-Square p-value		
	Presentation of the logical argument for COVID-19	Appeal to Pathos	Appeal to Ethos
Vaccine Response Groups	0.0607	0.2650	0.4279

means significant relationship between the Vaccine Response Groups and the Persuasive Appeal of Provider-Patient Interaction for Covid-19 Vaccine Acceptance in a Service Unit in Isabela. n=90, $\alpha = 0.05$

3.6 Patients' Socio-Demographic Characteristics and Their Level of Agreement on the Persuasive Appeal of their Interaction with the Providers

Table 7. Chi-square test results for the relationship between demographic profile and the persuasive appeal of provider-patient interaction for COVID-19 vaccine acceptance in a service unit in Isabela

Demographic Profile	Chi-Square p-value		
	Logical Argument (Logos)	Appeal to Pathos	Appeal to Ethos
Age	0.1151	0.4094	0.2692
Sex	0.578	0.2536	0.6998
Marital Status	0.1912	0.9916	0.3791
Educational Attainment	0.4751	0.2444	0.3976

means significant relationship between the demographic profile and the Persuasive Appeal of Provider-Patient Interaction for Covid-19 Vaccine Acceptance in a Service Unit in Isabela. n=90, $\alpha = 0.05$

Table 7 shows the Chi-Square test results for the relationship between demographic profiles and the persuasive appeal of provider-patient interaction for COVID-19 vaccine acceptance in a service unit in Isabela. It reveals a non-significant finding across various demographic factors. The analyzed data of the respondents' age, sex, marital status, and educational attainment do not significantly influence the level of agreement on three different persuasive appeals – logical argument, appeal to pathos, and appeal to ethos.

For age, the Chi-Square values, and corresponding p-values (0.1151, 0.4094, 0.2692) indicate no statistical significance. The same holds for sex, where the p-values (0.5782, 0.2536, 0.6998) demonstrate no substantial relationship. Marital status, with Chi-Square values of (0.1912, 0.9916, 0.3791) and p-values exceeding 0.05, also fails to show significance. Similarly, educational attainment, with Chi-Square values of (0.4751, 0.2444, 0.3976) and p-values above the threshold, indicates no noteworthy association. Some study such as Marzo et al., (2022) revealed that the place of residence was identified as a significant factor that may influence COVID-19 acceptance and uptake and the effectiveness and uptake of COVID-19 vaccines were more likely to be supported by city residents.

Therefore, with all p-values exceeding the significance level of 0.05, shows that respondents across different demographic profiles within the Isabela service unit exhibit comparable patterns of agreement or disagreement regarding the persuasive appeal of provider-patient interaction for COVID-19 vaccine acceptance. This concludes that the demographic characteristics of respondents do not seem to be a factor influencing the level of agreement on the Persuasive Appeal of Provider-Patient Interaction for Covid-19 Vaccine Acceptance in a Service Unit in Isabela.

3.7 Health Beliefs of the Respondents Regarding the COVID-19 Vaccine After Their Interaction with The Providers

This study also investigates the relationship between individuals' pre-rollout health beliefs and their post-rollout views on the COVID-19 vaccine. A chi-square analysis was conducted, yielding a highly significant p-value of 0.0000, indicating a strong statistical association. The study, based on a sample size of 90 participants, concludes that there is a substantial change in health beliefs after the vaccine rollout. This implies that people's initial attitudes towards the vaccine are related to their opinions about it after the rollout, suggesting a connection between pre-existing health beliefs and subsequent perspectives on the vaccine. The respondent's initial beliefs about the vaccine seem to influence how they feel about the vaccine after experiencing the rollout. Similarly, a study in China, discovered that anxiety and depression levels decrease significantly after vaccination compared to before vaccination (Yuan et al., 2021).

A few responses during the interview about the before and after the vaccine rollout were “At first I didn't believe in the vaccine, but when many people were vaccinated, I also believed in the vaccine too. People's lives became safe at least the case of Covid decreased”. Some answers were “I understand the concern about the potential ineffectiveness of the medicine, especially since it was developed quickly. However, many people benefit from receiving the COVID-19 vaccine, which helps reduce cases and the risk of illness for others”.

Furthermore, it implies that people's attitudes and beliefs about the vaccine seem to be influenced by their experiences and observations after the vaccine became widely available. The study suggests that the rollout of the vaccine has had a notable impact on shaping and possibly altering people's perspectives and opinions regarding the COVID-19 vaccine.

4.0 Conclusion

Based on the analyzed demographic profile of the respondents, vaccine acceptance and hesitancy are multifaceted phenomena influenced by various factors such as age, education and income disclosure reluctance. Healthcare providers have effectively employed logical arguments, emotional connection and credibility, fostering confidence and trust among the respondents. However, the provider-patient interaction's persuasive appeal might not significantly impact COVID-19 vaccine acceptance among different response groups, necessitating consideration of alternative factors. Within Isabela's service unit, respondents from diverse demographics exhibit similar levels of agreement or disagreement regarding provider-patient interaction's persuasive appeal. Demographic characteristics seem to have minimal influence on agreement levels. Notably, a significant association exists between pre-rollout health beliefs and post-rollout vaccine views, indicating substantial shifts in perspectives following vaccination. Recognize that the persuasive appeal used in provider-patient interaction may not be the sole factor influencing COVID-19 vaccine acceptance. Study additional variables or factors that may play a substantial role in shaping perceptions of provider-patient interactions related to vaccine acceptance. Healthcare provider must be culturally competent and sensitive to the diverse background of patients and establish a system for continuous monitoring and evaluation of vaccine acceptance trends and to further improve the provider-patient interaction in the service unit of Isabela.

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7.0 Conflict of Interests

The author declares no conflicts of interest

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Unveiling the Nexus: Most Essential Learning Competencies and Critical Thinking Skills of Students

Everon Joy P. Catanus

Foundation University, Dumaguete, Negros Oriental, Philippines

Author email: everonjoy.catanus@foundationu.com

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Abstract. Knowledge and critical thinking (CT) play vital roles and serve as foundational pillars for effective learning and intellectual development. This study aimed to identify the relationship between students' knowledge of the Most Essential Learning Competencies (MELCs) in English 7 and their CT skills. The descriptive-correlational approach was used, and survey questionnaires were utilized as the main data collection tool. Using the systematic sampling technique, 145 students from two secondary schools in Zamboanguita District 2 were selected as the respondents for this study. The results showed that the students' level of knowledge of the MELCs is predominantly categorized as "outstanding." The data also reflects that the students generally perceive a "somewhat high" extent of CT skills in the following areas: analyzing relevance, evaluating sources, and using evidence to formulate an argument. Additionally, a significant and strong correlation is evident between the level of knowledge of the MELCs and the previously mentioned constructs of CT skills. In conclusion, students' knowledge of the MELCs significantly influences their perception of the MELCs' importance in enhancing their CT skills. When students have a thorough grasp of a particular competency, they are more inclined to utilize it in their critical thinking processes. Hence, it is recommended to consider alternative research methods, such as longitudinal studies, to track students' development of CT skills over time, as they gain deeper knowledge of the MELCs. Furthermore, employing qualitative research approaches to delve deeper into the connections between knowledge of the MELCs and CT skills could be beneficial.

Keywords: Level of knowledge; CT skills; Critical thinking skills; MELCs; English 7; Academic achievement; Descriptive correlational.

1.0 Introduction

In the vast realm of human intellectual pursuit, knowledge stands as the cornerstone upon which progress and understanding are built. Educators and philosophers alike agree that knowledge serves as a tool that cultivates CT skills (Yuldashevna, 2019). Knowledge is a complex topic, with definitions ranging from the simplest to the most complicated. According to Oxford Languages (2023), knowledge refers to the accumulation of facts, information, and skills obtained through both experience and education. It is an understanding, whether in theory or practice, of a particular subject. Meanwhile, CT is a "cognitive activity, associated with using the mind" (Cottrell, 2017). This involves subskills such as observation, analysis, interpretation, explanation, evaluation, and metacognition (Indrasiene et al., 2021; Sato, 2021).

In 2020, when COVID-19 shook the entire world and temporarily halted education almost globally, the educational system in the Philippines suffered greatly due to the change in the mode of learning (Gunaban & Panolong, 2021). Within this span of time, the learning of a number of learners and the development of their CT skills have been impaired due to the absence of teacher facilitation and the major adjustment from the traditional

in-person instruction to virtual instruction. To address this concern, the Department of Education (DepEd) developed the Basic Education Learning Continuity Plan (BE-LCP) through DepEd Order No. 12, s. 2020. As part of this effort, the plan identified the MELCs in all subject areas. The MELCs, designed to respond to the changes in the educational landscape due to the global crisis, guides the curriculum and instruction in both public and private schools. It lists the competencies that are integral for lifelong learning, where instruction and learning activities are tailored to meet the demands of distance learning while making the learning experience worthwhile for pupils and students (DepEd Order No. 12, s. 2020).

While recent studies, such that of Ravina and Mendoza (2021), Gunaban and Panolong (2021), and Soliman and Marasigan (2021), have explored the effectiveness of MELCs distribution and MELCs assessment, the topic on determining the relationship between learners' knowledge about the individual competencies and their CT skills remains unexplored. This gap can be attributed to the novelty of the MELCs, especially that it has only been three years since the MELCs is officially used as a basis for basic instruction in schools. Hence, this set off an opportunity for the researcher to investigate the students' level of knowledge on the individual competencies in English 7 and how it is related to their CT skills.

With this in mind, exploring where the learners stand in terms of their knowledge about the individual competencies in English 7 will enable administrators and teachers to provide specific interventions that will be helpful as they proceed to higher level. Moreover, strategic interventions are best given at an early stage in their secondary education as these will serve as a strong foundation to establish and develop CT skills later on. Thus, the researcher is compelled to investigate this topic since it has been observed, and studies have proven, that learners lack critical analysis and need to develop CT skills (Nuryanti, Diantoro, & Zubaidah, 2018; Utami et al., 2018; Hasanah, Sunarno, & Prayitno, 2020).

The main objective of this study is to identify a relationship between students' knowledge on the MELCs in English 7 and their CT skills. Moreover, it seeks to answer the following research questions:

- a. What is students' level of knowledge on the MELCs in English 7?
- b. To what extent is the CT skills of students in terms of the following areas: Analyzing relevance; Evaluating sources, and Using evidence to formulate an argument?
- c. Is there a significant relationship between students' level of knowledge on the MELCs and the extent of their CT skills?

2.0 Methodology

2.1 Research Design

The research adopted a descriptive-correlational approach by Creswell. It is descriptive because it identified: 1) students' level of knowledge on the MELCs; and 2) the extent of students' CT skills. Correspondingly, it is correlational because it determined a significant relationship between the independent variable, which is the level of knowledge on the MELCs; and the dependent variables, which are the key areas in CT, namely, analyzing relevance, evaluating sources, and using evidence to formulate an argument.

2.2 Research Locale

The investigation was carried out within two secondary schools of Zamboanguita District 2 in the Schools Division of Negros Oriental. The first school is a small institution situated in the town proper of Zamboanguita; while the second school is located in Salngan, a sitio of barangay Mayabon, just a few kilometers away from the town proper. These schools were selected primarily because they are the only public secondary schools in the said district.

2.3 Research Participants

Using the systematic sampling technique, 145 students were selected to be the participants for this study. They were the Grade 8 students for academic year 2023–2024. The decision to select Grade 8 students instead of Grade 7 students was based on the premise that the Grade 8 students have already been introduced to the English 7 competencies. Choosing the current Grade 7 students as the participants would limit the researcher in terms of students' exposure to all the competencies in English 7, considering that the academic year is only in its third quarter.

2.4 Research Instrument

The MELCs, identified by DepEd to be used for school year 2021–2022, were utilized. The individual competencies in English 7 served as the basis in identifying the students' level of knowledge on the MELCs in this learning area and level. A survey questionnaire was also used. To verify the reliability of the questionnaire items, a pilot testing was carried out to 30 students. The Cronbach's Alpha coefficients are as follows: a) level of knowledge=0.949; b) analyzing relevance=0.848; c) evaluating sources=0.760; d) using evidence to formulate an argument=0.701.

2.5 Data Gathering Procedure

Beginning the research process involved conducting a pilot testing involving 30 students. Upon receiving approval for the request, the testing promptly followed. The gathered data underwent critical data processing by a statistician. The results were tallied in a spreadsheet, and the reliability was ensured using the Cronbach's Alpha coefficient. Subsequently, with confirmed item reliability, the researcher proceeded to the actual data gathering phase. A formal written consent, along with approved endorsement letters from proper authorities, was extended to the principals of two secondary schools to initiate data gathering from the identified target respondents within these schools. Upon approval, the process of data gathering and retrieval came about. To maintain the integrity of the research, all collected data were diligently forwarded to the statistician for meticulous data treatment and initial analysis.

2.6 Data Analysis

The tools used in analyzing the data were weighted mean, mean, and Spearman's Rank Correlation Coefficient. The tools used by the researcher in analyzing the data were as follows:

Weighted mean. This was used in identifying the extent of students' CT skills in terms of analyzing relevance, evaluating sources, and using evidence to formulate an argument.

Mean. This was used in getting the students' level of knowledge on the MELCs.

Spearman's Rank Correlation Coefficient. This was utilized to identify the degree of relationship between students' level of knowledge on the MELCs and the extent of their CT skills.

2.7 Ethical Considerations

Utmost ethical standards were maintained throughout the study. A disclosure statement containing the purpose of the study, the participant's voluntary involvement, the right to withdraw participation at any time without penalty, and the assurance that all collected data were exclusively utilized for the study's intended purpose was provided in the survey questionnaire. To maintain anonymity, the survey form excluded fields for names. Additionally, official permission from relevant authorities was obtained before initiating the study.

3.0 Results and Discussion

3.1 Level of Knowledge on the MELCs

Table 1. Level of knowledge on the MELCs (n = 145)

HOW WELL DO YOU KNOW EACH COMPETENCY?		$\bar{x}$	SD	VD
1.	Cite evidence to support a general statement.	92.29	6.22	O
2.	Use listening strategies for short texts listened to.	90.91	5.66	O
3.	Research a topic with support using newspapers, website, and print-based material.	90.90	5.91	O
4.	Decode information from linear to nonlinear texts and vice versa.	90.83	6.10	O
5.	Identify the genre and characteristics of different text types such as movies, news, documentaries, etc.	90.77	5.70	O
6.	Distinguish features of academic writing.	90.74	5.95	O
7.	Capture main ideas from a text into a short summary.	90.65	6.20	O
8.	Provide alternative words or phrases that complete an analogy.	90.63	5.73	O
9.	Speak and act appropriately when sharing factual or personal stories.	90.54	6.11	O
10.	Look up a specific topic using a search engine.	90.43	5.98	O
11.	Present insightful, stimulating, and thought-provoking questions during public forums or panel discussions.	90.38	5.97	O
12.	Use phrases, clauses, and sentences correctly and purposely.	90.35	5.86	O
13.	Compose an informative essay.	90.33	6.78	O
14.	Use the right multimedia resources accurately when recounting events in personal or factual narratives.	90.31	6.33	O
15.	Confirm the integrity and correctness of the material viewed.	90.28	6.39	O

16. Use both active and passive voice appropriately in different situations.	90.23	6.12	O
17. Express agreement or disagreement of a text.	90.21	5.88	O
18. Find the importance of working together and being responsible through Philippine literature.	90.10	6.12	O
19. Discover literary conflicts and the need to resolve them in nonviolent ways.	90.09	6.37	O
20. Navigate a website using headings, links, etc.	90.04	5.64	O
21. Use different methods to communicate effectively with others.	90.03	55.77	O
22. Assess the significance of ideas discussed in the text listened to.	90.02	6.45	O
23. Use the past and past perfect tenses appropriately in various situations.	90.01	6.05	O
24. Apply analogy to express a point.	89.91	6.24	O
25. Use scanning, skimming, and close reading for various purposes.	89.61	6.59	O
26. Employ direct and reported speech across different situations.	89.57	6.08	O
27. Illustrate how various factors such as culture, history, environment, or others can impact a selection.	89.54	6.07	O
28. Explore how literature can affirm one's individual identity.	89.48	6.24	VS
29. Share personal beliefs/convictions based on a viewed material.	88.77	6.43	VS
OVERALL	90.27	6.10	O

Legend:	Scale	Verbal Description
	90% - 100%	Outstanding
	85% - 89%	Very Satisfactory
	80% - 84%	Satisfactory
	75% - 79%	Fairly Satisfactory

Table 1 specifically addresses the research question: "What is students' level of knowledge on the MELCs in English 7?" According to the displayed results, the students' level of knowledge on the MELCs is predominantly categorized as "outstanding" and "very satisfactory," with weighted mean values ranging from 88.77 to 92.29 (see Table 1). This signifies that students have developed basic knowledge and core understanding about each competency and can independently translate these understandings into realistic performance tasks. The discovery here goes hand in hand with Robert Gagné's Hierarchical Theory of Instruction (1985), which suggests that intellectual skills grow by building on existing knowledge and incorporating new information. This emphasizes that students should see how these skills connect their previous knowledge with their current learning and how they can use them in real-life situations.

Significantly, the data reveal that among the listed competencies, students have predominantly achieved a foundational understanding in citing evidence to support a general statement. This indicates that students have a strong grasp of the foundational aspects of constructing arguments and supporting claims with relevant information. It also suggests that they likely understand the importance of evidence-based reasoning and critical thinking in academic context. According to Rogers (2023), citing evidence involves providing instances from a text to demonstrate the validity and accuracy of the information. From this definition, the result indicates that the students have acquired a solid understanding of finding evidences in texts to support a claim or understand the main idea. While this holds true for some learners, various studies, including those by Sitohang et al. (2021) and Butterfuss et al. (2023) expose that some learners struggle with identifying main ideas. This difficulty is attributed to factors like laziness, limited vocabulary knowledge, and poor reading strategies.

Moreover, students demonstrate notable proficiency in several other competencies. One of these is utilizing listening strategies, which attained the second highest position. This proficiency implies that students are likely able to comprehend and process spoken information efficiently. It also indicates that they understand the importance of listening as a fundamental aspect of communication and learning. Listening strategies come in different forms, which aid in the learning process. The study of Afriyuninda and Oktaviani (2021) specifically highlights the positive impact of listening to English songs on enhancing listening skills and correct pronunciation. According to their findings, incorporating listening strategies like engaging with English songs has been proven beneficial in enhancing students' listening abilities (Simamora & Oktaviani, 2020, cited in Afriyuninda & Oktaviani, 2021).

Unexpectedly, grammar-related competencies, such as using phrases, clauses, and sentences; using passive and active voice; using the past and past perfect tenses; using direct and reported speech; and composing an informative essay, obtained "outstanding" evaluations despite studies suggesting that developing the macro skill of writing is recognized as one of the more difficult areas in English teaching. This assertion is supported by Moses and Mohamad (2019) and Harun et al. (2017) in their investigation about writing skills within the English as a Second Language (ESL) contexts. Their researches reveal that enhancing students' writing abilities is a

significant challenge for instructors of ESL in many educational institutions today. Nonetheless, writing has consistently posed a serious challenge for students as they learn the English language, particularly in elementary schools. Additionally, Baron (2019) identified a concerning issue among Grade 9 students at Nagbalaye High School regarding subject-verb agreement. The findings reveal a remarkable frequency of errors, indicating a moderately extensive occurrence of grammar mistakes, particularly in the area of subject-verb agreement.

Although exploring how literature can affirm one's individual identity is positioned lower in the ranking, it still received a descriptive rating of "very satisfactory." This suggests that, even though it is somewhat lower on the scale, students have shown a commendable level of competence in this particular area. Notably, Altun (2023) claims that literature has played a significant role in shaping both individual and cultural backgrounds. It encompasses the complexities of human identity by portraying individuals' encounters, cultural heritages, and personal development. By offering diverse viewpoints and stories, literature allows readers to attain a deeper understanding of their own identity.

With all these perspectives put together, it is asserted that the implementation of the MELCs has been instrumental in fostering the foundational knowledge and understanding of each competency among students. This assertion finds reinforcement in the work of Zalun (2023), who identified a strong correlation between the extent of MELCs utilization and the corresponding level of learning development. It is postulated that the effective incorporation of the MELCs has played a crucial role in shaping and enhancing students' comprehension and proficiency across various competencies.

3.2 Extent of Students' CT Skills in Terms of Analyzing Relevance

Table 2. Extent of students' CT skills in terms of analyzing relevance (n = 145)

INDICATORS		WX	VD	EOCT
1.	I know how to identify and obtain necessary information for my assignments.	5.24	F	SoH
2.	I can organize information based on its level of importance.	5.12	F	SoH
3.	I can easily distinguish fact from opinion.	5.11	F	SoH
4.	I carefully examine information before citing or using them in my assignment.	5.10	F	SoH
5.	I can narrow down topics or information that are relevant to my assignment.	5.04	F	SoH
6.	I can easily relate the lessons in day-to-day situations like how grammar rules can be applied in daily conversation.	4.97	F	SoH
7.	I know exactly when to disregard unnecessary information.	4.94	F	SoH
8.	I classify information systematically and logically.	4.91	F	SoH
9.	I know how to separate relevant from irrelevant information.	4.77	F	SoH
10.	I can suggest the best solution for a real problem using the right information.	4.65	F	SoH
COMPOSITE		4.99	F	SOH

Table 2 provides insights on the research question: "To what extent is the CT skills of students in terms of analyzing relevance?" The data illustrate that students generally perceive a "somewhat high" extent of CT skills, as evidenced by weighted mean values ranging from 4.65 to 5.24 (see Table 2.1). This indicates that students demonstrate CT skills when assessing the significance of information for their research requirements 59–72% of the time. These indicators play a significant role in the students' ability to comprehend. Aquino and De Vera (2018) believe that reading comprehension involves the capacity to read a text, analyze it, and understand its significance. Additionally, a person's aptitude for comprehending a text is affected by his ability to draw conclusions, which is another component of CT.

Specifically, the data reveal that students are knowledgeable most in identifying and obtaining necessary information for their assignments, with a considerably higher weighted mean value compared to the other indicators. This implies that students likely understand the importance of thoroughness and resourcefulness in academic work, as well as the significance of utilizing appropriate sources to support their arguments or assertions. Organizational aspects, such as, organizing information based on its level of importance, classifying information systematically and logically, and narrowing down relevant topics or information for assignments, while still strong, demonstrates a slightly lower level of proficiency. This suggests that there may be some room for improvement in how they organize and classify information systematically, prioritize information based on importance, and narrow down topics effectively.

To aid English learners in understanding what they read and acquiring knowledge, instructional methods must extend beyond basic reading skills development (Vaughn et al., 2017). In their research, Elleman and Oslund (2019) highlighted the intricate nature of reading comprehension as a cognitive process, which poses challenges in terms of studying, teaching, and evaluating. Despite this notion, other indicators that obtained weighted mean values ranging from 4.65 to 4.97, namely, relating lessons to day-to-day situations, knowing when to disregard unnecessary information, separating relevant from irrelevant information, and suggesting the best solution for a real problem using the right information, all suggest students' capability to comprehend and find solutions for real-world challenges.

Therefore, it is essential to prioritize the early and ongoing focus on building foundational knowledge, enhancing vocabulary understanding, and fostering skills in monitoring comprehension as individuals progress in their development (Elleman & Oslund, 2019).

3.3 Extent of Students' CT Skills in Terms of Evaluating Resources

Table 3. Extent of students' CT skills in terms of evaluating sources (n=145)

INDICATORS		WX	VD	EOCT
1.	When looking for information, I skim, scan, and close read to make sure I find the appropriate data I am looking for.	5.30	U	H
2.	When making my assignments, I make sure I only source out information from reliable sources.	5.28	F	SoH
3.	I seek only the truth and nothing but the truth.	5.13	F	SoH
4.	I compare and contrast different sources and analyze if they share common information before I consider using them in my assignments.	5.12	F	SoH
5.	I confirm the credibility of the information before sourcing them out.	5.10	F	SoH
6.	I can easily differentiate credible sources from non-credible ones.	4.92	F	SoH
7.	I only source out up-to-date information for my assignments.	4.88	F	SoH
8.	I do not consider highly opinionated sources (e.g., columns) for the fact that the information they provide are mostly subjective.	4.70	F	SoH
9.	I do not source out information from Wikipedia or brainly.com.	4.61	F	SoH
10.	I am well aware that blogs are not reliable sources of information.	4.60	F	SoH
COMPOSITE		4.96	F	SOH

Table 3 reveals answers to the research question: "To what extent is the CT skills of students in terms of evaluating sources?" The data reflect that generally, the students perceive a "somewhat high" extent of CT skills as indicated in most of the weighted mean values ranging from 4.60 to 5.28 (see Table 2.2). Similar to the previous finding under analyzing relevance, this result implies that the students apply their CT skills approximately 59–72% of the time. In learning, metacognition is one of the significant predictors of academic achievement. Chick (2017) says that metacognition refers to the capacity to critically comprehend one's cognitive abilities and learning methods and perceives oneself as a thinker and learner. Guzman (2017), in her study about metacognitive awareness and academic performance, discovered that Grade 7 students who possess strong metacognitive abilities generally achieve higher academic results in English compared to those who lack such awareness.

Based on the findings, students are particularly proficient in ensuring that they find the appropriate data they are looking for by skimming, scanning, and close reading. This proficiency in information retrieval techniques can be beneficial for academic success, research endeavors, and overall learning outcomes. This finding is corroborated by Banditvilai's research (2020), which suggests that utilizing reading techniques like skimming, scanning, making predictions, and asking questions assisted students in achieving a satisfactory level of reading comprehension. She also observed that a majority of the students demonstrated the capability to apply these reading strategies effectively in their reading tasks.

Additionally, the results indicate a commendable level of competence in terms of critically sourcing out information that are reliable, credible, up-to-date, and factual. This suggests that students have a comprehensive understanding of evaluating the trustworthiness and credibility of information sources before incorporating them into their assignments. Pennycook and Rand (2019) reinforce this by claiming that the capability to differentiate fabricated news from authentic news is often associated with the inclination to engage in analytical reasoning, which is a subskill of CT.

When students are aware of how they learn, they can plan and think more effectively. According to Naimnule and Corebima (2018), having good metacognitive skills not only improves CT but also helps students do better in their learning.

3.4 Extent of Students' CT Skills in Terms of Using Evidence to Formulate an Argument

Table 4. Extent of students' CT skills in terms of using evidence to formulate an argument (n = 145)

INDICATORS		w $\bar{x}$	VD	EOCT
1.	I focus on the question first before giving an answer.	6.03	U	H
2.	I seek valuable information that support my argument rather than those that contradict them.	5.28	F	SoH
3.	I am open-minded to different perspectives that can possibly support my argument.	5.19	F	SoH
4.	I clarify and analyze evidences before arriving at conclusions and formulating arguments.	5.10	F	SoH
5.	I critically analyze situations and/or evidences before taking my stand.	4.95	F	SoH
6.	I critically examine findings and results.	4.91	F	SoH
7.	I offer different interpretations for a set of evidence that could be attributed to various factors.	4.90	F	SoH
8.	I seek to establish non-biased and sensitive arguments.	4.83	F	SoH
9.	I compare and contrast comments or theories.	4.81	F	SoH
10.	I approach various complex evidences in a variety of ways.	4.79	F	SoH
COMPOSITE		5.08	F	SOH

Table 4 provides insights into the research question: "To what extent is the CT skills of students in terms of using evidence to formulate an argument?" The data show that the students generally perceive a "somewhat high" extent of CT skills as evident in the weighted mean values ranging from 4.79 to 5.28 (see Table 2.3). Akin to the previous outcomes under analyzing relevance and evaluating sources, this result implies that the students apply their CT skills approximately 59–72% of the time. Developing advanced CT skills or HOTS early in formal education is crucial to meet the increasing demand for highly skilled professional in the future. According to Singh and Shaari (2019), HOTS go beyond mere memorization and factual observation.

The data suggest that students have the capacity to critically examine results and findings, which ranks sixth among the indicators. This indicates that students do not simply rely on what is provided to them but gives effort to analyze pieces of information before accepting or utilizing them. Additionally, students demonstrate proficiency in seeking valuable information that support their argument, being open-minded to different perspectives that can support their argument, critically analyzing situations and/or evidences before taking a stand, offering different interpretations for a set of evidence that could be attributed to various factors, and approaching complex evidences in a variety of ways. These indicators underscore students' capacity for reasoning, reflecting, and decision-making, all of which are indicative of HOTS. As Ichsan et al. (2019, cited in Kosasih et al., 2022) assert, HOTS denote students' ability to engage in advanced cognitive processes. This ability is not only crucial within the classroom setting but will also have profound impact for students to face real-world challenges and make informed decisions, whether in their careers or in addressing everyday problems (Anggraini & Pratiwi, 2019). Hence, to develop HOTS among learners, teachers are expected to provide quality instruction and utilize teaching strategies that go beyond simple rote learning.

3.5 Relationship Between Students' Level of Knowledge on the MELCs and The Extent of Their CT Skills

Table 5. Relationship between the students' level of knowledge on the MELCs and the extent of their CT skills

VARIABLES CORRELATED	R _s	P-VALUE	DECISION	REMARK
Analyzing Relevance	0.622	0.000	Reject H ₀	Significant
Evaluating Resources	0.576	0.000	Reject H ₀	Significant
Using Evidence to Formulate an Argument	0.564	0.000	Reject H ₀	Significant

Level of significance = 0.05

Table 5 presents data analyzing the correlation between students' level of knowledge on the MELCs and the extent of their CT skills. Applying Spearman's Rank Order Correlation, the results indicate that the p-values for analyzing relevance, evaluating sources, and using evidence to formulate an argument are all below the significance level of 0.05. This means that at a 5% level, there is a noteworthy correlation between students' level of knowledge on the MELCs and the extent of their CT skills. This suggests that a higher level of knowledge on

the MELCs in students corresponds to an increased ability to engage in CT, specifically in terms of analyzing relevance, evaluating resources, and using evidence to formulate an argument.

This aligns with the findings of Mutakinati, Anwari, and Kumano (2018), indicating that learners possess sufficient skills to navigate information for solving contextual problems. As pointed out by Indrasiene et al. (2021), CT is a powerful tool for processing knowledge. It involves activities like analysis, evaluation, and explanation, making it a crucial aspect of learning. Having said this, knowledge, therefore, forms the bedrock for nurturing CT skills. This connection is underscored by the discoveries of Yu, Wu, and Fan (2020), who noticed that students who are adept in CT skills like deduction, explanation, and evaluation, showed a remarkable ability to effectively apply scientific knowledge. In simpler terms, knowledge and CT go hand in hand in creating a powerful synergy in the learning process. Adding another layer to this understanding, Guzman (2017) stated that students who possess strong metacognitive skills tend to outshine their peers with limited metacognition when it comes to academic performance. Metacognition, often described as knowledge about knowledge, emerges as a unique factor that predicts how well students will do across various subjects. According to Sato (2021), metacognition enables students to strategically organize, assess, and reflect on their learning journey. This skill is crucial in fostering self-regulated learning, wherein individuals proactively manage their learning endeavors, leading to a more efficient and autonomous acquisition of knowledge.

Despite significant results on the correlation between knowledge and CT skills among learners, contrasting perspectives emerge in the studies by Hasanah, Sunarno, and Prayitno (2020); Nuryanti, Diantoro, and Zubaidah (2018); and Utami et al. (2018). Their studies indicate that learners may possess lower levels of CT skills, leading to difficulties in fully mastering learning materials. Notably, Vaughn et al. (2017) and Elleman and Oslund (2019) emphasize the complexity of developing CT skills. Both sets of researchers advocate for collaborative efforts from educators and administrators to ensure sustained and long-term enhancement of these skills among learners.

4.0 Conclusion

There is a significant correlation between students' knowledge on the MELCs and their perception of its importance in enhancing their CT skills. This means that a deeper understanding of the MELCs among students correlates with an improved ability to apply critical thinking, particularly in terms of analyzing relevance, evaluating sources, and using evidence to formulate an argument. This understanding enables them to translate what they learn into practical tasks that empower them to make well-informed decisions and effectively address real-world challenges. When students have a thorough grasp of a particular competency, they are more inclined to utilize it in their CT processes. For example, when students possess proficiency in citing evidence to formulate an argument, they are more critical to also obtain necessary information for their assignments; source out information that are reliable; credible, and factual; and seek valuable information that support their argument – indicators all showing the application of the different constructs of CT.

Based on these conclusions, the following recommendations are proposed:

- a. Teachers should foster opportunities for students to make connections between different subject areas and apply their understanding of the MELCs across disciplines. This interdisciplinary approach can help reinforce learning and demonstrate the relevance of CT skills in various contexts.
- b. Conduct longitudinal studies to track students' development of CT skills over time as they gain deeper knowledge on the MELCs. This will help researchers understand how knowledge on the MELCs contributes to enhancing CT skills and enable them to observe how these skills evolve over the course of students' education.
- c. Employ qualitative research methodologies such as interviews or focus group discussions to explore in greater depth the mechanisms that link knowledge on the MELCs with CT skills. This could entail examining how students' cognitive processes and decision-making strategies are influenced by their application of their knowledge on the MELCs in real-world scenarios that require CT.
- d. Compare the CT skills of students who have been explicitly taught using the MELCs with those who have not. This could involve creating experimental studies where one group receives instruction on MELCs while the other does not and then assessing their CT skills using standardized assessments.

5.0 Contributions of Authors

This study was written by only one author and had been carefully reviewed and approved by her adviser and method specialist before its finalization.

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7.0 Conflict of Interests

There are no conflicts of interest pertaining to the study.

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Post-Mortem Analysis of the 2016 Election Based on the Political Marketing Strategies Used by Local Political Parties in Dumaguete City

Eduard I. Catapusan

University of San Carlos, Cebu City, Philippines

Author email: eduardicatapusan@gmail.com

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Abstract. This research study is a post-mortem analysis of the 2016 local elections in Dumaguete City, focusing on the political marketing strategies used by the Liberal Party (LP) and Nationalist People's Coalition (NPC) candidates. The objective was to analyze the political marketing strategies the political parties and candidates employed in the 2016 elections. It also aimed to address the research gap by systematically examining and analyzing the political marketing practices within the local context. The researcher employed a combination of descriptive-quantitative and qualitative designs. The quantitative design was facilitated by measuring the level of effectiveness of the political marketing strategies used by the party and the candidates to win votes, which was measured on a scale of 5.00, where 1.00 is not effective, and 5.00 is the most effective. The qualitative design was facilitated by the archival of documents and structured interviews. The study's respondents were the mayor, vice mayor, and ten city councilors, totaling 12 (n=12). However, only 9 (n=9) participated in answering the survey questionnaire and guide interview. Using Menon's framework, the study found that LP dominated the election, employing strategies like clear platforms, candidate image building, party disclosure, information drives, material rewards, smart slogans, and social media use. They also managed attitudinal and behavioral barriers effectively. LP's dominant strategies included media campaigns, house-to-house campaigns, public forums, small group meetings, and leaflet distribution. NPC, on the other hand, focused on good governance, transparency, and monetary indulgence. Both parties utilized product function, distribution function, cost function, machine politics and rewards, news management function, and communication function. The top three effective strategies were the news management function (4.61), product function (4.59), and communication function (4.58). The study concluded that LP was more thorough and organized in its marketing strategy application, giving them critical advantages in the election.

Keywords: Post-Mortem analysis; Political marketing strategies; Local political party; Level of effectiveness.

1.0 Introduction

Political marketing has been a global phenomenon since ancient electoral civilizations, attributed to factors such as investigative press, changes in political processes, and declining party loyalty (Kelley, 1956). While historical evidence suggests past utilization of political marketing, its systematic analysis in political science is relatively recent. Its importance is evident in the internationalization of consumerism, where political actors mimic consumer behavior (Ger & Belk, 1996). Freedman (2005) notes that consumers are increasingly aware of products due to digital information accessibility. Lees-Marshment (2001) coined political marketing as applying marketing concepts in politics, particularly in Europe and the UK, leading to market-oriented strategies exemplified by Margaret Thatcher's approach. The Labor Party's success in the UK's 2001 election was attributed

to a market-oriented focus on public services (Lees-Marshment & Lliker, 2005). In the US, political marketing involved designing candidates as products, as seen in Ronald Reagan's campaign, which utilized market intelligence to match voter needs (Newman, 1994).

Political marketing was employed in Canada, but the context differed due to a multi-party system encompassing the Liberal Party, Progressive Conservative Party, and New Democratic Party. While the Liberal Party pursued a mass marketing-centered approach to balancing socialism and conservatism, the other parties utilized distinct strategies. The Liberal Party's success in the 2000 electoral campaign was attributed to symbols, policies, and charismatic candidates promoting a new liberal administration focused on community health initiatives. In contrast, the Progressive Conservative Party adopted an offensive marketing strategy, targeting opponents' reputations and leveraging personal issues to sway voters' opinions (Clarkson, 2001).

The utilization of formal political marketing in the Philippines still needs to be explored. Nevertheless, drawing from the concept of marketing as described by Lees-Marshment and Lilleker (2009), which involves informing citizens about political promises, persuading voters to support specific candidates, and mobilizing them towards voting, Filipino politicians have integrated elements of political marketing into the electoral process (Lande, 1996). Despite the prevalence of patronage in Philippine politics, similar to the United States, there is a growing trend towards a polyarchal system, wherein political parties strategically promote specific issues through television channels alongside the rise of civil society organizations and NGOs (Leichter, 1972). While issue-oriented political activities may not fully meet the criteria of political marketing, certain electoral practices in the Philippines exhibit characteristics akin to formal political marketing activities (O'Cass, 1996; Butler & Collins, 1994). Simbulan (1990) underscores that Philippine politics, influenced by its colonial history, revolves around personalities and candidates akin to many Latin American countries.

Consequently, political parties in the Philippines prioritize electoral platforms and network organizations over ideological alignment, diverging from traditional political marketing approaches (Kimura, 1992). The transition from a two-party to a multiparty system has democratized political participation, allowing individuals from various backgrounds to run for public office under mainstream parties such as the Christian Muslim Democratic Lakas, the Liberal Party, the Conservative Nationalist People's Coalition, and Partido Demokratiko Pilipino-Laban (Perron). Party-switching is prevalent, as observed in Estrada's victory in the 1998 election, where politicians swiftly joined his party post-election to secure a majority in Congress. Like the United States, political parties in the Philippines market candidates during electoral campaigns, often employing patronage politics to attract voters (Sidel, 1990; Lande, 1992; Wurfel, 1990; Simbulan, 2005). This blend of contemporary high-tech campaigning and traditional patronage politics characterizes Philippine political campaigns.

This research aimed to demonstrate how Filipino politicians utilize organized political activities akin to political marketing to inform voters about their political services and persuade them to support these services through voting. Such activities draw from the principles of political marketing observed in the practices of leaders from the United States, Britain, and Canada (Aguirre, 2016; Holmes, 2016; Lorenzana & Sayo, 2004). Strategies employed include media campaigns through weblogs, self-made websites, Facebook, Twitter, television advertisements, and radio guesting to disseminate information about candidates' backgrounds and governance platforms. While political culture may influence the development of political marketing frameworks, these frameworks are not constrained by specific cultural contexts. Although political culture arises from American and European individualism, political marketing principles can adapt to diverse cultural settings and remain effective (Jocano, 1990 & Porter, 2004). Even in political systems characterized by patronage, clientelism, and dynasties, political marketing strategies can garner support and influence voter behavior. Culture serves as a means of transmitting norms and practices, making it essential for informing citizens about party platforms, incentivizing votes for party candidates, and facilitating the voting process (Porter, 2004). The introduction of the wage system in the Philippines has transformed its political landscape, shifting away from feudal patronage systems towards a more issue-oriented approach led by entrepreneurial elites and young professionals (Wurfel, 1990). This shift aligns with Robert Dahl's concept of polyarchy, suggesting that the current political environment in the Philippines is conducive to applying political marketing (Krouse, 2008). Examples such as the Liberal Party and Nationalist People's Coalition illustrate this trend towards employing political marketing strategies.

Based on the literature review, political marketing has not received significant attention and has remained at the periphery of research in the Philippines. The literature focused on campaigns and voting preferences, leaving a research gap in understanding the political marketing strategies the political parties and candidates employed. The present study aims to address this gap by systematically examining and analyzing the political marketing practices within the local context. Hence, the readers can gain valuable insights into effective campaign strategies and enhance their understanding of voter-oriented approaches.

2.0 Methodology

2.1 Research Design

The research design was a combination of descriptive-quantitative and qualitative. The quantitative research design was facilitated by measuring the level of effectiveness of the political marketing strategy used by the party and the candidates to win votes, which was measured on a scale of 5.00, where 1.00 is not effective, and 5.00 is the most effective. All the other variables, such as the voting turn-out distribution in the 2016 election, the political marketing strategies used by the local NPC and LP candidates, and the dominant or best political marketing strategies used by NPC and LP candidates, the classification of the political marketing strategies by Menon's taxonomy, were done in qualitative plan of analysis. Further, the research study aims to establish the level of effectiveness of the political marketing strategies used by the candidates (key informants) of this study who won their respective seats in the local government during the 2016 local elections. The survey method collected the data using a questionnaire containing the operationalized concept of political marketing. Each strategy was given a statement-indicative measure on a scale of 5.0 for the key informants to respond. In survey research, concepts are operationalized through questions in the form of statement indicators and observations consisting of recording respondents' answers to the statement indicators (Manheim & Rich, 1981). The survey collected perceptions and opinions, as defined by Manheim and Rich (1981). Despite their subjective nature, an intersubjective process using a weighted mean made them objective (Duverger, 1972; Thompson, 2005). The level of effectiveness of the political marketing strategies, determined by the respondents' perceptions, was quantified using a weighted mean score. For instance, the level of effectiveness of product and distribution function strategies was represented by a score of 4.20, indicating the effectiveness of the political marketing strategies. (Manheim & Rich, 1981).

2.2 Research Locale

The study was conducted in Dumaguete City, Negros Oriental's capital, with a 34.76 square kilometer area, 131,377 population, and 21,582 households. In the 2016 elections, 80,122 voters registered, with a turnout of 83.00% (COMELEC Data, 2016). The Liberal Party (LP) and Nationalist People's Coalition (NPC) were the main parties. Dumaguete, a university town, is home to various institutions, including Silliman University, Saint Paul University, Foundation University, Negros Oriental State University, Asian College, Metro Dumaguete College, and STI College. The city is divided into thirty barangays, eight urban and twenty-two rural. Several political challenges arose during the 2016 elections in Dumaguete, a town known for its intellectual community. Mayor Ipe Remollo noted campaign issues like mudslinging and misuse of city equipment, and voters expressed concerns about inexperienced candidates and key issues like social inequality, crime, and environmental preservation (Quijano, 2016). Despite a low poverty rate, problems like street children and informal settlers persisted. Candidates proposed various initiatives to address these issues, including training and job opportunities, toll-free hotlines, youth sports programs, environmental ordinances, waste management, and cultural heritage preservation. Youth participation was a focal point in the elections, with efforts to educate young voters and discourage vote-selling. The 'One Good Vote' campaign, led by Engr. Fred Magallano, was central to these efforts. Nationwide discussions among youth, facilitated by the KDC and supported by the World Bank, led to actionable proposals for national development (Garcia, 2016). The candidates from the Liberal Party (LP) and the Nationalist People's Coalition (NPC) employed various political marketing strategies to address the city's pressing issues during the elections.

2.3 Research Participants

The study population of the research study was the candidates who won during the 2016 election. Since complete enumeration was employed, all those who won in the said election were eligible as study participants. These were the key informants belonging to the Liberal Party and National People's Coalition. The key

informants covered the mayor, vice mayor, and ten city councilors, thus amounting to 12 (n=12) respondents. However, out of the 12 respondents, only 9 (n=9) participated in answering the survey questionnaire and guide interview. The inclusion criteria in the determination of the study participants were the candidates who won the 2016 election regardless of age, gender, political party they belonged to, and other circumstances. Conversely, the exclusion criteria in determining those who could not be qualified as respondents were any candidates who lost during the 2016 election and those who ran independently. Table 1 shows their socio-demographic profile below to distinguish the respondents' backgrounds further.

Table 1. Socio-demographic profile of the key informants

	Age Range	Gender	Religion	Educational Background	Occupation	No. of Years of Affiliation of Their Political Party before the 2016 Election
KII 1	40 - 65	F	RC	Post Graduate	Entrepreneur	5 yrs. before 2016
KII 2	40 - 65	M	RC	Post Graduate	Entrepreneur	6 yrs. before 2016
KII 3	40 - 65	M	RC	Post Graduate	Lawyer	4 yrs. before 2016
KII 4	40 - 65	M	RC	College Graduate	Food Service	6 yrs. before 2016
KII 5	40 - 65	M	RC	Post Graduate	Lawyer	5 yrs. before 2016
KII 6	40 - 65	M	RC	Post Graduate	Lawyer	5 yrs. before 2016
KII 7	40 - 65	M	RC	College Graduate	Dentist	6 yrs. before 2016
KII 8	40 - 65	F	RC	Post Graduate	Lawyer	5 yrs. before 2016
KII 9	18 - 40	M	RC	College Graduate	Entrepreneur	6 yrs. before 2016

Legend: KII - Key Informant Interview, F - Female, M - Male, RC - Roman Catholic

Note: The total number of key informants was 9 (n=9) out of 12 (n=12)

Table 1 shows the key informants' demographic profile, age range, gender, religion, educational background, occupation, and number of years they were affiliated with their respective political parties before the 2016 election. Regarding age, 8 of the key informants belonged to the 40-65 age range, and only 1 of the eight fell into the 18-40 age range. There were eight males and two females for the research study. In terms of their educational background, 6 of them had post-graduate degrees, and 3 of them were college graduates. The occupations of the key informants are also seemingly varied. Across the two political parties, 3 of the nine key informants are entrepreneurs who own and manage their family businesses; one is a food service provider who also owns several food services around the city; one is a dentist who owns two dental clinics and a function hall for events and celebrations; and finally, 4 are lawyers who also have their respective law firms where they practice the legal profession. Almost all the key informants are sons and daughters of one of the oldest political clans and families in Dumaguete City.

2.4 Research Instrument

The research instruments used for data collection were the survey questionnaire, interview guide, and archives or documents. The survey questionnaire was predominantly close-ended and contained the profile of the respondents (key informants), the political marketing strategies used by the party, and the most effective political marketing campaign strategies used by the political party and candidates in the 2016 election. Interviews with the key informants from LP and NPC candidates corroborated the survey questionnaire. The interview involved questions about the political marketing strategies used in the 2016 local elections. The interview provided some pertinent information not covered by the survey questionnaire.

The survey questionnaire, corroborated by archival data, was used to determine the level of effectiveness of the political campaign strategies. The questionnaire was tested for reliability with a group of respondents, and the data was analyzed using Cronbach's alpha. A reliability coefficient of at least 0.60 was required for definitive data collection (DeVellis, 2016). Pilot testing was conducted in three municipalities of Negros Oriental, namely: Dauin, Sibulan, and Amlan, with a total of 30 respondents. The analysis yielded a reliability coefficient of 0.912, exceeding the 0.80 cut-offs, indicating a high cohesiveness among the questionnaire items and confirming its suitability for final data collection.

2.5 Data Gathering Procedure

The research instruments used for data collection were the closed-ended survey questionnaire, interview guide, and archives or documents. The survey questionnaire covered the profile of the respondents, the different political campaign marketing strategies used, and the level of effectiveness of these strategies. It was corroborated by the structured interview, which involved open-ended questions about the political campaign

marketing strategies the candidates and their political parties employ. Personal information not covered during the survey was obtained through the interview.

The survey and interview were based on archival data, including voter registration and turnout in Dumaguete City's 2016 election. The researcher recorded interviews with participant consent and ensured ethical data collection. The data gathered were analyzed using Cronbach alpha or coefficient alpha (α). Cronbach alpha is a reliability coefficient that measures the internal consistency of a set of scale or test items. Its coefficient of reliability ranges from 0 to 1 in providing the overall assessment of a measure's reliability. The higher the α coefficient, the more the items have shared covariance and can be construed to measure the same underlying concept. For final data collection, the reliability coefficient must be at least 0.70 (DeVellis, 2016). In this study, the data collected was deemed suitable for Cronbach's alpha analysis as items were Likert-scaled and continuous. Additionally, three field experts reviewed the questionnaire to ensure its reliability and validity.

2.6 Ethical Considerations

The study involved the key informants in a 30-minute survey and a structured interview lasting up to an hour, focusing on their insights into political marketing strategies due to their political roles. Participation was voluntary, with no impact on their careers for opting out. The survey was divided into three parts: demographic details, campaign marketing strategies used in the 2016 election, and the level of effectiveness rating of these strategies. The survey was conducted at the convenience of the respondents, who were assured of confidentiality and anonymity. The researcher and statistician were the only ones who could access the data. Participants also engaged in a confidential, recorded interview about their 2016 election strategies, with the option to decline any questions. The research spanned nine months, including data collection.

3.0 Results and Discussion

3.1 Election Voting Turnout Distribution

Election voting turnout reveals voters' core interests, resulting from the political strategies employed by local politicians affiliated with the LP, NPC, or independent candidate. To present a clearer picture of the result, the voting turnout is categorized based on the positions the candidates were running for Mayors, Vice-Mayors, and Councilors.

Table 2. Voting turnout distribution for mayors

Mayors Name of Candidates	Voting Turnout Distribution					
	NPC		LP		Others (IND)	
	Votes	Percentage	Votes	Percentage	Votes	Percentage
Generoso, Dindo					3592	5.91
Maquiling, Woodrow Sr.	27,132	44.66				
Ramirez, Kinix					505	0.83
Remollo, Ipe					29,518	48.49

Note: The data above was taken from the COMELEC Official Document. Retrieved March 17, 2022

The voting turnout distribution for mayors (see Table 2) reveals that of the five candidates, Ipe Remollo, who ran as an independent candidate, won the mayoral position with 29,518 votes or 48.49%, which is higher by 2,386 compared to his closest contender, Woodrow Maquiling, who earned 27,132 votes or 44.66% of the entire voting population. It is interesting to note that Remollo was an independent candidate, while Maquiling ran for the NPC. The other candidates, Generoso and Ramirez, who were also independent, earned 3,592 votes or 5.91% and 505 votes or 0.83%, respectively. The winning of Ipe Remollo to the seat of political power can be attributed to several factors. As an incumbent city mayor, he established a political base down to the barangay level, where he consolidated his political power by using them as conduits for distributing social services to the barangay population. The regular distribution of patronage and material rewards gave Ipe Remollo tremendous political leverage over his rivals. The most effective material reward was the *ayuda*, which Ipe Remollo effectively used even during the campaign. *Ayuda* is a Filipino word for "aid" or "assistance," such as cash or food.

Table 3. Voting turnout distribution for vice mayors

Vice Mayors Name of Candidates	Voting Turnout Distribution					
	NPC		LP		Others (IND)	
	Votes	Percentage	Votes	Percentage	Votes	Percentage
Esmeña, Franklin	28,499	51.83				
Layague, Nelson					1,658	3.01
Remollo, Antonio	24,824	45.15				

Note: The data above was taken from the COMELEC Official Document. Retrieved March 17, 2022

The voting turnout distribution for vice-mayors in Table 3 reveals that, of the three (3) candidates, Franklin Esmeña Jr. of NPC won by 3,675 votes or 51.83% against his closest contender, Antonio Remollo, also from NPC, who earned 24,824 votes or 45.15%. An independent candidate, Nelson Layague, made the lowest count of 1,658 votes or 3.01%.

Table 4. Voting turn out distribution for city councilors

City Councilors Name of Candidates	Voting Turnout Distribution					
	NPC		LP		Others (IND)	
	Votes	Percentage	Votes	Percentage	Votes	Percentage
Alviola, Eslao					29,039	6.11
Arbas, Joe Kenneth			27,522	5.79		
Arbon, Manny			24,500	5.15		
Bana, Isagani					20,021	4.21
Banogon, Lionel	14,092	2.96				
Catan Peter	21,871	4.60				
Cordova, Alan Gel						
Dicen, Samuel	20,416	4.29				
Elmaco, Leovigildo	22,416	4.71				
Eramas, Melissa	19,542	4.11				
Imbo, JV	28,001	5.89				
Ismil, Reu					5,753	1.21
Leon, Dandan	22,294	4.69			14,332	3.01
Mariano, Maelyne						
Patrimonio, Manuel	18,904	3.97				
Perdices, Agustin			29,195	6.14		
Ramon, Lani			27,004	5.68		
Sagarbarria, Chaco	22,792	4.79				
Tolentino, Karissa			32,409	6.82		

Note: The data above was taken from the COMELEC Official Document. Retrieved March 17, 2022

The voting turnout distribution for city councilors in Table 4 reveals that, of the 21 candidates, seven (7) from the LP won, and these were Alan Gel Cordova, Karris Faye Tolentino, Augustin Miguel Perdices, Joe Kenneth Arbas, Lilani Ramon, Michael Bandal, and Manuel Arbon; two (2) were from the NPC, namely: Jose Victor Imbo and Chaco Sagarbarria; and one independent candidate, (1) Estanislao Alviola. Hence, the overall voting turnout distribution reveals that it was the Liberal Party that dominated and obtained most of the seats in the 2016 national election in Dumaguete City. The dominance of the LP is an exciting result that could inform the political marketing strategies employed to earn this advantage.

3.2 Liberal Party and Nationalist People's Coalition Political Marketing Strategies

The data presented, analyzed, and interpreted in this section cover the political marketing strategies of the Liberal Party and the Nationalist People's Coalition. This presentation includes the best or dominant political marketing strategies adopted and implemented by the two contending political parties seeking the local seats in Dumaguete City. Table 5 compares the political marketing strategies the political parties employed.

Table 5. Liberal Party and Nationalist People's Coalition's political marketing strategies and their dominant political marketing strategies

Political Marketing Strategies	
Liberal Party	Nationalist People's Coalition
• Clear and simplified platform • Clear and simplified platform • Building the image of candidates • Simplified party ideology promotion • A clear-party campaign delivery system	• Clear and simplified platform • Clear and simplified platform • Building the image of candidates • A clear-party delivery system • Full party disclosure and massive information drive about the

- Full party disclosure and massive information drive about the party and candidates.
- Effective management of attitudinal and behavioral barriers of voters
- Bantay Balota movement
- Use of material rewards (e.g., ayuda distribution)
- Clear and smart party slogan
- Rallies, pulong-pulong, and conduct of small group meetings and public gatherings
- party and candidates.
- Clear and smart party slogan
- Wide application of social media
- Recurrida to every Barangay
- Campaign jingles
- Monetary indulgence

Note: The researcher collected the political party's responses on the best political marketing strategies utilized during the 2016 election through a questionnaire and face-to-face interviews.

Table 5 reveals that both parties employed four similar political marketing strategies: a clear and simplified platform, building the image of candidates, full party disclosure and massive information drive about the party and candidates, and a clear and smart party slogan. However, they differed in terms of the other strategies used. The LP employed the use or conduct of simplified party ideology promotion, effective management of attitudinal and behavioral barriers of voters, *bantay balota* movement, material rewards and rallies, *pulong-pulong* and conduct of small group meetings and public gatherings. On the other hand, the NPC utilized a wide range of social media, *recurrida* to every barangay, campaign jingles, and monetary indulgence.

The *bantay balota* movement was defined by Key Informant 1 as "one of the advocacies of the LP to have a transparent, clean, and honest election" (KI1, Liberal Party, March 20, 2023), which showed that the LP in Dumaguete City adhered to the LP principle of advocating the integrity of the electoral process (Liberal Party of the Philippines, 2023). Key Informant 1 added that the *bantay balota* was an effective scheme; poll watchers were hired to guard and closely monitor the counting of the ballots in the precincts assigned to them. These precincts are usually those with a significantly high number of voters. Key Informant 1 also disclosed that LP is governed by the principle that leaders should be those who can be trusted and have no stain of corruption. Thus, he underscored the strategy of effectively managing voters' attitudinal and behavioral barriers. He said that none of the LP candidates had any corruption issues. He added that the "Liberal Party candidates could take the seats in the council because we had several lawyers, doctors, and entrepreneurs in the team that made us diverse in terms of crafting future programs and policies for the Dumagueteños" (KI1, Liberal Party, March 20, 2023). Key Informant 1 further emphasized using material rewards such as *bugas* (rice), *pan* (bread), and free health and legal consultations. He explained, "*Dili lang insakto og naa kay maayong character* (having a good character is not enough), we showed [to] the people that we could address their needs." They employed material rewards and command votes obtained through the exchange of patronage, pork barrels, and other favors delivered by the local leaders (Thompson, 2010; Teehankee, 2016). For instance, the success of the campaign of Fidel V. Ramos arose from the National Aide to Local Government Units (NALGU) funds distributed to the local leaders who campaigned for him (Lande, 1996).

Key Informant 2 disclosed that for the NPC candidates, "some of us were first-timers, and we needed to help them build their image by going to different areas in the city to campaign." Thus, the party focused on building the image of the candidates and employed a wide application of social media and a clear and simplified platform. He was thankful that "social media helped our fellow candidates from NPC to campaign online since the young population used it" (KI2, Nationalist People's Coalition, March 21, 2023). Thompson (2010) and Teehankee (2016) held that for political candidates to earn votes, they should campaign using advertisements, billboards, images, and speeches. They added that two crucial factors would attract or repeal market votes to candidates: image and issues. The image connotes the candidate's electorate's general perception, whether positive or negative. Problems refer to what the electorates want to hear from the candidates to address the issues once elected. Hence, the NPC candidates went to different crooks and crannies to campaign during the 2016 election. Furthermore, the use of marketing strategy into the political process is essential especially in building the image of candidates (Bigi, 2017; Kotler & Levy, 1969; Scammel, 1999; Houston, 1986; Lock & Harris, 1996; Foxall & Trustum, 1989; Bowler & Fowler, 1992; Shama, 1973; Posner, 1992; Niffenegger, 1989; Alexy, 1996; Newsman, 1994; Posner, 1992; Ingram & Lees-Marshment, 2002) which can be conveyed through a more comprehensive application of social media.

The dominant/best strategies that helped the candidates win in the 2016 election were based on the platform of good governance, according to Key Informant 1. He explained that:

"Regarding political party agenda, it aligned with the mantra of good governance. At that time, the issue at the local level was corruption. That was how I see it as the platform of our political party. We reached every nook and cranny of the city so that the voters and the market were informed of our plans and programs. To me, one of the best strategies was the platform on good governance and transparency. Aside from the good character we presented to the public, there was a need for monetary indulgence for our would-be voters. Another best strategy was to have a clear governance platform. Si PNoy had Daang Matuwid; si Duterte had this vessel to change the constitution to a federal system. That's how I see it. You must have a platform where the market share can grasp the plans and programs." (KI1, Nationalist People's Coalition, March 21, 2023).

The responses from Key Informant 1 unveiled two essential elements: political platform and the need for monetary indulgence. The political platform on good governance was aligned with their political party principle, which was a common ground in the previous elections. Lande (1996) reported on the candidates' political platforms in the 1992 Presidential election and explained that Fidel V. Ramos, campaigning under the National Union of Christian Democrats (NUCD), had a platform for deregulating key industries and liberalizing the economy. He also used the National Aid to Local Government Units (NALGU) funds distributed to the local leaders who campaigned for him. Ramos's primary political strategy that helped him win in the 1992 presidential election was party coalition building, as his team received support from Ateneo De Manila University and the Philippine Democratic Party. Miriam Defensor-Santiago, bearer of the People's Reform Party, had a campaign platform to fight graft and corruption, build low-cost housing, promote export-oriented industries, and make tourism a tool for earning foreign exchange. Danding Cojuangco, the standard bearer of the NPC, also had a platform for good governance and transparency. Ramon Mitra, who campaigned under the Laban Demokratikong Pilipino, had a platform for deregulating the economy, strengthening agriculture, and reforming land. Conversely, key informant 4 presented the best and most effective strategies and explained that:

"Media campaigns such as radio and local television exposures were effective strategies for us. In Dumaguete, almost everyone listens to the radio. Conventional media works in Dumaguete. We also used social media, house-to-house campaigns, and public forums. We did these to inform the people of our programs and plans. Also, we were able to express who we are as a team. Local party campaigns worked because the machinery was there. So, we worked on the intelligent side of the campaign. We tried to convince people to believe that we had the best plans. Our previous terms have proven that we were worthy of being re-elected. So that is why public forums are very important to us. In addition, our party also conducted several small group meetings with our support groups, such as the church, business sector, schools, and other sectors that helped us in the campaign period. It was an opportunity for us to express the platforms and convince them of who we are. We also distributed leaflets. Leaflets were very effective because we could distribute them from house to house. So, everybody gets to read our profiles. We distributed leaflets three times the whole duration of the campaign. People were able to read the different contents of our leaflets. Our leaflets contained three parts. The first part was more detailed [than the second]. The second and third had fewer details to be easy to read. At that time, all candidates from different parties distributed leaflets, so we ensured our leaflets were simple, substantial, and concise. Another strategy we employed as a team was being visible to the Dumagueteños. To me, being visible to the people was the best strength of our team" (KI4, Liberal Party, March 20, 2023).

In other words, it has been a practice among political candidates to use political campaign strategies grounded on good governance (Lande, 1996; Bolo & Murcia, 2016; Calida, 2016; Holmes, 2016; Thomson, 2010; Teehankee, 2016).

3.3 Liberal Party's Political Marketing Strategies by Menon's Taxonomy

This section presents the LP candidates who formulated, adopted, and executed political marketing strategies based on Menon's taxonomy. The presented political marketing strategies were identified by the candidate-respondents of the study. Table 6 shows that the LP candidates offered the following strategies:

Table 6. Liberal Party's political marketing strategies by Menon's typology

Menon's Taxonomy	Political Marketing Strategies
• Product function • Distribution function • Cost function and Machine politics and rewards • News management function and Communication function • Fundraising function • Parallel campaign management function • Internal Cohesion management function	• Clear and simplified platform; Building the image of candidates; Clear and smart party slogan • Simplified party ideology: A clear party campaign delivery • Use of material rewards (e.g., ayuda distribution) • Full party disclosure and massive information drive about the party and candidates; Wide application of social media) • Bantay Balota movement • Rallies, pulong-pulong, and conduct of small group meetings and public gatherings • Effective management of attitudinal and behavioral barriers of voters

Note: The researcher collected the political party's responses on the best political marketing strategies utilized during the 2016 election through a questionnaire and face-to-face interviews.

Clear and simplified platform, building the image of candidates and a clear and smart party slogan, which Menon categorizes as product function. Product function means that the political party offers a clear and defined set of programs to the people in terms of 1) the use of a clearly defined political platform, 2) the image of candidates, and 3) the party ideology and policies on environment preservation, infrastructure development, livelihood programs, women and gender rights, transparency and accountability political researchers found as effective in winning the votes of the people. Key Informant 1 explained that the "Liberal Party candidates could take the seats in the council because we had several lawyers, doctors, and entrepreneurs in the team that made us diverse in terms of crafting future programs and policies for the *Dumagueteños*" (KI1, Liberal Party, March 20, 2023). He also added that the "local party campaigns work because the machinery is there. So, we worked on the intelligent side of the campaign. We tried to convince people to believe that we had the best plans. Our previous terms have proven that we were worthy of being re-elected. So that is why public forums are very important to us. It was an opportunity for us to express the platforms and convince them of who we are." Key Informant 3 shared that "our team employed visibility to the people of Dumaguete City as one of our best strategies" (KI3, Liberal Party, March 20, 2023). The statement holds that a candidate's image in the people's collective perception is superior to the totality of his actual attributes, assets, and accomplishments (Philippine Center for Investigative Journalism, 2014). For instance, in the 2016 presidential elections, Binay's campaign team capitalized on using the native local term *nognog* (dark-skinned) to obtain votes from the people. To Binay's team, *nognog* resembles a type of hard-working Filipino who spent time working under the scorching heat of the sun tilling the land, was forced to work overseas, and endured teaching without proper classroom amenities and with the meager amount of money to buy food, or he was deceptively accused of a crime.

The LP also employed a simplified party ideology and a clear party campaign delivery, which Menon categorizes as a distribution function. Distribution function refers to the ability of the political party to present to the voters through 1) a clear-party campaign delivery system that provides the voters easy access to all vital information about their political platform of essential services, infrastructure, and environment programs; 2) full disclosure and dissemination of information about the part and its ideology; and 3) full disclosure and dissemination about the candidates and their government programs. According to Menon, these techniques effectively win the electorates' votes. Key Informant 4 explained how his party educated their voters of their party effectively, saying,

"We also distributed leaflets. Leaflets were very effective because we could distribute them from house to house. So, everybody gets to read our profiles. We did the distribution of leaflets three times during the whole duration of the campaign. People were able to read the different contents of our leaflets. Our leaflets contained three parts. The first part was more detailed [than the second]. The second and third had fewer details so that it would be easy to read. At that time, all candidates from different parties distributed leaflets, so we ensured that our leaflets were simple, substantial, and concise" (KI4, March 20, 2023).

In the 2016 Philippine Presidential election, Grace Poe's team used *galing at puso* (competence and compassion) as a political slogan. Poe's slogan depicts inclusive growth, global competitiveness, and transparent government. With a party and campaign team coming from diverse business, political, media, and law sectors, Poe exposed an image of a caring mother who was victorious despite the challenges hurdled, hopeful for a better inclusive

government, conveyed in the media and other forms of publicity to produce a collective cognitive truth (Elemia, 2016) about her and her dreams for the Philippines.

The LP candidates also used material rewards as a political marketing strategy. Menon classified it as a cost function and machine politics and rewards. The cost function, in the current study, is the ability of the political party to employ calculated campaign strategies through 1) management of attitudinal and behavioral barriers of voters through calculated or controlled campaign strategies; 2) *bantay balota* movement; 3) the use of material rewards such as coupons and "family *ayuda*"; 4) party slogan promotion such as "*Daang Matuwid*," "Change," or "Good Governance"; and 5) wider social media dissemination of platforms on education, health, livelihood, and environment are effective generators of votes. The professions of the LP candidates range from lawyers to entrepreneurs, which allowed them to disburse material rewards to gain votes from the people. Machine politics and material rewards, on the other hand, are the capacity of the political party to give rewards to the constituents who contributed to the success of the campaign by 1) rewarding job placements to their constituents, 2) delivering the essential services for each *barangay*; and 3) distributing house-to-house *ayuda*. Key Informant 1 recalled the need for material rewards such as *bugas* (rice), *pan* (bread), free health and legal consultations. *Dili lang insakto og naa kay maayong character* (it was not enough to have a good character), we showed the people that we could address their needs.

In the 2016 election, Roxas' political slogan was the straight path (*daang matuwid*). The slogan was the extension of former President Aquino's type of governance. *Daang Matuwid* held a promise to sustain good governance just like his predecessor, President Aquino. Roxas became the standard bearer of the Liberal Party, and his other political governance platform centered on the bottom-up budget. The bottom-up budget emerged as a platform with a promise that if he won, he would obtain a generous Php100 billion from the national budget as additional funds for the *barangays* and municipalities (Lardizabal, 2016). Roxas' economic policy focused on generating jobs through BPO-IT, significant growth in the tourism sector, and poverty eradication through the 4Ps (*Pantawid Pamilyang Pilipino Program*). For his peace and order platform, he also promised to strengthen the justice system and punish crooks who engage in corrupt practices. Furthermore, many of Roxas' donors were his family members in both the Roxas and Araneta clans (ABS-CBN, 2016). As specified in his Statement of Contributions and Expenditures (SOCE), her mother, Judy Araneta-Roxas, spent Php 110,000,000.00 for her son's campaign.

Former President Gloria-Macapagal Arroyo, running under the banner of the LAKAS party, employed the allocation of pork barrels to fortify her political support in the 2004 presidential elections. Kasuya (2009) posited that the pork barrel is the political method to deliver financial assistance to its constituents. Using the pork barrel as a strategy, a politician or political party gained a political advantage over their rivals.

The LP candidates also employed full party disclosure, a massive information drive about the party candidates, and a comprehensive social media application, which Menon classifies as a news management and communication functions. News management function pertains to the ability of the political party to use social media platforms for the success of their campaign delivery by believing that: 1) social media effectively plays a vital role in the success of the campaign delivery to win votes; 2) publicity and social media outlet exposures are effective in vote-drawing techniques to succeed in the election; 3) public relation activities, media management, and online advertising campaign management are practical influencers of drawing in the votes to win the election; 4) having simplified and concise party messages during the campaign delivery period that allowed voter comprehension of the principles, ideology, and platform is effective in winning the local election. Communication function refers to the ability of the political party to address issues and future policy-making and progress by 1) being knowledgeable about communicating the people's concerns regarding poverty, graft, corruption, and the prevalence of illegal drugs; 2) communicating their intention to end vote-buying and other forms of corrupt practices; 3) seriously sharing their plans to upgrade the people's skills development through social media; 4) having transparent platforms and campaign slogans to address social issues, and 5) having simplified and concise campaign deliveries to allow better comprehension to the voters. Key Informant 4 posited that:

"Media campaigns, such as radio and local television exposures, were effective strategies for us. In Dumaguete, almost everyone listened to the radio. Conventional media works in Dumaguete. We also used social media, house-to-house campaigns, and public forums. We did this to inform the people of our programs and plan." (KI4, Liberal Party, March 20, 2023).

The LP employed the *bantay balota* movement, classified by Menon as a fundraising function. The fundraising function is the capacity of the political party to have multiple sets of fundraising activities through 1) party fundraising activity that generates substantial fund support; 2) party membership fee, an effective fund campaign raising technique that played a crucial role in winning the election; and 3) donations from friends, benefactors, and other citizens who believe in party ideology and political platforms. These techniques effectively draw significant votes from the voting population to win the election. Key Informant 1 defined the *bantay balota* movement as an effective strategy since the hired poll watchers in the chosen precincts, especially those with plenty of voters, could closely monitor the ballots (KI1, Liberal Party, March 20, 2023). The LP employed rallies, *pulong-pulong*, small group meetings, and conduct of small group meetings and public gatherings classified by Menon as parallel campaign management function. The parallel campaign function is the ability of the political party to coordinate with their management activities by 1) advancing the utilization of political machinery down to the barangay level to mobilize voters' support; 2) mobilizing churches and NGOs in the campaign operations to win votes; and 3) engaging with fraternities and sororities in various schools and campus organizations to campaign for their candidates to win votes. Key Informant 4 recalled that "our party also conducted several small group meetings with our support groups such as church, business sector, schools, and other sectors. It was an opportunity for us to express the platforms and convince them of who we are" (KI4, Liberal Party, March 20, 2023).

Like Former President Ramos's campaign, who gained the support of the clerical members of the Catholic communities and the small non-communist reform-oriented party called the Philippine Democratic Socialist Party, various sectors' support yielded large chunks of votes (Lande, 1996). UNA's 2016 Presidential Candidate, Binay, heavily relied on his relationship with his fraternity brothers from Alpha Phi Omega, Sisters of Makati, and Boy Scouts of the Philippines (Cepeda, 2016).

The LP candidates were confirmed to have effectively managed attitudinal and behavioral barriers of voters classified under Menon's taxonomy as an internal cohesion management function. It refers to the ability of the political party to have inner stability and credibility concerning its outside image by 1) coordinating with party critics and allies to project harmony with the party, 2) maintaining a good image and stability, and 3) deputizing key political figures/personalities to integrate different sectors for the mobilization of campaign operations. Key Informant 4 argued that the local party campaign works because the machinery is there. So, we worked on the intelligent side of the campaign. We tried to convince people to believe that we had the best plans. Our previous terms have proven that we were worthy of being re-elected. This strategy corroborates with Key Informant 1, who stated, "Liberal Party candidates could take the seats in the council because we had several lawyers, doctors, and entrepreneurs in the team that made us diverse in terms of crafting future programs and policies for the *Dumagueteños*" (KI1, Liberal Party, March 20, 2023).

In the 2016 election, Grace Poe utilized the political mechanism of some influential political clans in Cebu, particularly the Duranos, who served as Poe's campaign manager (Elemia, 2016). The Duranos were mainly responsible for the operating units held by political groups, volunteer groups, campaign services, and legal groups. In his interview with Rappler, Durano stated that his role is to orchestrate the activities of the operating units during weekly coordination meetings.

3.4 Nationalist People's Coalition Political Marketing Strategies by Menon's Typology

The NPC's political marketing strategies are summarized in this section and categorized based on Menon's typology. These identified political marketing strategies were gathered from the NPC candidates' responses through the research instrument and structured interview.

Table 7 has this instruction below:

Table 7. Nationalist People's Coalitions political marketing strategies by Menon's Typology

Menon's Taxonomy	Political Marketing Strategies
• Product function • Distribution function • Cost function and Machine politics and rewards • News management function and Communication function	• Clear and simplified platform; Clear smart party slogan • Recurrída to every Barangay; Campaign Jingles • Monetary indulgence • Full party disclosure and massive information drive about the party and candidates; Wide application of social media)

Note: The researcher collected the political party's responses on the best political marketing strategies utilized during the 2016 election through a questionnaire and face-to-face interviews.

The table shows that NPC candidates employed a clear and simplified platform and a clear and smart party slogan classified by Menon as a product function. The NPC was guided by the platform of good governance fighting against corruption, an issue the administration was then criticized for. Key Informant 1 posited that:

"When we speak of the political party agenda, at that time, it was in line with the mantra of good governance and transparency. I see the pivotal role of the NPC and our campaign to provide good governance and transparency for Dumaguete because, at that time, the issue was corruption at the local level. So, that's how I see it sa amoang (in our) political party nga para namo naay (that for us has an) advantage during that time. Our political slogan was also in line with our political platform. It was good governance and transparency. We had to tell the people that we must fight against corruption" (KI1, Nationalist People's Coalition, March 21, 2023).

The NPC candidates also employed *recurrida* in every barangay and sounded off campaign jingles as strategies to win votes, which Menon classified as a distribution function. Key Informant 1 stated, "We reached every nook and cranny of the city so that the market, which is the voters, were informed of our plans and programs" (KI1, March 21, 2023).

Senator Tito Sotto also underscored using a simple yet relevant platform when he ran for senator in 2016 under the NPC. His platforms of government were anti-illegal drug campaigns, anti-insurgency, and budget reform. He also used political ads, leading him to the 19th spot among the candidates who spent money on political ads (Simon, 2017). The NPC also utilized monetary indulgence, which Menon classified as cost function, machine politics, and material rewards. The NPC reported that they strove to provide accessibility to the public. Key Informant 1 emphasized that:

"As public servants, we stood to be "dali maabot or mapangita or dali mahangyo sa katawhan (easily accessible and quick to respond to people). If there are requests that cannot be given, we say honestly. If pwede dili pud mi mo promise (if possible, we also do not promise). However, we tried our best na mahatag ilahang gipangayo (we tried our best to give what they requested). Aside from the good character we presented to the public, there was a need for monetary indulgence to our would-be voters" (KI1, March 21, 2023).

Aspinal and Hicken (2020) argued that a relationship based on the calculations of immediate rewards rather than a long-term relationship of mutual trust and dependence should be established, illustrating that transactional clientelism would secure votes to help candidates win the election. The candidates also give dole-outs such as money, basic foodstuff, clothing, and accessible healthcare check-ups. These material inducements spread to the local leaders who directly interact with the voters. The NPC candidates also employed full party disclosure, a massive information drive about the party candidate, and wide application of social media, which Menon classifies under the news management function and communication function. Key Informant 1 posited that social media helped our fellow candidates from the NPC to campaign online since the young population used it (KI1, March 20, 2023). Demicillio (2010) posited that the Dumaguete local politicians such as Remollo (LP), Macias (NPC), Arnaiz (Lakas CMD), and Villegas (Lakas CMD) visited houses, posted posters in the streets, distributed fliers and pamphlets containing their personal and educational backgrounds, and conducted motorcades, radio guesting, and, most importantly, community meetings. Lorenzana and Sayo (2005) argued

that candidates build their campaign strategies around believing the only way to win is to project a popular, dependable, and even moneyed personality. Thus, each candidate must be expected to utilize various methods such as poster production, conducting rallies, and media and radio exposur. Menon's taxonomy (2008) is an essential tool used in the current study to objectively describe the political marketing strategies of local politicians from the LP and NPC. The more exciting inquiry, however, is the level of effectiveness of these political marketing strategies.

3.5 The Level of Effectiveness of the Political Marketing Strategies as Perceived by the Winning Party Candidates by Position

This section presents the level of effectiveness of the political marketing strategies as perceived by the winning party candidates by position. Effectiveness is measured by the ability of the candidates to convert their political platform and political marketing strategies into results by gathering votes. Those who won their respective seats of power in the City of Dumaguete responded on which strategy or a combination thereof was the most effective in catapulting themselves into the seat of power. This data set was influenced by the field experience when, unconsciously, the winning candidates in the 2016 election appeared more conversant in using several political marketing strategies. For instance, all Key Informants admitted to having massively utilized the local media and publicity activities using all available media outlets to translate their candidacy into the voters' minds. Further, they also suggested that controlling the voters' minds through the party principles and their image building, reinforced by material rewards, assured their platform strategy conversion into votes, as explicated by Key Informants 1 and 4:

"Winning the election requires much money, big and effective machinery at the grassroots level, time, and effort. Without these material rewards and the corresponding services in the barangays, as well as the frequent visits for visibility and party imaging, winning elections is almost impossible. Our party's knowledge of effectiveness is result-driven. When we see relative results, we say we were effective" (KI1 & KI4, Liberal Party March 24, 2023).

Table 8 presents the perceived effectiveness of the political marketing strategies to concretize the statements of key informants 1 and 4.

Table 8. The level of effectiveness of the political marketing strategies as perceived by the winning party candidates by position

Candidates/Party/Position	Political Marketing Strategies								
	A	B	C	D	E	F	G	H	I
KI 1 (LP) City Councilor	4.67	5.00	4.20	4.20	4.75	3.33	3.67	4.33	3.67
KI 2 (NPC) City Councilor	4.67	4.67	4.40	4.80	4.75	2.33	4.00	4.00	3.33
KI 3 (LP) City Councilor	4.67	3.67	4.00	4.60	5.00	3.67	4.00	4.67	3.67
KI 4 (LP) City Councilor	5.00	4.67	4.20	4.80	4.25	3.67	4.00	5.00	4.33
KI 5 (LP) City Councilor	3.00	2.00	2.00	-	5.00	3.00	3.00	1.00	-
KI 6 (NPC) City Councilor	5.00	5.00	3.40	5.00	4.50	1.00	1.00	3.00	2.33
KI 7 (LP) City Councilor	4.67	3.67	3.40	3.80	4.25	3.67	3.67	3.67	3.33
KI 8 (LP) City Councilor	5.00	5.00	3.80	5.00	4.00	3.67	4.00	3.67	3.67
KI 9 (NPC) City Councilor	4.67	4.33	4.20	4.40	5.00	4.33	4.33	5.00	4.33
Mean	4.59	4.22	3.73	4.58	4.61	3.19	3.52	3.81	3.58

Legend A: WX=Weighted Mean; s=Standard Deviation; VD=Verbal Description; 1.00-1.79=Not Effective (NE); 1.80-2.59=Less Effective (LE); 2.60-3.39=Neutral(N); 3.40-4.19=Effective(E); 4.20-5.00=Most Effective (ME)

Legend B: A.) Product function; B.) Distribution function; C.) Cost function; D.) Communication function; E.) News management function; F.) Fundraising function; G.) Parallel campaign management function; H.) Internal cohesion management function; I.) Machine politics and material rewards. (Menon, 2008)

Based on the mean ratings, the top 9 political marketing strategies in descending order are the following: news management function (4.61), product function (4.59), communication function (4.58), distribution function (4.22) perceived as most effective; internal cohesion management function (3.81), cost function (3.73), machine politics and material rewards (3.58), parallel campaign management function (3.52) perceived as effective; and fundraising function (3.19) perceived by the candidates as either effective or less effective (neutral).

News management function, being the most effective political marketing strategy, is propelled by the fact that social media platforms widely contributed to the success of the candidates' campaign delivery. Publicity and social media outlet exposures were also used as a vote-drawing technique to win the 2016 election. Public

relations activities, media management, and online advertising campaign management augmented personal and party image building. The political party's simplified and concise party message delivered through media facilitated voters' appreciation of the candidates and the party's principles, ideology, and platform.

Product function, being the second most effective, means that the candidates ensured that their voters made intelligent choices. A clear and well-defined set of programs was designed, covering relevant political platforms, specially packaged image presentation of candidates, and carefully formulated party ideology and policies on environment preservation, infrastructure development, livelihood programs, women and gender rights, transparency, and accountability.

Communication function, the third most effective, indicates that the candidates addressed issues and future policymaking and progress by communicating the people's concerns regarding poverty, graft and corruption, and the prevalence of illegal drugs. The candidates also clearly communicated their intentions to end vote-buying and corrupt practices. They shared their plans to improve people's skills and well-being and presented platforms and campaign slogans to address social issues. They also developed simplified and concise campaign materials to facilitate voters' appreciation.

Distribution function, the fourth most effective political marketing strategy, exhibits that all the candidates presented themselves to the voters through a clear-party campaign delivery system that gave them easy access to all vital information about their political platform of essential services, infrastructure, and environment programs. The candidates also resorted to disclosure and dissemination of their programs of government.

Internal cohesion management function, the top political marketing strategy perceived as effective, explicates that internal stability and credibility concerning the candidates outside image were evident. They coordinated with party critics and allies to maintain stability and project harmony with the party. The candidates also deputized key political figures/personalities to involve various social sectors and mobilize campaign operations.

Cost function, the second effective political marketing campaign strategy, explicates that the candidates employed calculated campaign strategies by managing attitudinal and behavioral barriers of voters or controlled campaign strategies. They utilized material rewards, such as monetary indulgence, distribution of bread, and free legal and dental consultation. The candidates also employed a party slogan promotion, such as "*Daang Matuwid*," "Change," or "Good Governance," and they used a wider social media to disseminate their platforms on education, health, livelihood, and the environment.

Machine politics and material rewards, emerging as the third effective political marketing strategy, exemplify that the candidates rewarded the constituents who contributed to the campaign's success by giving job placements to their constituents. The candidates also delivered essential services as *ayuda* to each barangay to garner votes. This strategy is called "*panapos pagtulak sa ilahang desisyon para sa maong particular na kandidato*" (full push for the voters to decide in favor of a particular candidate) (KI1, Liberal Party March 20, 2023), even though material rewards, especially if they entail the use of government funds, will make it blatantly corrupt. It has been an accepted norm in politics (Scott, 1969).

Parallel campaign management function, the fourth effective political marketing strategy, facilitates the coordination of management activities by advancing the utilization of political machinery down to the barangay level to mobilize voters' support. The candidates mobilized churches and NGOs in the campaign operations to win votes. The candidates also utilized the assistance of fraternities and sororities in various schools and other campus organizations to campaign for their candidates.

Fundraising function, perceived as neither effective nor ineffective, showed a result that generated substantial fund support, party membership fees, and donations from friends, benefactors, and other citizens that were relatively less effective in winning the people's votes. However, management and administration gurus are convinced that finance is an essential and strategic marketing resource to accomplish campaign goals through people and organizations.

4.0 Conclusion

The study found that LP and NPC candidates used marketing concepts, as espoused by various scholars like Bigi (2017), Kotler and Levy (1969), and Menon (2008), in their political campaigns. Political parties and candidates used various political marketing strategies, ranging from a well-defined political platform and building an image of candidates that would have a lasting impression on voters to utilizing funds as machinery during the campaign period (Al et al., 2013). These strategies aimed to gain votes, legitimize power, and convert it into authority (Ames & Hall, 2002). However, absolute power, like the misuse of pork barrel funds, can lead to corruption (Scott, 1969). Studies by Bolo and Murcia (2016), Calida (2016), and others included voting preferences. Key informants disclosed that they managed voters' preferences by offering material inducements (KI7 and KI8, July 7, 2023). Lande's (1996) survey, which found that support came from campaign strategies and party coalitions, was useful for this study. It revealed that pork barrel funds, classified as machine politics and rewards, were among the top strategies used by winning candidates in the 2016 elections. Thompson (2010) and Teehankee (2016) described Philippine campaigns as utilizing free market votes (advertisements, billboards, images, platforms, speeches) and command votes (patronage, pork barrel funds, favors from local leaders). This aligns with studies on clientelism culture by Lorenzana and Sayo (2005), Scheiner (2006), Kasuya (2009), Sidel (1992), and Aspinall and Hicken (2020), which highlight the role of transactional clientelism in securing votes through material inducements.

The current study affirmed that LP and NPC candidates used similar strategies, classified into news management, product, communication, and distribution functions based on Menon's taxonomy. News management ranked the most effective strategy, followed by product, communication, and distribution functions. Machine politics and material rewards were also effective and classified as command votes. The study identified other effective strategies not captured in previous research, including internal cohesion management function, cost function, and parallel campaign management function. The fundraising function could be more effective and warrants further. These findings corroborate with existing literature on political marketing strategies and Philippine campaigns.

It is recommended that, with the political marketing strategies employed by the candidates from both political parties in the 2016 election, the study could assist politicians in identifying the strategies that are most effective, effective, and not effective in electoral campaigns. It is recommended that future political parties have a clear operations plan by cascading each strategy into sets of key result areas (KRA) where key performance indicators, targets, and budget allocations to accomplish the strategy are rationally allocated, disbursed, and monitored for more efficient and effective political campaign operations. It is also further recommended that future researchers conduct a research study that focuses on the voters' perceptions, similar but not limited to Murcia and Bolo (2016) on the Millennial Voting Preferences for the Philippine Presidential Elections, Calda (2016) on Voting Preferences of Selected Voters in the City of Calapan, Ereno and Langoyan (n.d) on a comprehensive study of the Cebuano Electorates' Preferences highlighting the key attributes that candidates should possess, Lande (1996) on the Geographical and Statistical Analysis of the 1922 Presidential Elections, that may be useful to the future politicians to revisit and develop their campaign strategies to align with the voters' preferences in Dumaguete City.

In addition, the academe may use the findings to enrich the content of the courses offered in political science, especially in the universities in Dumaguete City, namely: Negros Oriental State University, Silliman University, Saint Paul University, Foundation University, Metro Dumaguete College, and other related academic units. The research findings may benefit future local political parties by helping them develop effective marketing strategies that respond to the prevalent political situations in Dumaguete City. Further, the research findings may also assist the voters of Dumaguete City to discern which candidates they would vote for in future local elections.

5.0 Contributions of Authors

The author affirms exclusive ownership of the research. The final manuscript has been examined, reviewed, and approved by the author, the adviser, and the statistician.

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The research was conducted without financial support from any external organizations. All costs associated with the research were covered by the researcher personally.

7.0 Conflict of Interests

The author has confirmed no conflicts of interest regarding this study.

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A Case Study on the Static Behavior of a Pedestrian Bridge Built with a Steel Pratt Truss Deck Bridge Supported by an Inclined Roller Support

Angelito N. Angeles*, Keith Zyren T. Almodovar, Gericho G. Gopez,
Kezia Irielle N. Lebre, Sharina Jolene B. Nucup, Georvin P. Samson

Civil Engineering Department, School of Engineering and Architecture, Holy Angel University,
Angeles City, Philippines

*Corresponding author email: anangeles@hau.edu.ph

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Abstract. Construction of bridges commonly uses trusses due to their lightweight design, which can endure heavy loads and span large distances. However, there are instances when the supports of these trusses do not lie normally on a horizontal surface. For some, the supports lie on inclined foundations, which is the focus of this study. The main objective of this study is to present the basic theory of plane truss analysis with an inclined roller support using the Direct Stiffness Method (DSM) in comparison to the use of the Graphic Rapid Analysis Software Program (GRASP) to analyze the static behavior of the structure. Furthermore, a case study is conducted to check the effects of inclined supports on a plane truss structure. Based on the results, it was discovered that the introduction of inclined roller supports does have a negative effect on the stability of the structure.

Keywords: Bridge; Bridge support; Inclined roller support; Plane truss; Graphic rapid analysis software; Program; Direct stiffness method.

1.0 Introduction

Many structures are being built with the use of trusses, whether it be made of steel or wood. The primary advantage of trusses is that it can cover large spans and support heavy loads. Bridges and roof systems often use trusses because of their characteristics. The use of structural trusses entails analysis especially when it comes to the material properties used as well as the length of each member used. Each element is designed such that it will be able to support a certain number of loads without noticeable deflections. The most important property being considered in the analysis of trusses is the stiffness of each element. However, there are instances when these trusses are supported by inclined supports, which may affect the load capacity of the truss system. The study will present the basic theory of analyzing Plane Trusses

with the use of the Direct Stiffness Method (DSM) and the use of Graphic Rapid Analysis Software Program (GRASP) to compare the static behavior of the structure. The study will also present a case study of a pedestrian bridge built using a Pratt truss deck bridge having various angles of inclination of the roller support to observe how the inclination would affect the structure.

2.0 Structural Model and Matrix Formulation

2.1 Structural Model

In Figure 1, a 9-element structure was used to demonstrate the analysis of a plane truss with a hinge support at one end, and a roller support inclined by 30 degrees at the other end using the Direct Stiffness Method (DSM). Loads were applied at both horizontal

and vertical directions of the joints, specifically, at joints where there are no restraints. The following are the material properties of the truss elements used in the structure:

Modulus of Elasticity: 200,000 MPa

Area of Members: 2,813.42 mm²

Moment of Inertia: 19.55×10^6 mm⁴

In Figure 2, the global axes for each node were established. In Figure 3, the truss elements were disassembled to display the local axes for each element. To simplify the computation using DSM, the element properties were displayed in Table 1.

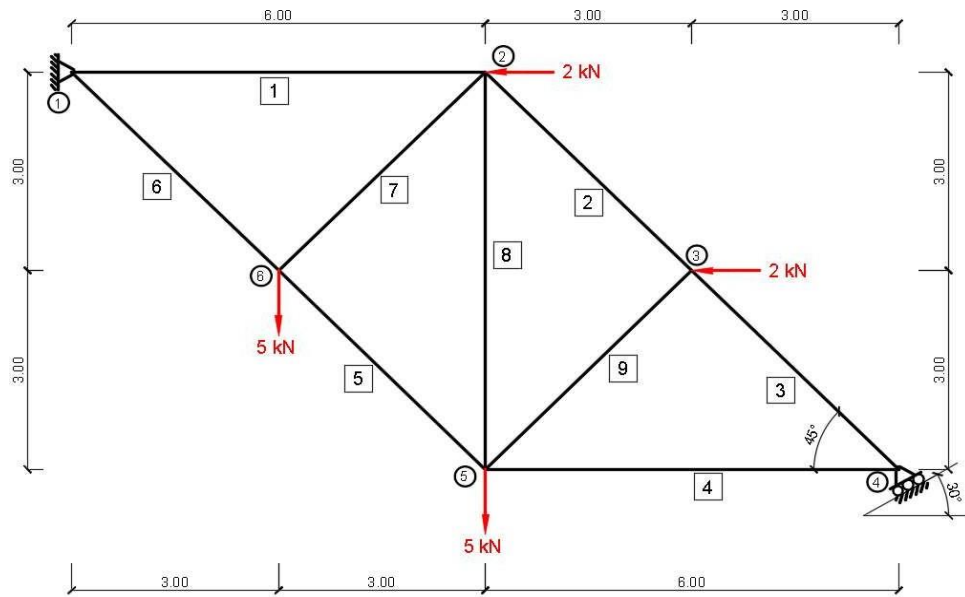


Figure 1. Plane truss model with inclined roller support

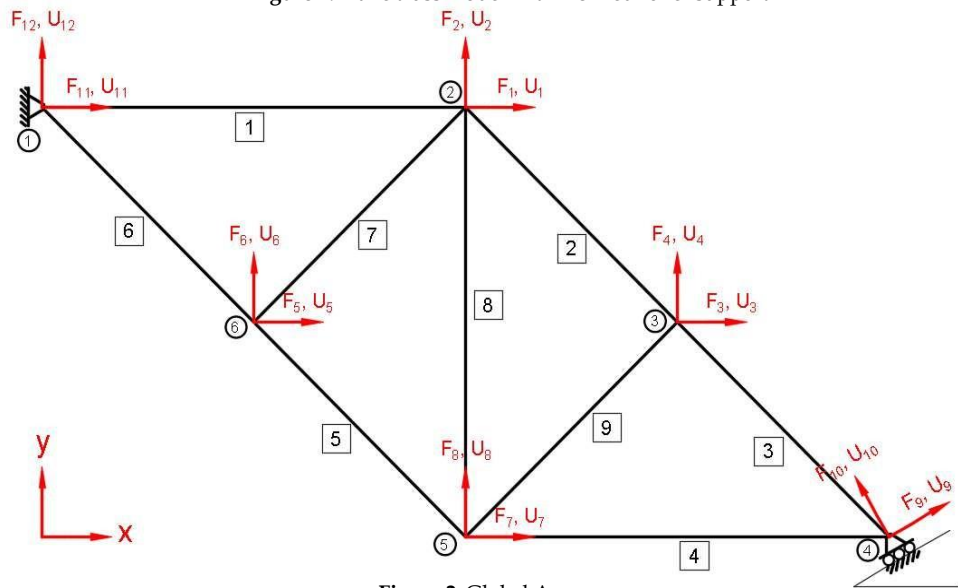


Figure 2. Global Axes

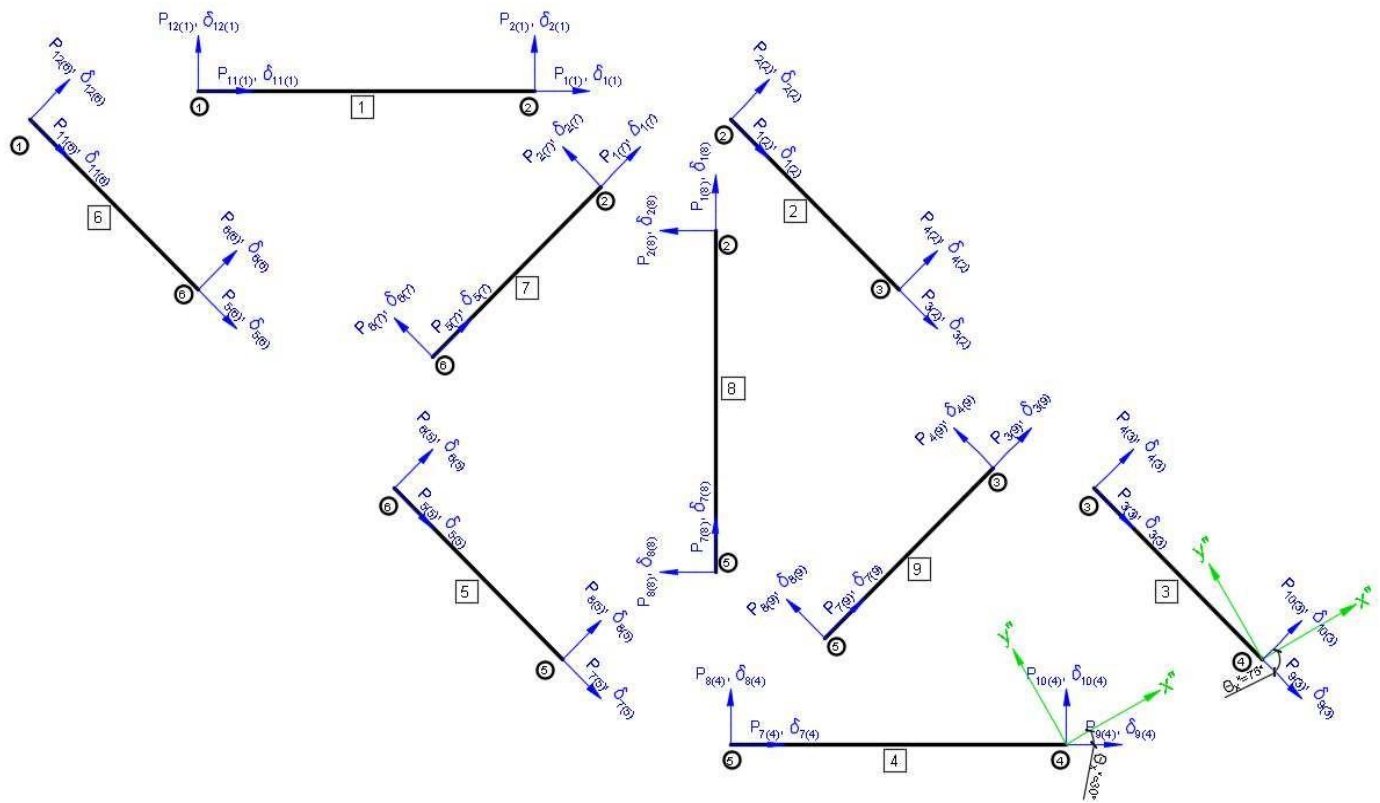


Figure 3. Local axes of each truss element

ELEMENT PROPERTIES											
Element	Node	Length	E	A	EA	θ (deg)	$\cos \theta$	$\sin \theta$	θ_x''	$\cos \theta_x''$	$\sin \theta_x''$
		(m)	(Mpa)	(mm ²)	kN				(deg)		
1	1 → 2	6.00	200,000	2,813.42	562,683.56	0.00	1.000	0.000			
2	2 → 3	4.24	200,000	2,813.42	562,683.56	-45.00	0.707	-0.707			
3	3 → 4	4.24	200,000	2,813.42	562,683.56	-45.00	0.707	-0.707	-75.00	0.259	-0.966
4	5 → 4	6.00	200,000	2,813.42	562,683.56	0.00	1.000	0.000	-30.00	0.866	-0.500
5	6 → 5	4.24	200,000	2,813.42	562,683.56	-45.00	0.707	-0.707			
6	1 → 6	4.24	200,000	2,813.42	562,683.56	-45.00	0.707	-0.707			
7	6 → 2	4.24	200,000	2,813.42	562,683.56	45.00	0.707	0.707			
8	5 → 2	6.00	200,000	2,813.42	562,683.56	90.00	0.000	1.000			
9	5 → 3	4.24	200,000	2,813.42	562,683.56	45.00	0.707	0.707			

Table 1. Element properties

2.2 Matrix Formulation

Using the Direct Stiffness Method, the local stiffness matrices for each truss element were constructed based on the given properties. Likewise, the transformation matrices were constructed based on the established local axes of the truss elements.

Element Local Stiffness Matrix

Tables 2 to 10 display the local stiffness matrix (k) for each element.

	11	12	1	2	
	0.167	0.000	-0.167	0.000	11
$k_1 = EA$	0.000	0.000	0.000	0.000	12
	-0.167	0.000	0.167	0.000	1
	0.000	0.000	0.000	0.000	2

Table 2. Local stiffness matrix of member 1

	1	2	3	4	
	0.236	0.000	-0.236	0.000	1
$k_2 = EA$	0.000	0.000	0.000	0.000	2
	-0.236	0.000	0.236	0.000	3
	0.000	0.000	0.000	0.000	4

Table 3. Local stiffness matrix of member 2

	3	4	9	10	
	0.236	0.000	-0.236	0.000	3
$k_3 = EA$	0.000	0.000	0.000	0.000	4
	-0.236	0.000	0.236	0.000	9
	0.000	0.000	0.000	0.000	10

Table 4. Local stiffness matrix of member 3

	7	8	9	10	
	0.167	0.000	-0.167	0.000	7
$k_4 = EA$	0.000	0.000	0.000	0.000	8
	-0.167	0.000	0.167	0.000	9
	0.000	0.000	0.000	0.000	10

Table 5. Local stiffness matrix of member 4

	5	6	7	8	
	0.236	0.000	-0.236	0.000	5
$k_5 = EA$	0.000	0.000	0.000	0.000	6
	-0.236	0.000	0.236	0.000	7
	0.000	0.000	0.000	0.000	8

Table 6. Local stiffness matrix of member 5

	11	12	5	6	
	0.236	0.000	-0.236	0.000	11
$k_6 = EA$	0.000	0.000	0.000	0.000	12
	-0.236	0.000	0.236	0.000	5
	0.000	0.000	0.000	0.000	6

Table 7. Local stiffness matrix of member 6

	5	6	1	2	
	0.236	0.000	-0.236	0.000	5
$k_7 = EA$	0.000	0.000	0.000	0.000	6
	-0.236	0.000	0.236	0.000	1
	0.000	0.000	0.000	0.000	2

Table 8. Local stiffness matrix of member 7

	7	8	1	2	
	0.167	0.000	-0.167	0.000	7
$k_8 = EA$	0.000	0.000	0.000	0.000	8
	-0.167	0.000	0.167	0.000	1
	0.000	0.000	0.000	0.000	2

Table 9. Local stiffness matrix of member 8

	7	8	3	4	
	0.236	0.000	-0.236	0.000	7
$k_9 = EA$	0.000	0.000	0.000	0.000	8
	-0.236	0.000	0.236	0.000	3
	0.000	0.000	0.000	0.000	4

Table 10. Local stiffness matrix of member 9

Element Transformation Matrix

Tables 11 to 19 display the transformation matrix (β) for each element.

	11	12	1	2	
$\beta_1 =$	1.000	0.000	0.000	0.000	11
	0.000	1.000	0.000	0.000	12
	0.000	0.000	1.000	0.000	1
	0.000	0.000	0.000	1.000	2

Table 11. Transformation matrix of member 1

	1	2	3	4	
$\beta_2 =$	0.707	-0.707	0.000	0.000	1
	0.707	0.707	0.000	0.000	2
	0.000	0.000	0.707	-0.707	3
	0.000	0.000	0.707	0.707	4

Table 12. Transformation matrix of member 2

	3	4	9	10	
$\beta_3 =$	0.707	-0.707	0.000	0.000	3
	0.707	0.707	0.000	0.000	4
	0.000	0.000	0.259	-0.966	9
	0.000	0.000	0.966	0.259	10

Table 13. Transformation matrix of member 3

	7	8	9	10	
$\beta_4 =$	1.000	0.000	0.000	0.000	7
	0.000	1.000	0.000	0.000	8
	0.000	0.000	0.866	-0.500	9
	0.000	0.000	0.500	0.866	10

Table 14. Transformation matrix of member 4

	5	6	7	8	
$\beta_5 =$	0.707	-0.707	0.000	0.000	5
	0.707	0.707	0.000	0.000	6
	0.000	0.000	0.707	-0.707	7
	0.000	0.000	0.707	0.707	8

Table 15. Transformation matrix of member 5

	11	12	5	6	
$\beta_6 =$	0.707	-0.707	0.000	0.000	11
	0.707	0.707	0.000	0.000	12
	0.000	0.000	0.707	-0.707	5
	0.000	0.000	0.707	0.707	6

Table 16. Transformation matrix of member 6

	5	6	1	2	
$\beta_7 =$	0.707	0.707	0.000	0.000	5
	-0.707	0.707	0.000	0.000	6
	0.000	0.000	0.707	0.707	1
	0.000	0.000	-0.707	0.707	2

Table 17. Transformation matrix of member 7

	7	8	1	2	
$\beta_8 =$	0.000	1.000	0.000	0.000	7
	-1.000	0.000	0.000	0.000	8
	0.000	0.000	0.000	1.000	1
	0.000	0.000	-1.000	0.000	2

Table 18. Transformation matrix of member 8

	7	8	3	4	
$\beta_9 =$	0.707	0.707	0.000	0.000	7
	-0.707	0.707	0.000	0.000	8
	0.000	0.000	0.707	0.707	3
	0.000	0.000	-0.707	0.707	4

Table 19. Transformation matrix of member 9

3.0 Matrix Solution Using Excel

3.1 Computation of the Element Global Stiffness Matrix

Using the constructed local stiffness matrix (k) and transformation matrix (β), the global stiffness matrix $[K_e]$ of each truss element can be computed using equation 1. Tables 20 to 28 display the computed global stiffness matrix $[K_e]$ for each element.

$$[K_e] = [\beta^T][k][\beta] \quad (\text{Equation 1})$$

	11	12	1	2	
	0.167	0.000	-0.167	0.000	11
$[K_1] = EA$	0.000	0.000	0.000	0.000	12
	-0.167	0.000	0.167	0.000	1
	0.000	0.000	0.000	0.000	2

Table 20. Global stiffness matrix of member 1

	1	2	3	4	
	0.118	-0.118	-0.118	0.118	1
$[K_2] = EA$	-0.118	0.118	0.118	-0.118	2
	-0.118	0.118	0.118	-0.118	3
	0.118	-0.118	-0.118	0.118	4

Table 21. Global stiffness matrix of member 2

	3	4	9	10	
	0.118	-0.118	-0.043	0.161	3
$[K_3] = EA$	-0.118	0.118	0.043	-0.161	4
	-0.043	0.043	0.016	-0.059	9
	0.161	-0.161	-0.059	0.220	10

Table 22. Global stiffness matrix of member 3

	7	8	9	10	
	0.167	0.000	-0.144	0.083	7
$[K_4] = EA$	0.000	0.000	0.000	0.000	8
	-0.144	0.000	0.125	-0.072	9
	0.083	0.000	-0.072	0.042	10

Table 23. Global stiffness matrix of member 4

	5	6	7	8	
	0.118	-0.118	-0.118	0.118	5
$[K_5] = EA$	-0.118	0.118	0.118	-0.118	6
	-0.118	0.118	0.118	-0.118	7
	0.118	-0.118	-0.118	0.118	8

Table 24. Global stiffness matrix of member 5

	11	12	5	6	
	0.118	-0.118	-0.118	0.118	11
$[K_6] = EA$	-0.118	0.118	0.118	-0.118	12
	-0.118	0.118	0.118	-0.118	5
	0.118	-0.118	-0.118	0.118	6

Table 25. Global stiffness matrix of member 6

	5	6	1	2	
	0.118	0.118	-0.118	-0.118	5
$[K_7] = EA$	0.118	0.118	-0.118	-0.118	6
	-0.118	-0.118	0.118	0.118	1
	-0.118	-0.118	0.118	0.118	2

Table 26. Global stiffness matrix of member 7

	7	8	1	2	
	0.000	0.000	0.000	0.000	7
$[K_8] = EA$	0.000	0.167	0.000	-0.167	8
	0.000	0.000	0.000	0.000	1
	0.000	-0.167	0.000	0.167	2

Table 27. Global stiffness matrix of member 8

	7	8	3	4	
	0.118	0.118	-0.118	-0.118	7
$[K_9] = EA$	0.118	0.118	-0.118	-0.118	8
	-0.118	-0.118	0.118	0.118	3
	-0.118	-0.118	0.118	0.118	4

Table 28. Global stiffness matrix of member 9

3.2 Construction of Expanded Structure Global Stiffness Matrix

With the computed global stiffness matrix $[K_e]$ of each element, the expanded structure global stiffness matrix $[K_s]$ can be constructed by getting the summation of the element global stiffness matrices. Table 29 shows the expanded global stiffness matrix $[K_s]$.

	1	2	3	4	5	6	7	8	9	10	11	12	
$[K_s] = EA$	0.402	0.000	0	0	0	0	0.000	0.000	0	0	-0.167	0	1
	0.000	0.402	0	0	0	0	0.000	-0.167	0	0.000	0	0	2
	0	0	0.354	-0.118	0	0	-0.118	-0.118	0	0	0.000	0	3
	0	0	-0.118	0.354	0	0.000	-0.118	-0.118	0	0	0	0	4
	0	0	0	0	0.354	0	-0.118	0	0	0	0	0	5
	0	0	0	0.000	0	0.354	0	0	0	0	0	0	6
	0.000	0.000	-0.118	-0.118	-0.118	0	0.402	0	-0.144	0	0	0	7
	0.000	-0.167	-0.118	-0.118	0	0	0	0.402	0	0	0	0.000	8
	0	0	0	0	0	0	-0.144	0	0.141	0	0	0	9
	0	0.000	0	0	0	0	0	0	0	0.262	0	0	10
	-0.167	0	0.000	0	0	0	0	0	0	0	0.285	0	11
	0	0	0	0	0	0	0	0.000	0	0	0	0.118	12

Table 29. Expanded global structure stiffness matrix

3.3 Global Nodal Forces

Table 30 displays the known global nodal forces [FP] and unknown reactions at supports [FQ].

F (kN)	
F _P	F ₁ = -2.00
	F ₂ = 0.00
	F ₃ = -2.00
	F ₄ = 0.00
	F ₅ = 0.00
	F ₆ = -5.00
	F ₇ = 0.00
	F ₈ = -5.00
	F ₉ = 0.00
F _Q	F ₁₀ = ?
	F ₁₁ = ?
	F ₁₂ = ?

Table 30. Global nodal forces and reactions at supports

3.4 Global Nodal Displacements

Table 31 displays the unknown global nodal displacements [UP] and zero nodal displacements at supports [UQ].

U (m)	
U _P	U ₁ = ?
	U ₂ = ?
	U ₃ = ?
	U ₄ = ?
	U ₅ = ?
	U ₆ = ?
	U ₇ = ?
	U ₈ = ?
	U ₉ = ?
U _Q	U ₁₀ = 0.00
	U ₁₁ = 0.00
	U ₁₂ = 0.00

Table 31. Global nodal displacements

3.5 Global Structure Stiffness Equation

Using the expanded global structure stiffness matrix [KS] in Table 29, global nodal forces [F] in Table 30, and global nodal displacements [U] in Table 31, the global structure stiffness equation can be formulated using equation 2. Equation 3 displays the partitioned matrices for the known and unknown values of the global nodal forces and global nodal displacements. Table 32 displays the partitioned global structure stiffness equation matrix.

$$[F] = [K_s][U] \quad (\text{Equation 2})$$

$$\begin{Bmatrix} F_P \\ F_Q \end{Bmatrix} = \begin{bmatrix} K_{PP} & K_{PQ} \\ K_{QP} & K_{QQ} \end{bmatrix} \begin{Bmatrix} U_P \\ U_Q \end{Bmatrix} \quad (\text{Equation 3})$$

$[F_P] =$	$[K_{PP}]$	$[K_{PQ}]$	$[U_P]$										
$[F_Q] =$	$[K_{QP}]$	$[K_{QQ}]$	$[U_Q]$										
-2	226,406.38	0.00	-66,312.89	66,312.89	-66,312.89	-66,312.89	0.00	0.00	0.00	0.00	-93,780.59	0.00	U_1
0	0.00	226,406.38	66,312.89	-66,312.89	-66,312.89	-66,312.89	0.00	-93,780.59	0.00	0.00	0.00	0.00	U_2
-2	-66,312.89	66,312.89	198,938.68	-66,312.89	0.00	0.00	-66,312.89	-66,312.89	-24,272.20	90,585.10	0.00	0.00	U_3
0	66,312.89	-66,312.89	-66,312.89	198,938.68	0.00	0.00	-66,312.89	-66,312.89	24,272.20	-90,585.10	0.00	0.00	U_4
0	-66,312.89	-66,312.89	0.00	0.00	198,938.68	-66,312.89	-66,312.89	0.00	0.00	0.00	-66,312.89	66,312.89	U_5
-5	-66,312.89	-66,312.89	0.00	0.00	-66,312.89	198,938.68	66,312.89	-66,312.89	0.00	0.00	66,312.89	-66,312.89	U_6
0	0.00	0.00	-66,312.89	-66,312.89	-66,312.89	66,312.89	226,406.38	0.00	-81,216.38	46,890.30	0.00	0.00	U_7
-5	0.00	-93,780.59	-66,312.89	-66,312.89	66,312.89	-66,312.89	0.00	226,406.38	0.00	0.00	0.00	0.00	U_8
0	0.00	0.00	-24,272.20	24,272.20	0.00	0.00	-81,216.38	0.00	79,219.69	-73,764.63	0.00	0.00	U_9
F_{10}	0.00	0.00	90,585.10	-90,585.10	0.00	0.00	46,890.30	0.00	-73,764.63	147,186.69	0.00	0.00	0
F_{11}	-93,780.59	0.00	0.00	0.00	-66,312.89	66,312.89	0.00	0.00	0.00	0.00	160,093.49	-66,312.89	0
F_{12}	0.00	0.00	0.00	0.00	66,312.89	-66,312.89	0.00	0.00	0.00	0.00	-66,312.89	66,312.89	0

Table 32. Global structure stiffness equation matrix

3.6 Computation of Global Nodal Displacements

Using the global structure stiffness equation in Table 32, the unknown nodal displacements may be computed using Equation 4. Table 33 displays the global nodal displacement equation matrix and Table 34 displays the computed values of the global nodal displacements.

$$[U_P] = [K_{PP}]^{-1}[F_P] \quad (\text{Equation 4})$$

$[U_p] =$	$[K_{pp}^{-1}]$									$[F_p]$
$U_1 =$	0.00001066	0.00000750	0.00000908	0.00000591	0.00000908	0.00000908	0.00000750	0.00000750	0.00000865	-2.00
$U_2 =$	0.00000750	0.00002471	0.00001376	0.00002038	0.00001386	0.00001834	0.00001259	0.00002155	0.00001088	0.00
$U_3 =$	0.00000908	0.00001376	0.00003599	0.00002782	0.00001407	0.00000877	0.00003344	0.00002284	0.00003678	-2.00
$U_4 =$	0.00000591	0.00002038	0.00002782	0.00003393	0.00001355	0.00001273	0.00002793	0.00002629	0.00002676	0.00
$U_5 =$	0.00000908	0.00001386	0.00001407	0.00001355	0.00001789	0.00001259	0.00001534	0.00001228	0.00001589	0.00
$U_6 =$	0.00000908	0.00001834	0.00000877	0.00001273	0.00001259	0.00002237	0.00000474	0.00001676	0.00000365	-5.00
$U_7 =$	0.00000750	0.00001259	0.00003344	0.00002793	0.00001534	0.00000474	0.00004128	0.00002008	0.00004401	0.00
$U_8 =$	0.00000750	0.00002155	0.00002284	0.00002629	0.00001228	0.00001676	0.00002008	0.00002904	0.00001953	-5.00
$U_9 =$	0.00000865	0.00001088	0.00003678	0.00002676	0.00001589	0.00000365	0.00004401	0.00001953	0.00006081	0.00

Table 33. Global nodal displacement equation matrix

$[U_P]$					
$U_1 =$	-0.0001224	m	-0.1224	mm	
$U_2 =$	-0.0002420	m	-0.2420	mm	
$U_3 =$	-0.0002482	m	-0.2482	mm	
$U_4 =$	-0.0002626	m	-0.2626	mm	
$U_5 =$	-0.0001707	m	-0.1707	mm	
$U_6 =$	-0.0002314	m	-0.2314	mm	
$U_7 =$	-0.0002060	m	-0.2060	mm	
$U_8 =$	-0.0002897	m	-0.2897	mm	
$U_9 =$	-0.0002067	m	-0.2067	mm	(along x"-axis)
	-0.0001790	m	-0.1790	mm	(along x-axis)
	-0.0001034	m	-0.1034	mm	(along y-axis)

Table 34. Global nodal displacements

3.7 Computation of Reaction Forces at Supports

Using the global structure stiffness equation in Table 32 and the computed global nodal displacements in Table 34, the reaction forces at supports may be computed using Equation 5. Table 35 displays the global nodal forces equation matrix and table 36 displays the computed values of the reaction forces at supports.

$$[F_Q] = [K_{QP}][U_P] \quad (\text{Equation 5})$$

[F _Q] =	[K _{QP}]									[U _P]
F ₁₀ =	0.00	0.00	90,585.10	-90,585.10	0.00	0.00	46,890.30	0.00	-73,764.63	-0.0001224
F ₁₁ =	-93,780.59	0.00	0.00	0.00	-66,312.89	66,312.89	0.00	0.00	0.00	-0.0002420
F ₁₂ =	0.00	0.00	0.00	0.00	66,312.89	-66,312.89	0.00	0.00	0.00	-0.0002482
										-0.0002626
										-0.0001707
										-0.0002314
										-0.0002060
										-0.0002897
										-0.0002067

Table 35. Global nodal forces equation matrix

$[F_Q]$		
$F_{10} =$	6.899	kN
$F_{11} =$	7.450	kN
$F_{12} =$	4.025	kN

Table 36. Reaction forces at supports

3.8 Computation of Local Member Forces

With the computed global nodal displacements, a transformation from global to local nodal displacement is necessary to compute the local axial forces of each member. Using the local member forces formula in equation 6, the axial member forces were computed. Tables 37 to 45 display the local member forces equation matrices and the results.

$$[P_e] = [k][\beta][U] \quad (\text{Equation 6})$$

$P_{(1)} =$	k_1				β_1				U	$P_{(1)}$		
$P_{11(1)} =$	93780.59333	0	-93780.59	0	1	0	0	0	0.0000000	$P_{11(1)} =$	11.47	kN
$P_{12(1)} =$	0	0	0	0	0	1	0	0	0.0000000	$P_{12(1)} =$	0.00	kN
$P_{1(1)} =$	-93780.59333	0	93780.59	0	0	0	1	0	-0.0001224	$P_{1(1)} =$	-11.47	kN
$P_{2(1)} =$	0	0	0	0	0	0	0	1	-0.0002420	$P_{2(1)} =$	0.00	kN

Table 37. Local member force of Member 1

$P_{(2)} =$	k_2				β_2				U	$P_{(2)}$		
$P_{1(2)} =$	132625.79	0	-132625.79	0	0.707106781	-0.707106781	0	0	-0.0001224	$P_{1(2)} =$	9.86	kN
$P_{2(2)} =$	0	0	0	0	0.707106781	0.707106781	0	0	-0.0002420	$P_{2(2)} =$	0.00	kN
$P_{3(2)} =$	-132625.79	0	132625.79	0	0	0	0.707106781	-0.707106781	-0.0002482	$P_{3(2)} =$	-9.86	kN
$P_{4(2)} =$	0	0	0	0	0	0	0.707106781	0.707106781	-0.0002626	$P_{4(2)} =$	0.00	kN

Table 38. Local member force of member 2

$P_{(3)} =$	k_3				β_3				U	$P_{(3)}$		
$P_{3(3)} =$	132625.79	0	-132625.79	0	0.707106781	-0.707106781	0	0	-0.0002482	$P_{3(3)} =$	8.45	kN
$P_{4(3)} =$	0	0	0	0	0.707106781	0.707106781	0	0	-0.0002626	$P_{4(3)} =$	0.00	kN
$P_{9(3)} =$	-132625.79	0	132625.79	0	0	0	0.258819045	-0.965925826	-0.0002067	$P_{9(3)} =$	-8.45	kN
$P_{10(3)} =$	0	0	0	0	0	0	0.965925826	0.258819045	0.0000000	$P_{10(3)} =$	0.00	kN

Table 39. Local member force of member 3

$P_{(4)} =$	k_4				β_4				U	$P_{(4)}$		
$P_{7(4)} =$	93780.59	0	-93780.59	0	1	0	0	0	-0.0002060	$P_{7(4)} =$	-2.53	kN
$P_{8(4)} =$	0	0	0	0	0	1	0	0	-0.0002897	$P_{8(4)} =$	0.00	kN
$P_{9(4)} =$	-93780.59	0	93780.59	0	0	0	0.866025404	-0.5	-0.0002067	$P_{9(4)} =$	2.53	kN
$P_{10(4)} =$	0	0	0	0	0	0	0.5	0.866025404	0	$P_{10(4)} =$	0.00	kN

Table 40. Local member force of member 4

$P_{(5)} =$	k_5				β_5				U	$P_{(5)}$		
$P_{5(5)} =$	132625.79	0	-132625.79	0	0.707106781	-0.707106781	0	0	-0.0001707	$P_{5(5)} =$	-2.16	kN
$P_{6(5)} =$	0	0	0	0	0.707106781	0.707106781	0	0	-0.0002314	$P_{6(5)} =$	0.00	kN
$P_{7(5)} =$	-132625.79	0	132625.79	0	0	0	0.707106781	-0.707106781	-0.0002060	$P_{7(5)} =$	2.16	kN
$P_{8(5)} =$	0	0	0	0	0	0	0.707106781	0.707106781	-0.0002897	$P_{8(5)} =$	0.00	kN

Table 41. Local member force of member 5

$P_{(6)} =$	k_6				β_6				U	$P_{(6)}$		
$P_{11(6)} =$	132625.79	0	-132625.79	0	0.707106781	-0.707106781	0	0	0	$P_{11(6)} =$	-5.69	kN
$P_{12(6)} =$	0	0	0	0	0.707106781	0.707106781	0	0	0	$P_{12(6)} =$	0.00	kN
$P_{5(6)} =$	-132625.79	0	132625.79	0	0	0	0.707106781	-0.707106781	-0.0001707	$P_{5(6)} =$	5.69	kN
$P_{6(6)} =$	0	0	0	0	0	0	0.707106781	0.707106781	-0.0002314	$P_{6(6)} =$	0.00	kN

Table 42. Local member force of member 6

$P_{(7)} =$	k_7				β_7				U	$P_{(7)}$		
$P_{5(7)} =$	132625.79	0	-132625.79	0	0.707106781	0.707106781	0	0	-0.0001707	$P_{5(7)} =$	-3.54	kN
$P_{6(7)} =$	0	0	0	0	-0.707106781	0.707106781	0	0	-0.0002314	$P_{6(7)} =$	0.00	kN
$P_{1(7)} =$	-132625.79	0	132625.79	0	0	0	0.707106781	0.707106781	-0.0001224	$P_{1(7)} =$	3.54	kN
$P_{2(7)} =$	0	0	0	0	0	0	-0.707106781	0.707106781	-0.0002420	$P_{2(7)} =$	0.00	kN

Table 43. Local member force of member 7

$P_{(8)} =$	k_8				β_8				U	$P_{(8)}$		
$P_{7(8)} =$	93780.59	0	-93780.59	0	6.12574E-17	1	0	0	-0.0002060	$P_{7(8)} =$	-4.47	kN
$P_{8(8)} =$	0	0	0	0	-1	6.12574E-17	0	0	-0.0002897	$P_{8(8)} =$	0.00	kN
$P_{1(8)} =$	-93780.59	0	93780.59	0	0	0	6.12574E-17	1	-0.0001224	$P_{1(8)} =$	4.47	kN
$P_{2(8)} =$	0	0	0	0	0	0	-1	6.12574E-17	-0.0002420	$P_{2(8)} =$	0.00	kN

Table 44. Local member force of member 8

$P_{(9)} =$	k_9				β_9				U	$P_{(9)}$		
$P_{7(9)} =$	132625.79	0	-132625.79	0	0.707106781	0.707106781	0	0	-0.0002060	$P_{7(9)} =$	1.41	kN
$P_{8(9)} =$	0	0	0	0	-0.707106781	0.707106781	0	0	-0.0002897	$P_{8(9)} =$	0.00	kN
$P_{3(9)} =$	-132625.79	0	132625.79	0	0	0	0.707106781	0.707106781	-0.0002482	$P_{3(9)} =$	-1.41	kN
$P_{4(9)} =$	0	0	0	0	0	0	-0.707106781	0.707106781	-0.0002626	$P_{4(9)} =$	0.00	kN

Table 45. Local member force of member 9

4.0 Computer-Aided Analysis

4.1 Modeling in GRASP Software

In this section, an equivalent model was presented using GRASP software to compute the displacements and forces acting on the structure. In Figure 4, an additional truss member, labeled as D-11, was added perpendicular to the y-axis of the inclined roller support. To get accurate results, the area of the additional member was increased to a large extent to increase the stiffness of the inclined roller support equivalent representation.

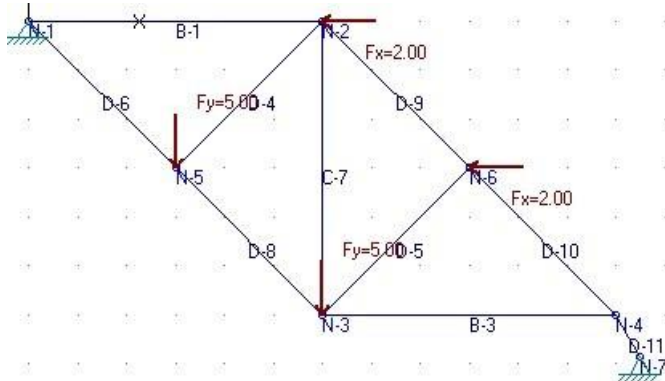


Figure 4. GRASP equivalent model

4.2 Results of the Analysis

In Figure 5 and Table 46, the resulting reactions at the supports based from the GRASP software analysis are displayed.

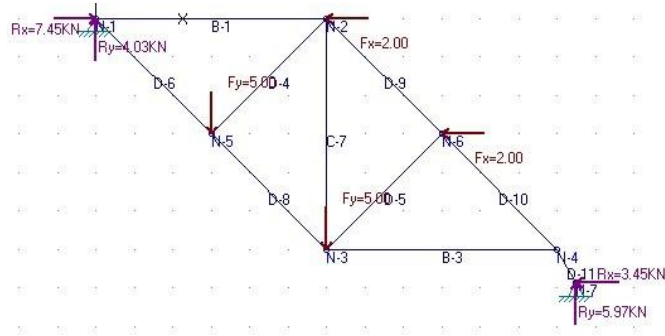


Figure 5. GRASP reaction at supports

Nodal Reactions		
Live Load		
Node	F _x [KN]	F _y [KN]
N-1	7.4495	4.0252
N-7	-3.4495	5.9748

Table 46. Tabulated GRASP reaction at supports

In Figure 6 and Table 47, the resulting nodal displacements based from the GRASP software analysis are displayed.

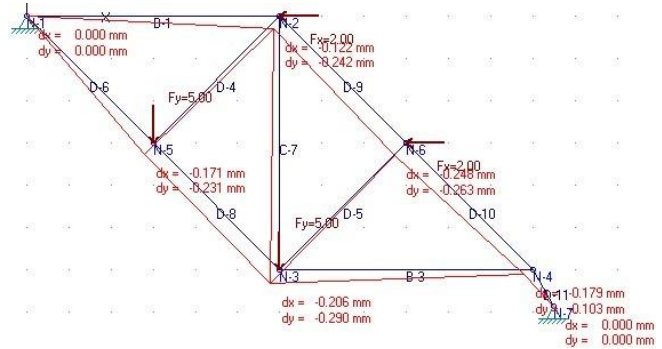


Figure 6. GRASP nodal displacements

Nodal Displacements		
Live Load		
Node	dx [mm]	dy [mm]
N-1	0.000000	0.000000
N-2	-0.122358	-0.241990
N-3	-0.206004	-0.289705
N-4	-0.179077	-0.103430
N-5	-0.170673	-0.231374
N-6	-0.248168	-0.262621
N-7	0.000000	0.000000

Table 47. Tabulated GRASP nodal displacements

In Figure 7 and Table 48, the resulting local member forces based from the GRASP software analysis are displayed.

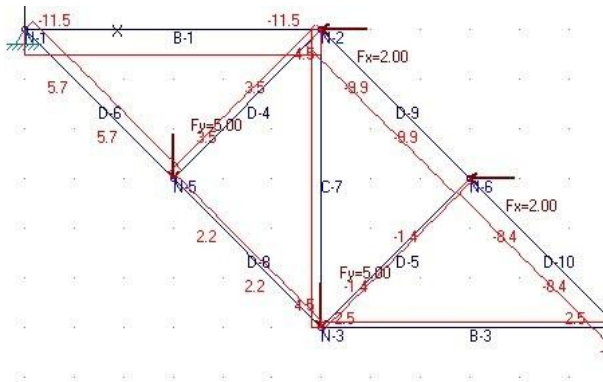


Figure 7. GRASP member forces

Member Forces		
Live Load		
Member	Fx,i [kN]	Fx,j [kN]
B-1	-11.4748	-11.4748
B-3	2.5252	2.5252
D-4	3.5355	3.5355
D-5	-1.4142	-1.4142
D-6	5.6925	5.6925
C-7	4.4748	4.4748
D-8	2.1570	2.1570
D-9	-9.8638	-9.8638
D-10	-8.4496	-8.4496
D-11	-6.8991	-6.8991

Table 48. Tabulated GRASP member forces

5.0 Case Study

5.1 Objectives

- To analyze the behavior of a Plane Pratt Truss Deck Bridge supported by a hinge at one end and a roller support inclined at varying angles at the opposite end
- To verify if inclined supports are detrimental to a structure

5.2 Scope of the Study

- The study was done in accordance with the given parameters and loading conditions to simplify the analysis.
- The truss was loaded under concentrated live loads only at the joints of the structure

- Self-weight and other supplemental loads were neglected
- An equivalent model was created using the Graphical Rapid Analysis of Structures Program (GRASP) to evaluate the static behavior of the truss.

5.3 Methodology

The analysis of the Pratt Truss Deck Bridge was executed using a two-dimensional linear elastic-truss model with the aid of the Graphical Rapid Analysis of Structures Program (GRASP). The study focused on four models having roller supports with the following angles of inclination:

- Model A - 0 degrees inclination
- Model B - 30 degrees inclination
- Model C - 45 degrees inclination
- Model D - 60 degrees inclination

Modelling the Truss Bridge

For the three models with an inclined roller support, the roller support was represented by a truss element which was oriented perpendicular to its restrained axis since the GRASP software is only limited to supports that are oriented normally to the horizontal surface. Figures 8 to 11 show the different models with their corresponding roller support inclined at a certain degree. Figures 12 to 15 will display the equivalent GRASP representations of the four models, together with the reactions obtained.

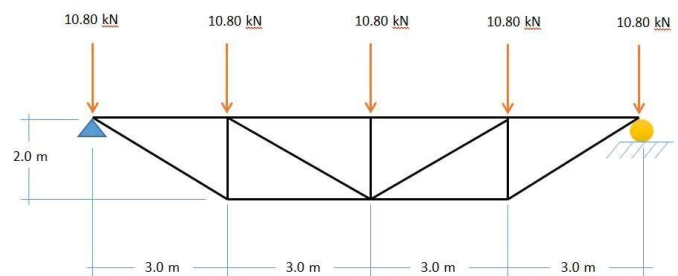


Figure 8. Model A - zero degrees inclination

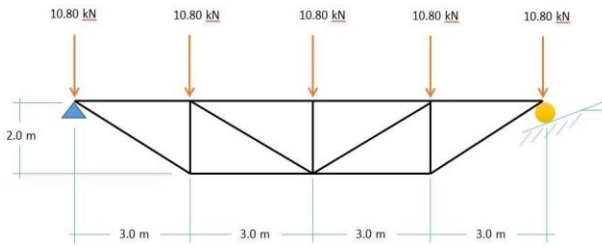


Figure 9. Model B - 30 degrees inclination

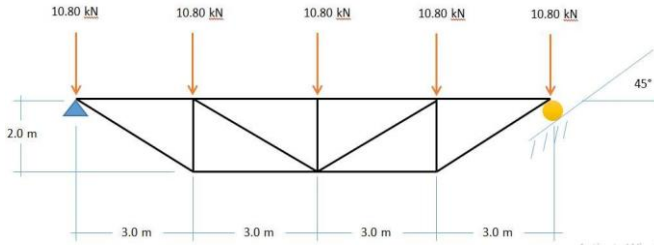


Figure 10. Model C - 45 degrees inclination

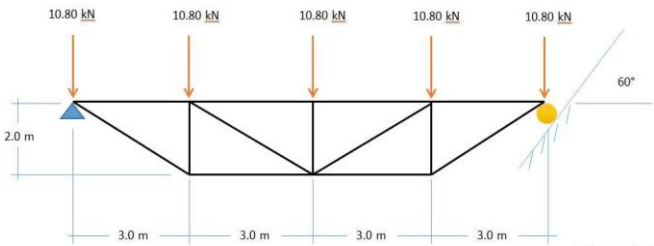


Figure 11. Model D - 60 degrees inclination

Design Parameters

The truss elements were designed using W8x31 steel members having a modulus of elasticity of 200GPa, a cross-sectional area of 5,890mm², and a moment of inertia of $46 \times 10^6 \text{ mm}^4$.

Loadings

For this case study, live loads acting at the joints with a magnitude of 10.8 kN were considered. Self-weight and other supplemental loads were neglected.

5.4 Results and Discussions

Reaction at Supports

In Figure 12, the reactions at the supports at node N-1 and node N-5 were presented. As observed, the reactions at the supports were limited to vertical reactions since all the supports are normal to the

horizontal surface, and no horizontal forces acted on the truss model.

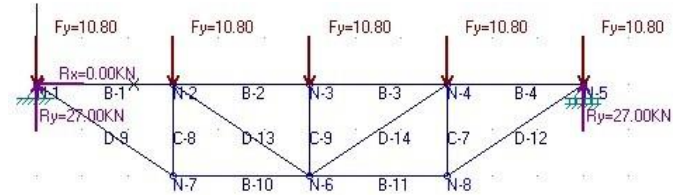


Figure 12. Reaction at supports of Model A

On the other hand, figures 13, 14, and 15 with the inclined roller support display the reactions of the hinge supports at node N-1 and node N-9. As can be observed in the three figures, there is an additional truss member D-15 representing the equivalent roller support connected to node N-5. D-15 is varyingly inclined depending on the angle of inclination of the roller support. From the reactions obtained, we notice that as the angle of inclination of the roller support increases, the horizontal reactions at the hinge supports also increase. The resultant values obtained from the reactions at node N-9 will result in the vertical reaction of the inclined roller support along its independent y-axis. From here, we can already deduce that as we increase the angle of inclination of the roller support, it becomes more stressed based on the resultant value of the reactions at node N-9 of each model.

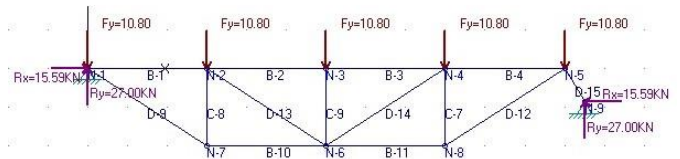


Figure 13. Reaction at supports of Model B

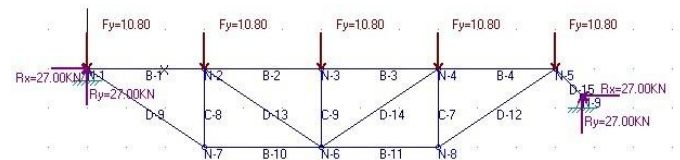


Figure 14. Reaction at supports of Model C

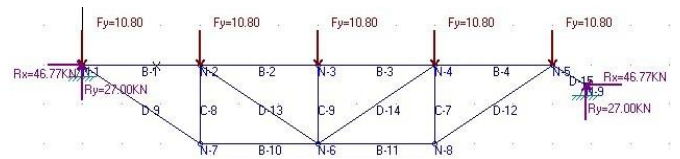


Figure 15. Reaction at supports of Model D

Local Member Forces

In Figures 16 to 19, the local member axial forces for each model are displayed. Tables 49 to 52 will display the tabulated axial forces of the members of each model.

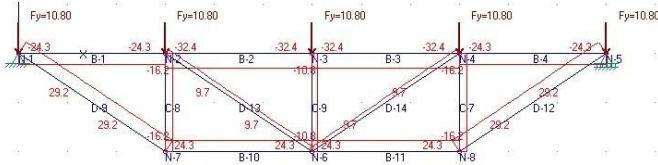


Figure 16. Axial member forces of Model A

Member Forces		
Live Load		
Member	F _{x,i} [kN]	F _{x,j} [kN]
B-1	-24.3000	-24.3000
B-2	-32.4000	-32.4000
B-3	-32.4000	-32.4000
B-4	-24.3000	-24.3000
C-7	-16.2000	-16.2000
C-8	-16.2000	-16.2000
D-9	29.2050	29.2050
C-9	-10.8000	-10.8000
B-10	24.3000	24.3000
B-11	24.3000	24.3000
D-12	29.2050	29.2050
D-13	9.7350	9.7350
D-14	9.7350	9.7350

Table 49. Tabulated axial member forces of Model A

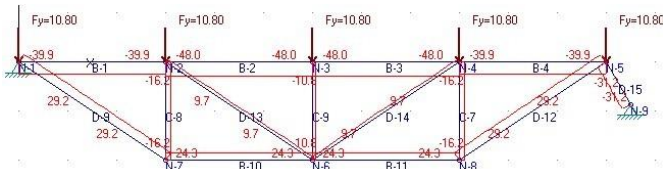


Figure 17. Axial member forces of Model B

Member Forces		
Live Load		
Member	F _{x,i} [kN]	F _{x,j} [kN]
B-1	-39.8885	-39.8885
B-2	-47.9885	-47.9885
B-3	-47.9885	-47.9885
B-4	-39.8885	-39.8885
C-7	-16.2000	-16.2000
C-8	-16.2000	-16.2000
D-9	29.2050	29.2050
C-9	-10.8000	-10.8000
B-10	24.3000	24.3000
B-11	24.3000	24.3000
D-12	29.2050	29.2050
D-13	9.7350	9.7350
D-14	9.7350	9.7350
D-15	-31.1769	-31.1769

Table 50. Tabulated axial member forces of Model B

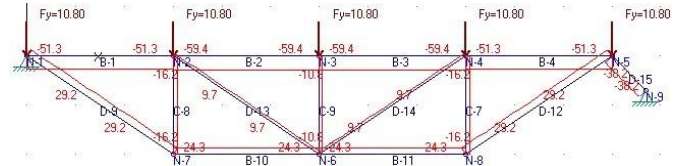


Figure 18. Axial member forces of Model C

Member Forces		
Live Load		
Member	F _{x,i} [kN]	F _{x,j} [kN]
B-1	-51.3000	-51.3000
B-2	-59.4000	-59.4000
B-3	-59.4000	-59.4000
B-4	-51.3000	-51.3000
C-7	-16.2000	-16.2000
C-8	-16.2000	-16.2000
D-9	29.2050	29.2050
C-9	-10.8000	-10.8000
B-10	24.3000	24.3000
B-11	24.3000	24.3000
D-12	29.2050	29.2050
D-13	9.7350	9.7350
D-14	9.7350	9.7350
D-15	-38.1838	-38.1838

Table 51. Tabulated axial member forces of Model C

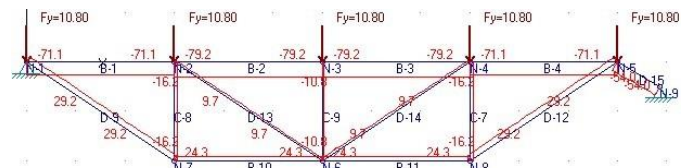


Figure 19. Axial member forces of Model D

Member Forces		
Live Load		
Member	F _{x,i} [kN]	F _{x,j} [kN]
B-1	-71.0654	-71.0654
B-2	-79.1654	-79.1654
B-3	-79.1654	-79.1654
B-4	-71.0654	-71.0654
C-7	-16.2000	-16.2000
C-8	-16.2000	-16.2000
D-9	29.2050	29.2050
C-9	-10.8000	-10.8000
B-10	24.3000	24.3000
B-11	24.3000	24.3000
D-12	29.2050	29.2050
D-13	9.7350	9.7350
D-14	9.7350	9.7350
D-15	-54.0000	-54.0000

Table 52. Tabulated axial member forces of Model D

Based on the results, it can be observed that the elements on top of the truss structure exhibited large axial forces as the inclination of the roller support increased. This is critical because a larger section or stiffer design is required for these members.

Nodal Displacements

In figures 20 to 23, the nodal displacements for each model are displayed. Tables 53 to 56 display the tabulated nodal displacements of each model.

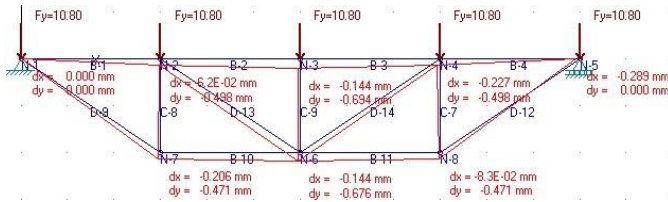


Figure 20. Nodal displacements of Model A

Nodal Displacements		
Live Load		
Node	dx [mm]	dy [mm]
N-1	0.000000	0.000000
N-2	-0.061885	-0.498075
N-3	-0.144397	-0.693896
N-4	-0.226910	-0.498075
N-5	-0.288795	0.000000
N-6	-0.144397	-0.675560
N-7	-0.206282	-0.470571
N-8	-0.082513	-0.470571

Table 53. Tabulated nodal displacements of Model A

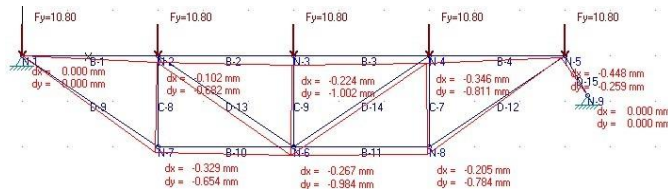


Figure 21. Nodal displacements of Model B

Nodal Displacements		
Live Load		
Node	dx [mm]	dy [mm]
N-1	0.000000	0.000000
N-2	-0.101584	-0.681821
N-3	-0.223795	-1.001840
N-4	-0.346007	-0.811119
N-5	-0.447590	-0.258596
N-6	-0.266895	-0.983504
N-7	-0.328779	-0.654317
N-8	-0.205010	-0.783615
N-9	0.000000	0.000000

Table 54. Tabulated nodal displacements of Model B

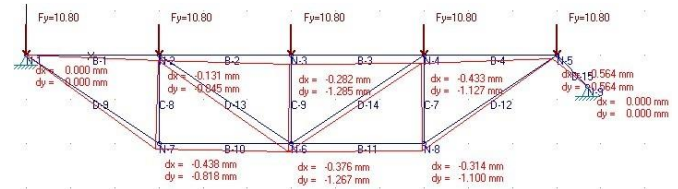


Figure 22. Nodal displacements of Model C

Nodal Displacements		
Live Load		
Node	dx [mm]	dy [mm]
N-1	0.000000	0.000000
N-2	-0.130645	-0.845383
N-3	-0.281918	-1.285372
N-4	-0.433192	-1.127437
N-5	-0.563837	-0.564107
N-6	-0.375936	-1.267036
N-7	-0.437821	-0.817879
N-8	-0.314052	-1.099932
N-9	0.000000	0.000000

Table 55. Tabulated nodal displacements of Model C

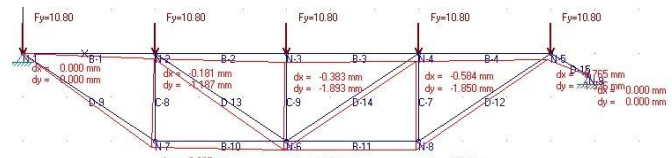


Figure 23. Nodal displacements of Model D

Nodal Displacements		
Live Load		
Node	dx [mm]	dy [mm]
N-1	0.000000	0.000000
N-2	-0.180981	-1.186834
N-3	-0.382591	-1.892769
N-4	-0.584201	-1.849771
N-5	-0.765182	-1.325874
N-6	-0.603570	-1.874433
N-7	-0.665455	-1.159330
N-8	-0.541686	-1.822267
N-9	0.000000	0.000000

Table 56. Tabulated nodal displacements of Model D

When designing trusses, the main consideration would be the nodal displacements since it is important to limit these variables. The displacements obtained will determine whether the structure can sustain the dead loads and live loads that are imposed on the structure. Most of the time, there are only limiting values for the displacements before the design becomes acceptable. In table 57, a comparative tabulation of the horizontal and vertical

nodal displacements are presented. Also, a graphical analysis of the nodal displacements is presented in Figures 24 and 25.

Node	Displacement (mm)							
	Model A		Model B		Model C		Model D	
	x	y	x	y	x	y	x	y
1	0	0	0	0	0	0	0	0
2	-0.062	-0.498	-0.102	-0.682	-0.131	-0.845	-0.181	-1.187
3	-0.144	-0.694	-0.224	-1.002	-0.282	-1.285	-0.383	-1.893
4	-0.227	-0.498	-0.346	-0.811	-0.433	-1.127	-0.584	-1.850
5	-0.289	0	-0.448	-0.259	-0.564	-0.564	-0.765	-1.326
6	-0.206	-0.471	-0.329	-0.654	-0.438	-0.818	-0.665	-1.159
7	-0.144	-0.676	-0.267	-0.984	-0.376	-1.267	-0.604	-1.874
8	-0.083	-0.471	-0.205	-0.784	-0.314	-1.100	-0.542	-1.822

Table 57. Tabulated nodal displacements of the four models

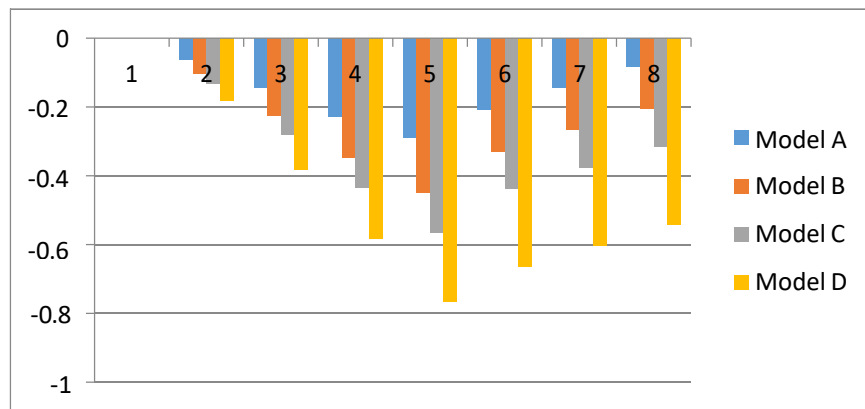


Figure 24. Horizontal displacements at each node of the four models

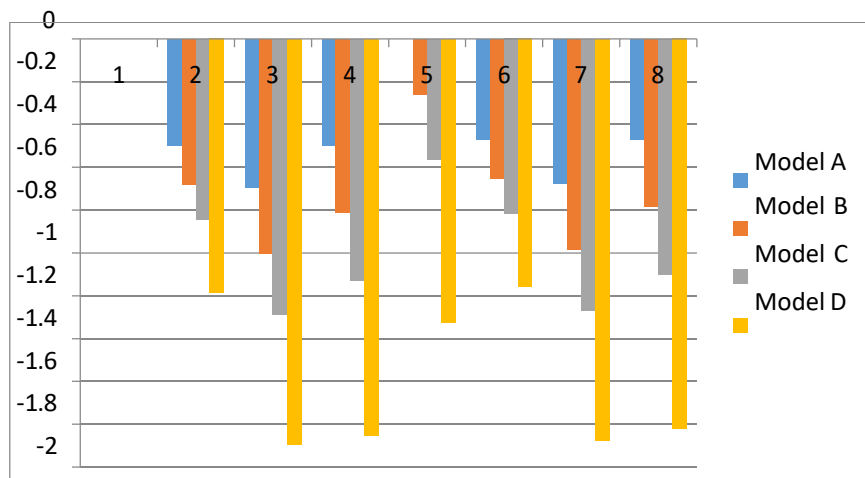


Figure 24. Vertical displacements at each node of the four models

6.0 Conclusion

On a theoretical note, the analysis of a plane truss with inclined roller supports may be done using the conventional Direct Stiffness Method (DSM) when analyzing plane trusses lying on horizontal supports. The only difference with the computation is that the transformation matrices of members that are connected to the inclined roller support will vary since the assigned global axes of the node where the inclined roller support is located are different from the global axes defined for the other nodes of the whole structure. It is important to be consistent with the defining of the global and local axes of the structure since the angle to be considered in the transformation matrices will depend on it

For the Graphical Rapid Analysis Software Program (GRASP), direct modeling of the plane truss with inclined roller supports is not possible. However, an inclined roller support may be represented by a truss element that is inclined perpendicular to the y-axis of the inclined roller support. It is important to take note that since the additional truss element is only a representation of the roller support, the area and modulus of elasticity may be increased to increase the stiffness of the member. With that, it will give more accurate results, which may be comparable to the results to be obtained using the Direct Stiffness Method.

In conclusion, when designing plane trusses, the main factors that affect the overall stability of the structure would be the properties of the truss elements such as the modulus of elasticity and the cross-sectional area. These factors determine the deflections of each node of the truss structure. However, there are other considerations that affect the stability of the truss structures. These factors include environmental impacts such as the temperature, as well as the geographical location of the structure. As observed in the case study presented

in section 5, it can be concluded that structures that are supported by an inclined roller support would be detrimental to the overall stability of the structure. It poses problems to the nodal displacements since the displacements increase as the slope of the inclined roller support increases.

7.0 Contributions of Authors

The authors have equal contributions for this work.

8.0 Funding

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9.0 Conflict Of Interests

The authors declare no conflicts of interest

10.0 Acknowledgment

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Stress, Appraisal, Coping and Adaptation of Family Caregivers of Patients on Dialysis: A Transactional Theory Approach

Claire Tudayan-Espiritu

Notre Dame of Dadiangas Univeristy, General Santos City, Philippines

Author email: cespiritu@nddu.edu.ph

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Abstract. The primary purpose of this research was to determine the levels of stress, appraisal, coping, and adaptation among family caregivers. The study employed a quantitative descriptive research design. There were 402 respondents involved in this study who completed a survey questionnaire. The results demonstrated that family caregivers experienced moderate stress levels, yet exhibited exceptional levels of appraisal, coping, and adaptation. The data analysis led to the conclusion that family caregivers of dialysis patients face stressors, including financial burden, but cope well. They feel supported, satisfied, and in control of their caregiving experiences. They also manage their responsibilities well by adjusting to their work, social life, and finances, and prioritizing patient care. To address these findings, the researcher recommends that healthcare providers establish tailored stress management and counseling programs to support family caregivers of dialysis patients. By providing such resources, healthcare providers can help caregivers manage the range of stressors they face on a daily basis. Furthermore, social workers should continue offering emotional support and resources to caregivers, which will help maintain their positive appraisal and sense of control over their caregiving experiences. Empowering family caregivers in this way can help them feel better equipped to tackle the challenges that come with caring for their loved ones.

Keywords: Family caregivers; Hemodialysis patient; Stress; Adaptation; Coping; Appraisal.

1.0 Introduction

Chronic Kidney Disease (CKD) is an increasing public health concern with an approximate prevalence of 5–10% and an annual growth of 8% (Hawamdeh, et al, 2017). According to data from the World Health Organization (WHO) released in 2020, 39,380 people died from kidney disease in the Philippines, making up 5.84% of all fatalities. Similarly, as cited by the Department of Health's Administrative Order No. 2021-0010, CKD is the fourth-leading cause of death in the nation. Locally, Region 12, as posted by the Department of Health - Center for Health Development-SOCCSKSARGEN XII in 2020, shows, that the third leading cause of morbidity among the top ten morbidity is urinary tract infection, which is one of the kidney diseases with 13,708 cases or 278.62 rate in 1000 population. In addition, among the top ten leading causes of death in Region 12, glomerular and renal diseases rank the third cause of mortality in SOCCSKSARGEN with 1,345 cases of deaths or 0.27 rate per 1000 population in the year 2020 (FHSIS,2020).

On the other hand, in Asian countries, the family is the best care partner for clients undergoing hemodialysis. Families of clients treated with hemodialysis assume the roles of primary caregivers. However, providing care for a client with CKD can be a stressful experience, causing a significant burden. In a recent study conducted by Ebadi et al (2021), it was discovered that family caregivers who tend to loved ones with end-stage renal disease (ESRD) may experience psychological stress due to their emotional connections. This can result in a range of negative emotions and feelings associated with caregiving, such as compassion fatigue, helplessness, feeling

confined to the hospital or home, distress, frequent visits to the hemodialysis department, depression, regret, neglect, and boredom with caregiving responsibilities. In this context, the transactional theory of stress and coping finds practical application in the lives of family caregivers. According to Lazarus & Folkman (1984), as cited by Etchin (2018), stress is a response and exists within the relationship of person and environment. In the present study, Ebadi, et al (2021) claimed that there were factors that would cause secondary stress in different aspects of the family caregiver's life, including work and family relationships. These stresses exist with confusion, fatigue, shock, worry, anxiety, restlessness, fear, and extreme panic about losing patients. The study was guided by Lazarus and Folkman's (1984) transactional model and sought to determine the level of stress, appraisal, coping, and adaptation of family caregivers caring for their dialysis patient.

2.0 Methodology

2.1 Research Design

This research study utilized a quantitative and descriptive approach to determine the experiences of family caregivers who provide care for patients undergoing dialysis treatment. The primary objective of the study was to assess the levels of stress, appraisal, coping, and adaptation of these family caregivers. The descriptive research design allowed for a detailed description of the family caregiver's experiences and their ability to cope with the demands of providing care.

2.2 Research Locale

The research was conducted in six chosen hospitals situated in Region 12, a region in the southern part of the Philippines. The hospitals were divided into two categories, public and private, and were further classified into three types: primary, secondary, and tertiary hospitals. The study included three hospitals from Gen. Santos City, two provincial hospitals from South Cotabato and Sultan Kudarat, and one tertiary hospital from Kidapawan City. The hospitals were selected based on various factors such as their location, capacity, and services provided.

2.3 Research Respondents

The study involved a total of 402 respondents who were selected using a simple random sampling method. To ensure that the study results accurately represent the population, a specific type of probability sampling was employed to collect the quantitative data. The chosen method was simple random sampling, which involved randomly selecting samples from a sampling frame. The sampling frame was constructed by identifying all the individuals in the population under study.

2.4 Research Instrument

The researcher developed a research instrument for this study based on the transactional theory of stress and coping. To validate the quantitative survey questionnaire for family caregivers, four experts reviewed and rated each item using mean scores to assess its appropriateness. The results of this validation showed a highly positive outcome. Additionally, the survey questionnaire underwent a test-retest method to determine its reliability. Thirty family caregivers answered the questionnaire, and a reliability standard of 8 was used to determine its reliability for data collection. Based on the results, all four items were found to be very reliable. This means that the instrument is highly suitable for measuring its variables, valid, and capable of providing accurate data for the study.

2.5 Data Gathering Procedure

The researcher obtained a clearance from the Graduate School Dean to conduct the study. The researcher wrote a letter seeking approval from the hospital's board, which was addressed to the medical directors of the selected hospitals in Region 12 through their nursing service administrators. Once the hospital administrators approved the request, the researcher went to each hospital's hemodialysis unit and spoke with the head nurses to select the possible respondents for the study. During the data collection process, the researcher ensured that the participants' confidentiality was protected, and consent was obtained before executing the survey. The researcher anonymized data, securely stored information, and used appropriate data protection measures to safeguard the participants' privacy and confidentiality. In addition, the family caregivers were informed that participation was voluntary and that they were not obligated to sign or complete the form if they chose not to participate. The researcher informed the respondents of the study's general objectives and importance and

provided instructions on how to complete the forms. The researcher distributed the self-administered questionnaire with a translation from English to Filipino to ensure that respondents could understand the statements and provide accurate responses.

2.6 Ethical Considerations

The researcher exercised caution and prudence in ensuring that the rights of the respondents were fully protected and that they were not constrained in any way. During the process of data collection, the researcher provided comprehensive information to the respondents regarding the purpose of the study. In the survey questionnaire, the researcher made certain that respondents had read the consent form and had willingly agreed to participate in the study with a clear understanding of the study's purpose, potential risks, and benefits. Moreover, the informed consent was read out to the prospective respondents, emphasizing the process and their voluntary participation in the study. By implementing these measures, the researcher was able to ensure that the respondents were fully informed and had given their informed consent willingly and voluntarily.

3.0 Results and Discussion

Table 1. Family caregiver's level of stress (n = 402)

INDICATORS	MEAN	SD	INTERPRETATION
Anxious about excessive patient demands.	3.38	1.15	Moderate
Lack of personal time due to caregiving.	3.32	1.03	Moderate
Pressure from caregiving and other responsibilities.	3.50	1.07	High
Anxiety when with dialysis patients.	2.98	1.21	Moderate
Patient's negative impact on family/friend relationships.	2.54	1.15	Moderate
Caregiving affects social life negatively.	2.55	1.19	Moderate
Feeling sole responsibility for the patient.	3.60	1.20	High
Isolation in the family caregiver role.	2.63	1.19	Moderate
Loss of life control due to a family member's illness.	2.92	1.18	Moderate
Wishing for someone else to care for dialysis patients.	2.68	1.23	Moderate
OVERALL	3.01	0.90	Moderate

As shown in table 1, family caregivers experience a moderate level of stress in their caregiving journey. The stressors with mean scores falling within the moderate level include anxiety about excessive patient demands, lack of personal time due to caregiving, anxiety when with the dialysis patient, negative impact on family/friend relationships, negative effect on social life, isolation in the family caregiver role, loss of life control due to a family member's illness, and wishing for someone else to care for the dialysis patient. However, the indicators "pressure from caregiving and other responsibilities" and "feeling sole responsibility for the patient" are interpreted as high levels of stress, with respective mean scores of 3.50 and 3.60. These findings align with existing research on the stress of caregiving. As cited by Jansen et al. (2020), family caregivers often experience high levels of stress and emotional exhaustion because of the demands of caregiving emphasizing the burden as subtheme in multiple studies.

Table 2 shows that family caregivers have a high overall positive appraisal. They report feeling supported, receiving assistance, positive feedback, and emotional support in their caregiving tasks. They also share caregiving responsibilities, maintain balance in their lives, and express satisfaction with their role. The study emphasizes their resilience and adaptive capabilities. In addition, the high mean scores for indicators like feeling supported in caregiving tasks, receiving assistance, and positive feedback give emphasis on the importance of social networks and the positive outcome of emotional support from family, friends, and healthcare professionals on family caregivers' well-being, as noted by Li and Ang (2019). In addition, Pinquart and Sorensen (2017) further reported that social support not only decreases stress but also enriches family caregivers' self-efficacy and coping abilities. The high overall mean score for the family caregiver's level of appraisal (3.93) suggests that, on average, caregivers perceive their experiences positively.

Table 2. Family caregiver's level of appraisal (n = 402)

INDICATORS	MEAN	SD	INTERPRETATION
Supported in caregiving tasks.	3.99	0.79	High
Assistance in patient-related issues.	3.86	0.90	High
Positive feedback for caregiving achievements.	3.82	0.83	High
Reliable people for decision-making in care.	3.90	0.83	High
Emotional support during caregiving.	3.83	0.86	High
Sharing caregiving responsibilities with family.	3.76	1.00	High
Balancing life despite caregiving demands.	4.03	0.77	High
Satisfied with the caregiving role.	4.06	0.70	High
Maintaining physical and emotional health.	4.00	0.69	High
Confident and in control in caregiving.	4.01	0.73	High
OVERALL	3.93	0.57	High

Table 3 shows that family caregivers have a high level of coping ability. They have a strong belief in overcoming challenges and seeking comfort in their religion or spirituality. They also possess confidence and effective strategies to meet the demands of caregiving. Family caregivers maintain a positive attitude, exhibit adaptability and problem-solving skills, and prioritize self-care and well-being. The significance of these results put emphasis on the prevalence of resilient coping strategies among the family caregivers. It also indicates the family caregiver's strong beliefs in surpassing life's adversities and their ability to find comfort in religion or spirituality. Overall, they effectively handle the difficulties of caregiving responsibilities, aligning with Montgomery & Kosloski's (2013) research on the important role of coping strategies in enhancing caregiver resilience and well-being. Moreover, Jankowski et al. (2016) acknowledged that spirituality is a coping resource for family caregivers, helping them in finding meaning and purpose in their caregiving journey.

Table 3. Family caregiver's level of coping (n = 402)

INDICATORS	MEAN	SD	INTERPRETATION
Belief in overcoming life's hardships.	4.42	0.69	High
Seeking comfort in religion/spirituality.	4.31	0.80	High
Confidence in handling caregiving challenges.	4.27	0.74	High
Developed strategies for caregiving demands.	4.23	0.74	High
Positive attitude in difficult times.	4.38	0.73	High
Adapting and problem-solving in caregiving.	4.28	0.74	High
Seeing myself as strong amid challenges.	4.35	0.75	High
Bouncing back after hardships.	4.24	0.77	High
Prioritizing self-care and well-being.	4.03	0.93	High
Maintaining perspective despite difficulties.	4.38	0.65	High
OVERALL	4.29	0.59	High

Table 4. Family caregiver's level of adaptation (n = 402)

INDICATORS	MEAN	SD	INTERPRETATION
Reducing work hours for caregiving.	4.13	0.74	High
Rearranging work hours for priorities.	4.21	0.65	High
Limiting social activities for caregiving.	4.19	0.69	High
Prioritizing patient care over personal life.	4.23	0.69	High
Budgeting accordingly.	4.21	0.64	High
Reassessing finances for patient needs.	4.27	0.64	High
Seeking financial assistance.	4.33	0.66	High
Exploring available financial resources.	4.23	0.73	High
Adjusting routine for caregiving priority.	4.17	0.75	High
Cutting back leisure time for caregiving.	4.31	0.68	High
OVERALL	4.23	0.53	High

The findings in Table 4, show that family caregivers are highly adaptive in their caregiving roles, making necessary changes to meet their patients' needs. They prioritize patient care over their personal lives and are skilled at budgeting to ensure patients' needs are met. They actively seek financial assistance and explore available resources to support their caregiving efforts. The overall mean score for the family caregiver's level of adaptation is high at 4.23. This implies the importance of adaptation and flexibility in family caregivers' ability to give care. The willingness of the family caregiver to make changes in their work and social lives, such as reducing work hours, rearranging schedules, and limiting social activities indicated a high mean scores. Which is consistent with Hirst et al.'s (2018) study. LaFontaine et al. (2014) in his study emphasize the importance of understanding the various adjustments made by family caregivers to effectively fulfill their caregiving roles. The results suggest that giving resources and assistance, consisting of financial support and flexible work arrangements, can enriched family caregivers' adaptation and overall well-being.

4.0 Conclusion

Based on the findings of the study, the following conclusions were drawn, that family caregivers of dialysis patients experience moderate levels of stress caused by a variety of factors, such as financial burdens. The demanding nature of caregiving requires a significant investment of time and energy, which can contribute to this stress. Despite these stressors, caregivers tend to have a positive perception of their caregiving experiences, feeling supported, satisfied, and in control. Additionally, family caregivers demonstrate a high level of resilience and coping skills, indicating their ability to effectively handle and adapt to caregiving challenges. Also, they are often tasked with managing complex medical information and procedures, administering medications, scheduling appointments, and providing emotional support to their loved ones. However, despite these challenges, they frequently find meaning in their caregiving role and derive a sense of purpose from it. The study also revealed that family caregivers exhibit flexibility in managing their responsibilities. They adjust various aspects of their lives, such as their work schedule, social life, and personal time, to prioritize patient care. Moreover, they typically show a strong commitment to their caregiving role, which can lead to improved patient outcomes and quality of life. Overall, the study suggests that caregivers of dialysis patients face significant challenges, but they also exhibit remarkable resilience and adaptability in their caregiving role.

Based on the conclusions drawn from the study, the following recommendations are proposed: healthcare providers should put into place stress management and counseling programs specifically designed for family caregivers of patients undergoing dialysis to help them cope with the range of stressors they encounter; social workers and other healthcare professionals should continue to offer emotional support and resources to caregivers to ensure that they maintain a positive outlook and feel supported and in control of their caregiving experiences; healthcare administrators should provide caregivers with access to stress management resources such as support groups, to further enhance their coping abilities; social service agencies should provide referrals for financial assistance to government and non-government organizations and offer workshops on financial planning and budgeting tailored for caregivers, empowering them to manage their finances effectively.

5.0 Contributions of Authors

The author hereby declares that she has undertaken all aspects of data acquisition, analysis, encoding and editing pertaining to this study.

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7.0 Conflict of Interests

The author declare no conflicts of interest about the publication of this paper.

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Developing an Evaluation Scale for Assessing the Effective Implementation of Matatag Curriculum in Philippine Public Schools: Exploratory Sequential Design

Eldon S. Aquino

Pasig Elementary School, Pasig City, Philippines

Author email: eldon.aquino@deped.gov.ph

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Abstract. The Matatag curriculum is a comprehensive educational framework designed to enhance learning and development in Philippine public schools, focusing on holistic, inclusive, and culturally relevant teaching practices incorporated into peace and values education and reading enhancement. Using a mixed-method exploratory sequential design, this study aimed to develop an evaluation scale for the effective implementation of the Matatag curriculum. The findings revealed twelve essential themes from the views of teachers, underscoring the need for integrating interactive learning, critical thinking, technology integration, cultural relevance, and collaborative strategies to boost student engagement and outcomes. Further, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) identified three core dimensions crucial for curriculum evaluation: Curriculum Design and Content, Teaching and Learning Enhancement, and Implementation and Support. These dimensions underscore the importance of a comprehensive, inclusive curriculum approach. While Structural Equation Modeling (SEM) indicated these dimensions were optimal for developing the Matatag curriculum's evaluation scale. The refinement of the thirteen items as a final evaluation tool went through rigorous item analysis, resulting in a reliable instrument with a Cronbach's alpha of 0.896, ensuring precise curriculum implementation assessment. This process validated the research findings, both quantitative and qualitative. The study concludes that a thorough assessment of curriculum effectiveness necessitates a blend of strategies, including stakeholder feedback and regular evaluations, to foster ongoing improvement. It recommends that educators embrace a holistic approach featuring interactive learning, critical thinking, technology, cultural relevance, and collaborative methods to elevate educational outcomes.

Keywords: Matatag curriculum; Philippine public schools; Curriculum implementation; Evaluation scale; Holistic education.

1.0 Introduction

Recently, there has been growing interest in implementing the Matatag curriculum in Philippine public schools. This program has aimed to undertake numerous initiatives and reforms to enhance educational quality and increase literacy rates (Cabaltea et al., 2023). However, the main challenge with the curriculum changes is the drastic cut in the range of topics covered in the K to 12 programs. The Matatag curriculum decreases the amount of material by 70%. This big cut might cause struggles about whether education will still be well-rounded, as it narrows down the focus to key subjects, potentially missing out on providing a broader learning experience (Estrellado, 2023).

Meanwhile, implementing new curricula presents both complex challenges and promising opportunities. Education systems must balance alignment with global standards while respecting local contexts (Caballero,

2023). This groundbreaking study by Hachero (2023) explores how innovative curricula are being implemented in diverse educational settings. It emphasizes the importance of flexibility, cultural sensitivity, and active stakeholder involvement (Hachero, 2023). This study demonstrates that successful curriculum implementation requires strategic planning, professional development for teachers, and continuous evaluation mechanisms to ensure relevance and effectiveness. This work contributes valuable insights into the global dialogue on educational reform, offering a roadmap for navigating the intricacies of curriculum change (Singh & Lee, 2021).

Similarly, the Matatag curriculum represents a bold step towards educational reform. Preliminary evaluations of this study indicate that while the reduction aims to declutter and focus the curriculum, it may inadvertently marginalize critical areas of learning. The study emphasizes the importance of maintaining a diverse educational framework that supports holistic development, pointing to a potential oversight in the curriculum's design that could impact the future workforce's versatility and adaptability (Escuadro, 2023).

However, developing a validation scale for the Matatag curriculum in Philippine schools has received little attention. Despite the lack of empirical studies assessing its impact on various stakeholders, including students, teachers, and communities (De La Fuente, 2022). While the curriculum aims to streamline educational content and focus on essential competencies, there is minimal evidence on how these changes affect student learning outcomes, teacher preparedness, and overall educational quality (Alvarado, 2023). Furthermore, the curriculum's responsiveness to the diverse cultural and socio-economic contexts across the Philippines remains underexplored. This gap highlights the need for detailed, longitudinal research to evaluate the curriculum's effectiveness in achieving its educational objectives and preparing students for the challenges of the 21st century (Pamintuan, 2023).

Furthermore, focusing on the Philippine public schools the detailed study conducted by Dela Cruz et al. (2024) explores the localized impact of the Matatag curriculum. This research highlights the varying degrees of acceptance and effectiveness of the curriculum, influenced by regional educational needs and socio-economic factors. The results show that the Matatag curriculum's one-size-fits-all approach may fail to appropriately meet the Philippines' different educational environments, necessitating a more specialized implementation plan.

Thus, the study aimed to create a detailed evaluation framework to systematically measure the Matatag curriculum's success in enhancing educational outcomes across Philippine schools, ensuring it meets its intended goals of streamlining and improving learning.

2.0 Methodology

2.1 Research Design

This study employed a mixed methods approach, specifically an exploratory sequential design. Mixed methods research is referred to as the 'third methodological orientation', drawing on the strengths of both qualitative and quantitative research (Teddle and Tashakkori, 2008). It is believed that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone. This design starts with the research phase of qualitative research to gather deeper, more insights into the research topic. The goal of this first phase is to identify key themes, variables, and hypotheses that may not be obvious from a purely quantitative perspective. Then comes the next phase of the design, where the qualitative findings guide the development of the quantitative phase of the research. The purpose of this next phase is to test hypotheses and seek changes qualitative research findings in general, to enable the generalizability of findings to larger populations (Creswell & Clark, 2007). In this study, mixed methods research (MMR), specifically exploratory sequential design, was selected to broadly explore, understand, describe, and analyse the validation scale for assessing the effective implementation of the Matatag curriculum in Philippine public schools.

In this exploratory sequential design, qualitative data were first collected and analysed, and themes were used to develop a quantitative instrument to further explore the research problem (Creswell & Plano Clark, 2011; Teddle & Tashakkori, 2008; Onwuegbuzie, Bustamante, & Nelson, 2010). As a result of this design, theme analysis was conducted after the primary qualitative phase, after the secondary quantitative phase, and during

the integration phase that connects the two strands of data and extends the initial qualitative exploratory findings (Creswell & Plano Clark, 2011).

2.2 Research Participants

The research participants in this study were ten (10) teachers for in-depth-interviews and seven (7) teachers for Focus Group Discussions. The selection of teachers to participate in in-depth interviews (IDIs) were carefully designed to allow the selected teachers and schools to draw on their diverse experiences and insights in various departments, with a rich multi-dimensional perspective on research. Including teachers from a variety of professions and educational backgrounds, the study used a broad range of first-hand experiences about their views on developing an evaluation scale for Matatag curriculum. Meanwhile Participants in focus group discussions (FGDs) play an essential role in the research process, acting as active groups to explore, discuss, and capture their experiences, ideas, and opinions it is about debating the topics being studied. The format of the FGD is deliberately chosen to create an interactive environment where participants can engage with each other's ideas, circulate ideas, and expand on them in real-time. This interactive process helps to unlock deeper perspectives and provides a more understanding of complex issues that can only be achieved through personal interviews.

For the quantitative component, 400 respondents were selected using random sampling, where each sample had an equal chance of being chosen. This sampling technique aimed to provide an unbiased representation of the total population. Specifically, 200 teachers were asked to complete a checklist for Exploratory Factor Analysis, while another set of 200 teachers responded to a researcher-made survey questionnaire for Confirmatory Factor Analysis. Additionally, 30 to 50 respondents were included to test the questionnaire's reliability for the final development of the measurement tool.

2.3 Research Instrument

To ensure validity in the design, the researcher enlisted the expertise of professionals. The interview guide questions, tools, checklists, and survey questionnaires underwent validation by these experts. For qualitative data, transcriptions were provided to participants to ensure accuracy. A statistician aided in the statistical aspects of quantitative data. All expert suggestions were considered to achieve validity. In the qualitative strand, an Interview Guide Questions Tool with sub-questions was utilized for in-depth interviews and focus group discussions with selected teachers. This aimed to gather insights for the study and refine the checklist and survey questionnaire.

For the quantitative aspect, a checklist was administered to 400 teachers, derived from themes in IDIs, FGDs, and related research. This checklist informed the development of a survey questionnaire on teachers' views regarding the Matatag curriculum implementation. The questionnaire's reliability was tested by 30-50 teachers. Both the interview guide questions, checklist, and survey questionnaires underwent validation by experts, enhancing their validity, credibility, and reliability.

2.4 Data Gathering Procedure

The researchers obtained permission to conduct their study from relevant authorities within the Department of Education. For the qualitative aspect, in-depth interviews and focus group discussions were conducted with teachers. Participants were briefed on the study's significance and confidentiality before providing their perspectives. The data gathered were transcribed, translated, and analysed to inform the development of a checklist. After validating the checklist, a random sample of 400 teachers completed it, aiding in factor analysis. The checklist results guided the creation of a survey questionnaire, which was used to gather further insights from teachers. This questionnaire formed the final measurement tool for assessing the Matatag curriculum's effectiveness.

2.5 Data Analysis Procedure

In analysing qualitative data, the researcher utilized thematic analysis, a method for identifying, analysing, and reporting patterns within data, focusing on patterns and themes generated in transcribed in-depth interviews and focus group discussions related to the validation scale for assessing the effective implementation of the Matatag curriculum. For the quantitative phase, exploratory factor analysis (EFA) was employed to identify

underlying factor structures within the administered checklist. EFA helps in understanding the relationships between observed variables and uncovering the factors influencing them, without imposing a preconceived structure on the outcome.

Confirmatory factor analysis (CFA) was then used to verify the factor structure identified in the EFA and test the hypothesis that a relationship exists between observed variables and their underlying latent constructs. This technique was crucial in identifying the final dimensions and items for the survey questionnaire aimed at developing a validation scale for assessing the effective implementation of the Matatag curriculum. Finally, Cronbach's alpha, a measure of reliability or internal consistency, was employed to assess the accuracy of the researcher-made survey questionnaire in measuring the variable of interest. This technique served as the last phase of tool development, ensuring the questionnaire's reliability in assessing the implementation of the Matatag curriculum.

2.6 Ethical Considerations

Research ethics, as outlined by Mack et al. (2011), emphasizes the importance of prioritizing the well-being of research participants. In this study, adherence to ethical guidelines, particularly those outlined in the National Ethical Guidelines for Health and Health-Related Research (NEGHHR, 2017), was paramount. The study underwent review and approval by the UIC Research Ethics Committee (UIC REC) to ensure participant rights and safety.

The social value of the study was established by identifying a validation scale for assessing the effective implementation of the Matatag curriculum, benefiting current and aspiring teachers. Participants were informed about the study's purpose and procedures, with emphasis on the potential benefits to them. Informed consent forms were obtained from participants, ensuring their voluntary participation and right to withdraw at any time. Regarding vulnerability, adult participants were considered capable of decision-making, and measures were taken to protect their identities and ensure confidentiality. Risks were minimized through private and safe interview settings, and participants were treated with sensitivity and respect.

Participants were compensated for their involvement, and their privacy and confidentiality were maintained through data coding and secure data handling procedures. Justice was ensured by accurately representing participant responses and sharing findings with participants. Transparency was upheld through clear communication with participants about study objectives and results. The researcher's qualifications were considered, and adequate facilities were provided for data collection. The study was completed successfully with support from the school and the Commission on Higher Education. Community involvement was emphasized through public forums, and the anticipated outcomes of the study include contributing to a deeper understanding of curriculum implementation and informing future planning and policy decisions, aligning with the goals of gender equality and sustainable development in the Philippines.

3.0 Results and Discussion

3.1 Teachers' Views in Developing an Evaluation Scale on the Implementation of the Matatag Curriculum in Philippine Public Schools

Twelve (12) main themes arose from the in-depth interviews and focus group discussions with the participants. Table 1 depicts these themes in developing a validation scale for assessing the effective implementation of the Matatag curriculum in Philippine public schools namely: Interactive Learning Engagement, Critical Thinking Enhancement, Technology Integration, Cultural Relevance, Collaborative Learning, Teacher Development, Diverse Learning Support, Experiential Learning Application, Student Autonomy, Inclusive Education, Community Engagement, and Feedback and Improvement.

Theme 1: Interactive Learning

Interactive learning engagement is vital as it actively involves students in their educational journey, enhancing understanding and retention of knowledge. Through participatory activities, it fosters critical thinking, collaboration, and practical application of concepts, making learning more meaningful and enjoyable. This approach adapts to diverse learning styles, promoting inclusivity and boosting overall academic achievement and student motivation. Most participants believe the Matatag Curriculum will enhance the learning

environment by promoting interactive, hands-on activities, increasing collaborative projects, and encouraging self-directed learning, making education more relevant and engaging. This consensus suggests a shift toward a more participatory and student-centered approach to teaching.

Moreover, the implication of the study is supported by Freeman et al. (2014), which discusses the impact of active learning on student performance in science, engineering, and mathematics. The findings revealed that active learning strategies significantly improve students' performance on exams and conceptual understanding compared to traditional lecturing. The study emphasizes the importance of interactive engagement in enhancing critical thinking, collaboration, and practical application of knowledge, aligning with the principles of the Matatag Curriculum. The findings advocate for a shift towards more participatory and student-centered educational approaches.

Theme 2: Critical Thinking Enhancement

Most of the participants believe that the enhancement of critical thinking and problem-solving skills through the Matatag Curriculum will lead to multiple educational benefits. They suggest that by embedding these skills within the curriculum and emphasizing their application in real-world contexts, students' comprehension, and ability to tackle complex problems will improve. This focus is expected to not only enhance academic performance on standardized tests but also reduce anxiety towards challenging subjects, contributing to overall higher achievement.

Table 1. Teachers' views on the effective implementation of matatag curriculum in philippine public schools

Issues Probed	Sample Statements	Codes/Category	Essential Themes
Perception on implementing Matatag Curriculum in Philippine public schools	I believe the Matatag Curriculum will foster a more interactive and engaging learning environment, potentially increasing students' interest in core subjects through hands-on and experiential learning activities (1.1) (IDI_P1).	Interactive Learning Experiences	Interactive Learning Engagement
	I expect an increase in collaborative learning opportunities, which can enhance students' engagement by working together on projects and discussions (1.1) (IDI_P3).		
	The curriculum's emphasis on critical thinking and problem-solving skills might significantly improve students' comprehension, as it encourages them to apply what they learn in real-world contexts (1.1) (IDI_P2).	Thinking Skill Development	Critical Thinking Enhancement
	Enhanced critical thinking and problem-solving skills taught through the curriculum could result in students achieving better outcomes in standardized tests and assessments (1.2) (IDI_P3).		
	The integration of technology and innovative teaching methods within the Matatag Curriculum could provide a more diverse range of learning experiences, catering to different learning styles (1.1) (IDI_P4).	Educational Technology Integration	Technology Integration
	Adapting to the increased use of technology and digital tools in teaching may be difficult for some teachers, necessitating ongoing professional development (2.1) (IDI_P3).		
	The curriculum's design to be culturally relevant and contextually appropriate for the Philippine setting might resonate well with students, making learning more relatable and impactful (1.1) (IDI_P6).	Cultural Relevance	Cultural Curriculum Relatedness
	Differentiated instruction will be key, providing tailored learning experiences for students based on their individual strengths, needs, and interests (2.2) (IDI_P2).		
	By focusing on holistic development, the curriculum could improve students' emotional and social skills, leading to better engagement in the classroom (1.1) (IDI_P7).	Diversified Learning Approach	Collaborative Learning
	We collectively foresee a need for more collaborative teaching approaches, emphasizing teamwork and communication among students (1.3) (FGD1).		
	One major obstacle could be the resistance to change among teachers who are accustomed to traditional teaching methods, requiring significant effort to shift mindsets (2.1) (IDI_P1).	Professional Growth	Teacher Development

• The group emphasized the need for initial intensive training sessions followed by regular, ongoing professional development to support the curriculum's implementation (3.1) (FGD1).		
• To address diverse learning needs, I plan to incorporate a variety of teaching methods, including visual, auditory, and kinesthetic activities, ensuring all students can engage with the material (2.2) (IDI_P1).	Inclusive Learning	Diverse Learning Support
• We discussed the importance of creating flexible learning environments that allow students to learn in ways that best suit their preferences and abilities (2.2) (FGD2).		
• I know the curriculum's integrated approach might spark a renewed interest in learning, as students see the relevance of their education to their lives and future careers (1.2) (IDI_P2).	Learning Methods	Experiential Learning Application
• We agreed that materials should facilitate active learning, including problem-based learning scenarios and case studies relevant to students' lives and communities (3.2) (FGD6).		
• I expect to adopt more student-centered teaching strategies, moving away from traditional lecture-based methods to more interactive and participatory approaches (1.3) (IDI_P1).	Student Empowerment	Student Autonomy
• We highlighted the potential difficulty in shifting from teacher-centered to student-centered classrooms, requiring new pedagogical strategies and classroom management skills (2.1) (FGD2).		
• Creating an inclusive classroom environment that values diversity and promotes equity will be essential in addressing the varied needs of students (2.2) (IDI_P4).	Inclusive Practices	Inclusive Education
• The group agreed that the Matatag Curriculum could lead to a more equitable and accessible education system, reducing disparities and promoting inclusion (2.3) (FGD7).		
• Engaging parents and caregivers in the educational process is crucial, providing them with the tools and knowledge to support their children's learning at home (3.3) (IDI_P2).	External Collaboration	Community Engagement
• Engaging alumni and local experts as guest speakers or mentors were seen as a valuable way to enrich the curriculum and provide role models for students (3.3) (FGD3).		
• Anticipated challenges include initially high levels of student resistance due to changes in teaching styles and assessment methods, which could temporarily affect engagement (1.1) (IDI_P9).	Quality Assurance	Feedback and Improvement
• We agreed that fostering a supportive school culture that embraces change and innovation would be crucial in overcoming obstacles to adapting teaching methods (2.1) (FGD7).		

Furthermore, the implication of the statements is supported by Zoller (2023) conducted research demonstrating that higher-order cognitive skills (HOCS)-centered teaching significantly impacts students' abilities to think critically and solve problems effectively. This approach, which emphasizes real-world applications and experiential learning, not only improves comprehension and academic performance but also reduces students' anxiety towards challenging subjects. This study supports the idea that curricula focusing on developing these skills can lead to better outcomes in standardized assessments and foster a more engaging and responsive learning environment through continuous feedback.

Theme 3: Technology Integration

It is crucial for implementing the Matatag Curriculum as it enhances learning experiences, enables personalized education, supports skill development in digital literacy, and facilitates access to diverse and interactive educational resources. Most of the participants believed that technology integration in the Matatag Curriculum is essential for diversifying learning experiences and accommodating various learning styles. However,

challenges include teachers adapting to new digital tools, necessitating ongoing professional development to enhance digital literacy and engage students effectively.

Anent to this, the implication of the statements is supported by Ertmer and Ottenbreit-Leftwich, (2020) who conducted a study that highlights the critical role of teacher beliefs and attitudes in the successful integration of technology in the classroom. They argue that while technology can significantly enhance the learning experience, its effectiveness is largely dependent on teachers' willingness and ability to incorporate it into their teaching practices. The study emphasizes the necessity of ongoing professional development to equip teachers with the skills needed for effective technology integration. This professional development should not only focus on the technical aspects but also on pedagogical strategies that leverage technology to enhance learning outcomes. The findings underscore the potential of technology to cater to diverse learning styles and improve student engagement, aligning with the perspectives shared by participants regarding the Matatag Curriculum.

Theme 4: Cultural Relevance

It ensures that educational content and teaching methods are reflective of and responsive to the cultural backgrounds, values, and experiences of the students. This approach fosters a more inclusive and engaging learning environment, where students see themselves represented and their cultural identities validated. By making learning more relatable and meaningful, cultural relevance boosts students' motivation, participation, and overall academic achievement. It bridges the gap between students' home and school lives, promoting better understanding and respect for diversity, which is essential for preparing students to thrive in a multicultural world. Based on the statements, participants believed that the culturally relevant Matatag Curriculum, combined with differentiated instruction and a focus on holistic development, would lead to more engaging, personalized, and impactful learning experiences for students.

To support the statements on the importance of cultural relevance, one can refer to the work of Geneva Gay (2020). The study emphasizes culturally responsive teaching as a pedagogical approach that uses the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning more appropriate and effective for them. This approach aligns with the principles of the Matatag Curriculum, highlighting the significance of integrating cultural relevance into educational practices to improve engagement, motivation, and academic achievement. The study supports the notion that education that respects and incorporates students' cultural backgrounds and personalizes learning experiences can lead to more meaningful and impactful outcomes, fostering well-rounded individuals equipped with both academic knowledge and life skills.

Theme 5: Collaborative Learning

Parallel to this, collaborative learning is pivotal in education as it fosters teamwork, critical thinking, and communication skills among students. By working together, learners can tackle complex problems, share diverse perspectives, and construct new knowledge, leading to deeper understanding and improved academic outcomes. Anchored with the statements, participants believed that the Matatag Curriculum's focus on collaborative learning and holistic development is essential for enhancing student engagement and outcomes. Emphasizing teamwork, problem-solving, and diverse teaching methods will transform classroom dynamics, fostering a more interactive and supportive learning environment.

The implication of the statement is supported by Adamson and Yin (2018). Their study demonstrates that cooperative learning, a structured form of collaborative learning, significantly enhances student engagement, academic achievement, and the development of social and communication skills. By working in groups, students not only acquire knowledge more effectively but also develop a deeper understanding of content through interaction and mutual support. This body of work supports the idea that collaborative learning approaches, as anticipated by participants, are fundamental for holistic development and preparing students for diverse challenges.

Theme 6: Teacher Development

Correspondingly, the statements underscore the critical role of teacher development in the effective implementation of the Matatag Curriculum, emphasizing the necessity for ongoing professional growth to adapt

teaching methods to new educational paradigms, enhance digital literacy, and support collaborative and culturally responsive pedagogies. Most participants believe that effective implementation of the Matatag Curriculum necessitates robust teacher development programs. These programs should address resistance to change, enhance pedagogical skills, and improve digital competencies through comprehensive and continuous professional development, ensuring teachers are fully equipped to deliver the curriculum successfully.

The implication of the statements is supported by Douglas, (2017). The study focuses on the critical importance of professional development in effecting change in teaching practices, attitudes, and teachers' acceptance of new curricula. He argues that effective professional development must be continuous and aligned with the specific needs of teachers as they adapt to new educational paradigms, including the use of technology and the adoption of collaborative and culturally responsive teaching methods. The study findings suggest that professional development is instrumental in overcoming resistance to change, enhancing pedagogical skills, and ensuring the successful implementation of innovative curricula.

Theme 7: Diverse Learning Support

Furthermore, the participants highlighted diverse learning support as essential in the Matatag Curriculum, emphasizing the importance of accommodating various learning styles and needs. Tailored instructional strategies ensure all students can access and benefit from the curriculum, promoting inclusivity and equity in the educational process. Most participants believed that implementing the Matatag Curriculum effectively requires a multifaceted approach to Diverse Learning Support. This involves employing varied teaching methods, fostering an inclusive classroom, and providing targeted resources to meet individual student needs, thus ensuring equitable access to education for all learners.

To support the statements on the importance of diverse learning support within the Matatag Curriculum, Lumadi (2017) works on differentiated instruction providing a solid theoretical foundation. The study outlines how tailored teaching strategies can address the wide range of learners' needs in a classroom. This approach emphasizes the significance of modifying content, processes, products, and learning environments to ensure all students can access and engage with the curriculum effectively. By advocating for the recognition and accommodation of students' varied learning preferences, backgrounds, and abilities, the study underscores the necessity of creating flexible and inclusive educational environments that promote equity and excellence for all students.

Theme 8: Experiential Learning Application

Consequently, the statements also illuminated the significance of experiential learning application in the Matatag Curriculum. Emphasizing hands-on activities and real-world problem-solving, this approach enriches learning by connecting theoretical knowledge with practical experiences, fostering deeper understanding and retention among students. Most participants believed that the Matatag Curriculum's focus on experiential learning and real-world applications would significantly enhance student engagement and learning outcomes. By making education relevant and practical, it aims to foster curiosity, collaboration, and a deeper connection between academic concepts and everyday life.

Furthermore, to support the emphasis on experiential learning and its application within the Matatag Curriculum, the work of Hill and MacDonald (2016) on experiential learning theory provides a foundational basis. Kolb's theory posits that learning is a process whereby knowledge is created through the transformation of experience. This approach stresses the importance of hands-on activities, real-world problem solving, and reflection as central to the learning process. By engaging students in experiences directly relevant to their lives and future careers, experiential learning fosters deeper understanding, improves retention, and enhances students' ability to apply knowledge in practical situations. This study supports the idea that experiential learning strategies, as anticipated by participants, are crucial for making education more engaging, relevant, and effective.

Theme 9: Student Autonomy Emerged

The theme of student autonomy emerged, emphasizing the Matatag Curriculum's role in fostering self-directed learning. Participants believe encouraging autonomy helps students take charge of their education, promoting

responsibility, decision-making skills, and personalized learning paths, thus preparing them for lifelong learning and adaptability. Most participants believed that the shift towards a student-centered Matatag Curriculum would require teachers to embrace roles as learning facilitators, promoting interdisciplinary teaching and active student participation. This transition challenges traditional educational paradigms, necessitating innovative pedagogical strategies and a reevaluation of classroom dynamics.

Moreover, the implication of the study is supported by Sommarstrom et al., (2021) which states that the study suggests that school and teacher autonomy significantly enhances the implementation of entrepreneurship education, acting as a catalyst for innovative educational practices. However, variations in the adoption of curriculum messages highlight the need for a balanced approach to autonomy and adherence to core curricula. It calls for further research on teachers' perceptions regarding curriculum expectations and the practical execution of entrepreneurship education.

Theme 10: Inclusive Education

This underscores the importance of creating a learning environment that accommodates all students, regardless of their diverse backgrounds or abilities. This approach emphasizes equity, accessibility, and personalized support, aiming to ensure every student benefits from educational opportunities and feels valued and included within the school community. Participants generally agreed that the Matatag Curriculum plays a crucial role in promoting Inclusive Education through its emphasis on diversity, holistic development, and community involvement. This strategy seeks to establish a fair and accessible educational setting, making sure every student feels included and valued and has equal access to learning opportunities.

Moreover, the implication of the study is supported by Cabañero, (2023) which states that implementing Inclusive Education within the Matatag Curriculum requires overcoming challenges such as infrastructural limitations, varying attitudes, and uneven resource distribution. It necessitates enhancing teacher training to cater to diverse learning needs and creating a supportive educational environment. By addressing these barriers, the curriculum can ensure equitable learning opportunities for all students, including those with disabilities, fostering an inclusive, engaging, and adaptable educational landscape for every child to succeed and thrive.

Theme 11: Community Engagement

This highlights the crucial role of involving local communities, businesses, and stakeholders in the educational process. This collaboration enhances the learning experience, bridges the gap between theory and practice, and reinforces the relevance of education to real-world challenges and opportunities. Based on the statements, participants believe that integrating Community Engagement into the curriculum by involving parents, students, alumni, and local experts plays a vital role in enriching students' educational journeys. This approach fosters ownership, civic responsibility, and real-world connections, enhancing motivation and practical learning outcomes.

Furthermore, the implication of the study is supported by Spector and Leard, (2020). The study presents a model for enhancing higher education through community engagement and participatory involvement in curriculum development, as shown in the Informal Science Institutions Environmental Education Graduate Certificate Program at the University of South Florida. This approach underscores the inclusion of stakeholders and the target audience in designing, assessing, and revising educational programs, ensuring they meet participants' needs while leveraging community resources to boost enrollment. Such active collaboration enhances the relevance and accessibility of new curricula, fosters a shared sense of commitment, and yields benefits for learners, communities, and institutions alike.

Theme 12: Feedback and Improvement

This highlights the critical role of continuous feedback mechanisms in refining and enhancing educational programs. This iterative process ensures that curricula remain responsive to stakeholder needs, fostering ongoing improvement, adaptation, and the success of educational initiatives in meeting the evolving demands of learners and the community. Most participants believe that establishing robust feedback mechanisms and fostering a culture of trust and respect are vital for the continuous improvement and adaptation of educational

programs. These practices are essential for overcoming resistance to change and ensuring the curriculum's relevance and effectiveness.

Moreover, the implication of the study is supported by Gouedard et al., (2020). The study suggests a shift from traditional "top-down" curriculum reforms to a "bottom-up" approach, emphasizing the importance of teacher autonomy and agency in curriculum implementation. This perspective acknowledges teachers as active participants in the reform process, capable of adapting and refining curricular content to align with overarching goals and principles. Aligning this with feedback and improvement strategies, it advocates for involving teachers and other stakeholders in the ongoing evaluation and adaptation of the curriculum, ensuring it remains relevant and effective in addressing 21st-century challenges.

3.2 Construction of the Evaluation Scale

Based on the narratives of the participants, emerging themes, constructed from the core ideas pave the way for the development of a checklist that will undergo the process of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The items in the checklist which are the generated core ideas are based on the statements of the participants from the in-depth interview and focus group discussion. Moreover, Table 2 exhibits the suggested Checklist Survey Questionnaire to be subjected to EFA and CFA

The items reflect the fundamental topics, fundamental ideas/ assertions, issues demonstrated, and implications. There are 50 items on the survey questionnaires. This instrument is thoughtfully constructed to yield a comprehensive understanding of the multifaceted dimensions inherent in the development of an evaluation scale for assessing the effective implementation of the Matatag curriculum in the selected public schools in the division of Pasig City.

Table 2. Proposed checklist questionnaire

Items	5	4	3	2	1
1 The Matatag curriculum aligns with the national educational standards.					
2 The curriculum content is relevant to the student's cultural and socio-economic context.					
3 The learning objectives of the Matatag curriculum are clear and attainable.					
4 The curriculum promotes critical thinking and problem-solving skills.					
5 The curriculum integrates academic, social, and emotional learning in a balanced manner.					
6 The Matatag curriculum encourages inclusivity and diversity.					
7 The environmental awareness is adequately incorporated into the curriculum.					
8 The curriculum prepares students for real-life challenges through practical applications.					
9 Digital literacy is effectively integrated into the curriculum content.					
10 The curriculum supports continuous learning and curiosity.					
11 The teaching methods prescribed by the Matatag curriculum enhance student engagement.					
12 Collaborative learning is effectively facilitated through the curriculum.					
13 The curriculum provides ample opportunities for experiential learning.					
14 The assessment methods within the curriculum accurately measure student learning.					
15 The curriculum allows for flexibility in teaching approaches to cater to different learning styles.					
16 The innovative teaching methods are encouraged and supported by the curriculum.					
17 The curriculum places a strong emphasis on formative feedback to support student growth.					
18 The curriculum promotes a positive and supportive classroom environment.					
19 The teaching materials provided are of high quality and enhance learning experiences.					
20 The curriculum provides clear guidelines for integrating technology into classroom instruction.					
21 Adequate training is provided for teachers to effectively implement the Matatag curriculum.					
22 The teachers have access to sufficient resources to support the curriculum's implementation.					
23 The curriculum includes ongoing support for teachers to address challenges in implementing it.					
24 The school infrastructure supports the effective delivery of the Matatag curriculum.					
25 The curriculum ensures that professional development opportunities related to it are readily available.					
26 The curriculum has a mechanism for incorporating feedback from teachers for improvement.					
27 The curriculum fosters collaboration among teachers to enhance its implementation.					
28 The curriculum leverages community resources to enrich its implementation.					
29 The curriculum is supported by adequate financial resources for all its aspects.					
30 The curriculum ensures that technology resources are sufficient and accessible for both teachers and students.					
31 The implementation of the Matatag curriculum has led to an improvement in students' academic performance.					
32 The curriculum has positively impacted students' emotional and social well-being.					
33 The curriculum has resulted in students showing increased resilience and adaptability.					
34 The curriculum enhances students' motivation and engagement in learning.					
35 The curriculum has fostered the development of stronger critical thinking and problem-solving skills in students.					

- 36 The Matatag curriculum has fostered a sense of community and teamwork among students.
- 37 The curriculum has provided evidence of improved student behavior and attitudes toward learning.
- 38 The curriculum has led to students exhibiting a greater awareness and understanding of environmental issues.
- 39 The curriculum has increased students' preparedness for future educational and career paths.
- 40 The curriculum has contributed to students demonstrating increased cultural awareness and appreciation of diversity.
- 41 The curriculum employs a systematic approach to evaluating its effectiveness.
- 42 The curriculum regularly seeks and utilizes student feedback to improve its implementation.
- 43 The curriculum recognizes teacher feedback as crucial for its continuous improvement.
- 44 The curriculum's impact on student outcomes is regularly assessed and reported.
- 45 The curriculum is adjusted based on empirical evidence and feedback.
- 46 The school administration is committed to the ongoing improvement of the curriculum.
- 47 The effectiveness of professional development programs related to the curriculum is evaluated.
- 48 The curriculum encourages community and parental involvement in the evaluation process.
- 49 The curriculum's implementation is reviewed to ensure alignment with educational trends and needs.
- 50 The curriculum establishes clear benchmarks and indicators for success in its implementation.

3.3 Dimensions of the Evaluation Scale

Testing of the Proposed Questionnaire

Table 3 highlights the results of the Kaiser Meyer-Okin Measure (KMO) of Sampling Adequacy and Bartlett's test of sphericity. It can be gleaned in Table 3 that the KMO value is 0.859 which is above the recommended value of 0.5. This indicates that the sample is meritorious and adequate for factor analysis. Bartlett's test of sphericity was performed to check if there is a certain redundancy between the variables that could be summarized with a few factors. The results revealed that the p-value is significant ($p < .000$) which indicates that the data has patterned relationships, and factorability is assumed. If the KMO indicates sample adequacy and Bartlett's test of sphericity indicates the item correlation matrix is not an identity matrix, then researchers can move forward with the factor analysis.

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.859
Bartlett's Test of Sphericity	Approx. Chi-Square	12467.2670
	df	3560
	Significance	0.000

Derivation of Factors Structures the Evaluation Scale

Table 4 Pattern Matrix now reveals the derivation of factor structure and shows the three-factor model that exhibits clean patterns. The 50-item construct is then subjected to rotation. The Promax rotation was used since the factors seem to be correlated with a coefficient above 0.50 which reflects that the data is not assumed as orthogonal. Furthermore, Table 4 also exhibits the pattern matrix using principal Axis factoring with a rotation method of Promax with Kaiser Normalization. It can be observed in the results that the loadings of items in the three factors are above 0.40. The item loadings of each item to their factor indicate sufficient correlation between factors and variables and thus can be considered as a component of the factor.

Table 4. Pattern Matrix

Items		Factor Loadings		
		1	2	3
1.	The Matatag curriculum aligns with the national educational standards.	0.820		
2.	The lessons in the Matatag curriculum promote critical thinking skills.	0.730		
3.	The learning objectives of the Matatag curriculum are clear and attainable.	0.800		
4.	The curriculum promotes critical thinking and problem-solving skills.	0.880		
5.	The curriculum integrates academic, social, and emotional learning in a balanced manner.	0.506		
6.	The Matatag curriculum encourages inclusivity and diversity.	0.550		
7.	@			
8.	The curriculum prepares students for real-life challenges through practical applications.	0.565		
9.	The digital literacy is effectively integrated into the curriculum content.	0.557		
10.	@10			
11.	The teaching methods prescribed by the Matatag curriculum enhance student engagement.		0.566	
12.	The collaborative learning is effectively facilitated through the curriculum.		0.526	
13.	The curriculum provides ample opportunities for experiential learning.		0.459	
14.	@14			
15.	The curriculum allows for flexibility in teaching approaches to cater to different learning styles.		0.680	
16.	The innovative teaching methods are encouraged and supported by the curriculum.		0.740	

17. @17		
18. The curriculum promotes a positive and supportive classroom environment.	0.596	
19. @19		
20. The curriculum provides clear guidelines for integrating technology into classroom instruction.	0.449	
21. @21		
22. @22		
23. The curriculum includes ongoing support for teachers to address challenges in implementing it.	0.568	
24. The school infrastructure supports the effective delivery of the Matatag curriculum.	0.740	
25. The curriculum ensures that professional development opportunities related to it are readily available.	0.589	
26. @26		
27. The curriculum fosters collaboration among teachers to enhance its implementation.	0.458	
28. The Matatag curriculum comprised the real-life lessons.	0.720	
29. The curriculum is supported by adequate financial resources for all its aspects.	0.557	
30. The curriculum ensures that technology resources are sufficient and accessible for both teachers and students.		0.790
31. The implementation of the Matatag curriculum has led to an improvement in students' academic performance.	0.478	
32. The curriculum has positively impacted students' emotional and social well-being.		0.810
33. The curriculum has resulted in students showing increased resilience and adaptability.	0.555	
34. The curriculum enhances students' motivation and engagement in learning.		0.800
35. The curriculum has fostered the development of stronger critical thinking and problem-solving skills in students.		0.830
36. @36		
37. The curriculum has provided evidence of improved student behavior and attitudes towards learning.	0.449	
38. The curriculum has led to students exhibiting a greater awareness and understanding of environmental issues.	0.551	
39. @39		
40. The curriculum has contributed to students demonstrating increased cultural awareness and appreciation of diversity.	0.592	
41. The curriculum employs a systematic approach to evaluating its effectiveness.	0.780	
42. The curriculum regularly seeks and utilizes student feedback to improve its implementation.		0.449
43. The curriculum recognizes teacher feedback as crucial for its continuous improvement.		0.568
44. The curriculum's impact on student outcomes is regularly assessed and reported.		0.526
45. The curriculum is adjusted based on empirical evidence and feedback.		0.512
46. The school administration is committed to the ongoing improvement of the curriculum.		0.542
47. The effectiveness of professional development programs related to the curriculum is evaluated.		0.587
48. The curriculum encourages community and parental involvement in the evaluation process.		0.523
49. The curriculum's implementation is reviewed to ensure alignment with educational trends and needs.		0.578
50. The curriculum establishes clear benchmarks and indicators for success in its implementation.		0.564

In Table 5, by using the EFA, the three-factor model of evaluation scale in assessing the implementation of the Matatag curriculum in Philippine public schools with 38 items was developed, namely: *Curriculum Design and Content*, *Teaching and Learning Enhancement*, and *Implementation and Support*. The derivation of factor structure was determined through a priori results of qualitative data analysis wherein there recognized dimensions in developing an evaluation scale in assessing the implementation of the Matatag curriculum in Philippine public schools.

Table 5. Factor structure of the evaluation scale

Factor Structures/ Underlying Dimensions		Factor Loading	Decision
Factor 1. Curriculum Design and Content			
1.	The Matatag curriculum aligns with the national educational standards.	0.820	Retained
2.	The learning objectives of the Matatag curriculum are clear and attainable.	0.730	Retained
3.	The curriculum promotes critical thinking and problem-solving skills.	0.800	Retained
4.	The curriculum integrates academic, social, and emotional learning in a balanced manner.	0.880	Retained
5.	The Matatag curriculum encourages inclusivity and diversity.	0.550	Retained
6.	The curriculum prepares students for real-life challenges through practical applications.	0.565	Retained
7.	The digital literacy is effectively integrated into the curriculum content.	0.557	Retained
Factor 2: Teaching and Learning Enhancement			
8.	The teaching methods prescribed by the Matatag curriculum enhance student engagement.	0.623	Retained
9.	The collaborative learning is effectively facilitated through the curriculum.	0.526	Retained
10.	The curriculum provides ample opportunities for experiential learning.	0.459	Retained
11.	The curriculum allows for flexibility in teaching approaches to cater to different	0.540	Retained

learning styles.		
12. The innovative teaching methods are encouraged and supported by the curriculum.	0.550	Retained
13. The curriculum promotes a positive and supportive classroom environment.	0.596	Retained
14. The curriculum provides clear guidelines for integrating technology into classroom instruction.	0.449	Retained
15. The curriculum includes ongoing support for teachers to address challenges in implementing it.	0.740	Retained
16. The school infrastructure supports the effective delivery of the Matatag curriculum.	0.740	Retained
17. The curriculum ensures that professional development opportunities related to it are readily available.	0.540	Retained
18. The curriculum fosters collaboration among teachers to enhance its implementation.	0.458	Retained
19. The curriculum is supported by adequate financial resources for all its aspects.	0.757	Retained
20. The curriculum ensures that technology resources are sufficient and accessible for both teachers and students.	0.874	Retained
21. The implementation of the Matatag curriculum has led to an improvement in students' academic performance.	0.478	Retained
22. The curriculum has positively impacted students' emotional and social well-being.	0.623	Retained
23. The curriculum has resulted in students showing increased resilience and adaptability.	0.655	Retained
24. The curriculum enhances students' motivation and engagement in learning.	0.477	Retained
25. The curriculum has fostered the development of stronger critical thinking and problem-solving skills in students.	0.558	Retained
26. The curriculum has provided evidence of improved student behavior and attitudes toward learning.	0.449	Retained
27. The curriculum has led to students exhibiting a greater awareness and understanding of environmental issues.	0.551	Retained

Factor 3. Implementation and Support

28. The curriculum has contributed to students demonstrating increased cultural awareness and appreciation of diversity.	0.592	Retained
29. The curriculum employs a systematic approach to evaluating its effectiveness.	0.551	Retained
30. The curriculum regularly seeks and utilizes student feedback to improve its implementation.	0.449	Retained
31. The curriculum recognizes teacher feedback as crucial for its continuous improvement.	0.568	Retained
32. The curriculum's impact on student outcomes is regularly assessed and reported.	0.526	Retained
33. The curriculum is adjusted based on empirical evidence and feedback.	0.512	Retained
34. The school administration is committed to the ongoing improvement of the curriculum.	0.996	Retained
35. The effectiveness of professional development programs related to the curriculum is evaluated.	0.587	Retained
36. The curriculum encourages community and parental involvement in the evaluation process.	0.623	Retained
37. The curriculum's implementation is reviewed to ensure alignment with educational trends and needs.	0.578	Retained
38. The curriculum establishes clear benchmarks and indicators for success in its implementation.	0.564	Retained

3.4 Confirmatory Testing the Evaluation Scale

Figure 1 exhibits the CFA model of the evaluation scale. The 13 items constructed were subjected to confirmatory factor analysis (CFA) to ensure the final dimensions, representation of items to their factor, and the goodness of fit of the factor models. Since there are items having cross-loadings with other dimensions, it was then removed from the model to improve model fit. After removing those items having poor loadings of less than 0.60 and those with cross-loadings, the model generated has items that represent well the latent construct and has shown in the factor loading that is greater than 0.60.

Correlation of Emerging Variables

The provided Figure 1 illustrates a statistically significant positive correlation between various aspects with all p-values less than 0.05. Specifically, a correlation coefficient of $r=0.75$ indicates a strong positive relationship between suggestive reminders and warning/threat, as well as between curriculum design and content and teaching and learning enhancement. Furthermore, the relationship between teaching and learning enhancement and implementation and support is slightly stronger at $r=0.76$, while the latter exhibits a significant positive correlation of $r=0.69$ with another unspecified variable. These findings highlight the interconnectedness of the curriculum's components, suggesting that improvements in one area may positively affect others, thereby enhancing the overall educational experience.

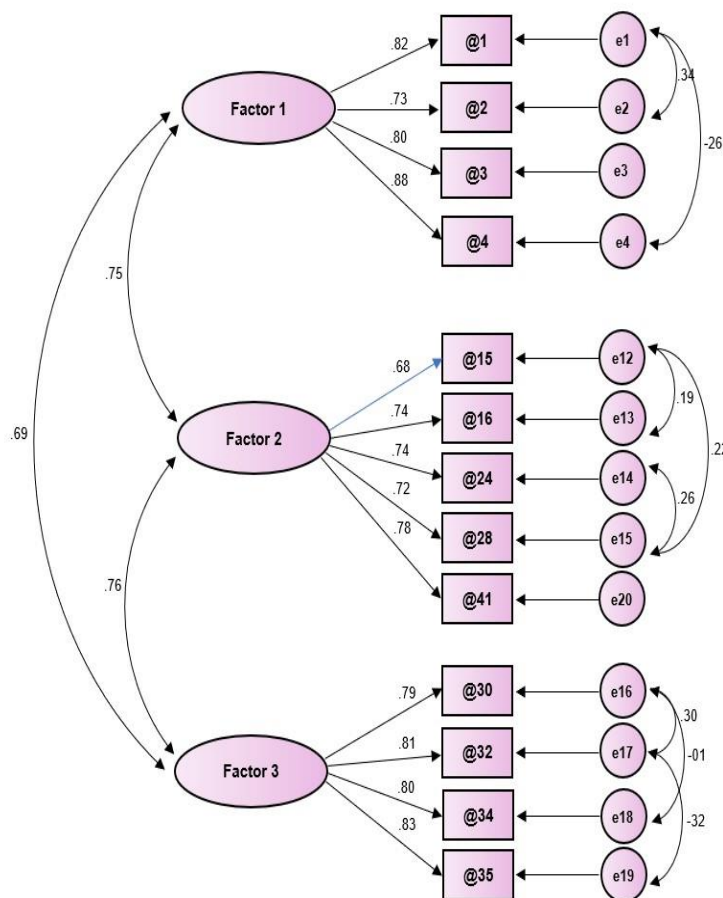


Figure 1. Hypothesized model of the evaluation scale

The correlation between variables that indicate positive relationships means that the two variables tend to increase or decrease together. However, a negative-positive relationship means that when one variable increases, the other decreases. Variables have a significant relationship if their p-value is less than 0.05 and no significant relationship if their p-value is above 0.05.

Goodness Fit of the Conceptual Model

Table 6 shows the derived model of the development of an evaluation scale in assessing the implementation of the Matatag curriculum in Philippine public schools which was evaluated to determine whether it exhibits a parsimonious fit. As can be gleaned in the table, all model fit, values have successfully met the criteria set by each index (CMIN/DF < 3.0), (TLI, CFI, and GFI > .90), and RMSEA < 0.08 with a PCLOSE > 0.05.

The derived three-factor model of the evaluation scale in assessing the implementation of the Matatag curriculum in Philippine public schools scale was also evaluated to determine whether it exhibits a parsimonious fit. The CMIN/DF is 1.178 which is lesser than 3.0, and the p-value is .188 which is greater than .05. Meanwhile the TLI is .981, CFI is .949, and GFI is .955 which is greater than .90. The RMSEA is .039 which is lesser than .08 and the PCLOSE is .875 which is greater than .05.

Further, as can be seen in Table 7, all model fit values have successfully met the criteria set by each index (CMIN/DF < 3.0), (TLI, CFI, and GFI > .90), and RMSEA < 0.08 with a PCLOSE > 0.05. This means that the model fits well with the data and therefore asserts as the best-fit model of evaluation scale in assessing the

implementation of the Matatag curriculum in Philippine public schools. The results simply mean that the identified model projects as the best-fit model for it.

Table 6. Goodness of fit of the conceptual model

Index value	Criterion Model fit value	
Chi-Square/ Degrees of Freedom	< 3	1.178
p-value	>.05	.188
Normal Fit Index GFI	>.90	.950
Tucker-Lewis Index	>.90	.981
Comparative Fit Index	>.90	.949
Goodness of Fit Index	>.90	.955
Root Mean Square of Error Approximation	<.08	.039
PCLOSE	>.05	.875

3.5 Final Version of Evaluation Scale

After conducting a Confirmatory Factor Analysis (CFA) a measurement tool was crafted revealed in Table 7 to assess its implementation accurately. This final tool now offers a reliable and statistically supported means of evaluating critical aspects of the curriculum, such as curriculum design, content delivery, and support systems, by measuring them against established theoretical expectations. It provides educators and policymakers with a nuanced understanding of the curriculum's effectiveness, allowing for data-driven decisions to enhance educational outcomes.

However, the final version of the instrument displayed in Table 7 which is the output of the study consists of 13 items. The 5-point Likert scale is used which ranges from 5-strongly agree to 1- strongly disagree. This final version of the instrument has been validated by expert evaluators for improvement. It has gained a rating of 4.6 which is considered a very good instrument.

Table 7. Final measurement tool assessing the implementation of the Matatag curriculum in the Philippines

Statements		1	2	3	4	5
Curriculum Design and Content						
1.	The Matatag curriculum aligns with the national educational standards.					
2.	The learning objectives of the Matatag curriculum are clear and attainable.					
3.	The curriculum promotes critical thinking and problem-solving skills.					
4.	The curriculum integrates academic, social, and emotional learning in a balanced manner.					
Teaching and Learning Enhancement						
1.	The teaching methods prescribed by the Matatag curriculum enhance student engagement.					
2.	The collaborative learning is effectively facilitated through the curriculum.					
3.	The curriculum provides ample opportunities for experiential learning.					
4.	The curriculum allows for flexibility in teaching approaches to cater to different learning styles.					
5.	The curriculum employs a systematic approach to evaluating its effectiveness					
Implementation and Support						
1.	The curriculum has contributed to students demonstrating increased cultural awareness and appreciation of diversity.					
2.	The curriculum employs a systematic approach to evaluating its effectiveness.					
3.	The curriculum regularly seeks and utilizes student feedback to improve its implementation.					
4.	The curriculum recognizes teacher feedback as crucial for its continuous improvement.					

Reliability Test of the Scale

The instrument was evaluated for reliability to determine the internal consistency of items. The overall reliability of the evaluation scale is high with a Cronbach's alpha value of ($\alpha = 0.896$). The subscale or dimension also is above the criteria of reliability about 0.70 alpha, namely: Curriculum Design and Content ($\alpha = 0.859$), Teaching and Learning Enhancement ($\alpha = 0.802$), and Implementation and Support ($\alpha = 0.895$). This indicates that the tool has good internal consistency.

3.6 Data Integration of Salient Qualitative and Quantitative Findings

In the simultaneous presentation of salient qualitative and quantitative results in Table 8, most of the variables and items from the quantitative phase supported and strengthened the emergent themes from the qualitative phase. This means that quantitative data confirms qualitative data. However, certain developing patterns in the

qualitative have not been verified by the quantitative phase. The good thing about mixed methods research is that it strengthens the claims of either quantitative or qualitative data findings since it employs both a qualitative and quantitative methodology.

Table 8. Data integration of salient qualitative and quantitative findings

Aspect for Focal Point	Qualitative Findings	Quantitative Findings	Nature of Data	Aspect for Focal Point
On Essential Themes	The themes that emerged were:	The target name of the domain dimensions (Adamson, B., & Yin, A., 2018).	Connecting-Building Up	Quantification additionally measurability demonstrates the a blend of topics that are being entangled or connected in some way by a group of individuals as described by the investigation of Schubert (1986). Measurability or quantification of the themes is often associated with constructivist learning theory areas explained by the Theory by Jean Piaget (1960).
	Curriculum Design and Content.	The target name of the domain is Curriculum Design and Content with 4 items on a 5-point Likert scale.		
	Teaching and Learning Enhancement, and	The target name of the domain is Teaching and learning improvement with 5 items on 5-point Likert Scale.		
On Factor Structure	The following themes remained:	The target name of the domain is Implementation and Support with 4 items on a 5-point Likert Scale.	Connecting-testing and validating	Equivalence between themes and scales is strengthened by the CFA statistical rigors as explained by Hair et al (1998)
	Curriculum Design and Content	Curriculum Design and Content Item 1: 0.820 Item 2: 0.730 Item 3: 0.800 Item 4: 0.880		
	Teaching and Learning Enhancement	Teaching and Learning Enhancement Item 15: 0.680 Item 16: 0.740 Item 24: 0.740 Item 28: 0.720 Item 41: 0.780		
	Implementation and Support	Implementation and Support Item 30: 0.790 Item 32: 0.810 Item 34: 0.800 Item 35: 0.830	Connecting-testing and validating	

The factor structure of development of an evaluation scale in assessing the implementation of the Matatag curriculum in Philippine public schools revealed the results that the underlying dimensions of Curriculum Design and Content, Teaching and Learning Enhancement, and Implementation and Support are confirmed in the quantitative data as reflected in Figure 1 which shows latent factor loadings of Curriculum Design and Content ranging from .73-.88; latent factor 2 which is the Teaching and Learning Enhancement has factor loadings ranging from .68-.78; and latent factor 3 which is Implementation and Support has factor loadings ranging from .79-.83. This presents the connecting nature of data integration which functions as testing and validating. Hence, it signifies that quantitative data confirms qualitative data. However, there are some emerging themes in the qualitative that have not been confirmed by the quantitative phase.

4.0 Conclusion

In the light of the findings derived from this study, the following conclusions were formulated:

- a. The emergence of twelve essential themes from teachers' views highlights the multifaceted nature of effective curriculum implementation. It underscores the importance of integrating interactive learning, critical thinking, technology, cultural relevance, and collaborative strategies to enhance student engagement and learning outcomes. This indicates that the curriculum developers and educators suggest that a broad, holistic approach to curriculum design that includes these elements can foster a more engaging and effective learning environment. The detailed implications of the emergence of twelve essential themes from teachers' views on curriculum implementation emphasize the need for a comprehensive, inclusive, and dynamic approach to education. By integrating these themes into curriculum design and teaching practices, educators can create a more engaging, relevant, and effective learning environment that meets the needs of all students.
- b. The identification of three underlying dimensions (Curriculum Design and Content, Teaching and Learning Enhancement, and Implementation and Support) through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) provides a clear framework for evaluating curriculum implementation. This signifies the need for educational stakeholders to consider these dimensions in curriculum evaluation to ensure a comprehensive assessment of its effectiveness. For policymakers and school administrators, this implies adopting a structured approach to curriculum evaluation that aligns with these dimensions.
- c. The refinement process leading to thirteen suitable items for the evaluation scale illustrates the critical role of thorough analysis in developing effective measurement tools. This has implications for both research and practice, highlighting the necessity of rigorous item analysis to ensure that evaluation tools are both efficient and comprehensive in capturing the essence of curriculum implementation.
- d. The validation of the three dimensions through Structural Equation Modeling (SEM) confirms their relevance and fit in developing an evaluation scale for the Matatag curriculum. This outcome has profound implications for future research and practice in educational evaluation, suggesting that focusing on these dimensions can lead to more accurate and meaningful assessments of curriculum implementation effectiveness.
- e. The high-reliability score (Cronbach's alpha of 0.896) of the final tool signifies a robust instrument capable of accurately measuring the effectiveness of the Matatag curriculum's implementation. This underscores the importance of achieving high reliability in evaluation tools for educational stakeholders to make informed decisions based on reliable data. For practitioners, this means using well-validated tools can provide confidence in the assessment outcomes, guiding improvements, and interventions.
- f. The quantitative data confirming the qualitative results emphasizes the strength of integrating diverse data sources for a comprehensive understanding. This finding has significant implications for research methodology in education, advocating for the use of mixed methods to capture the complexity of educational phenomena. The findings from the evaluation of the Matatag curriculum offer valuable insights into effective curriculum implementation and evaluation. The identified themes, dimensions, and the development of a reliable evaluation tool provide a solid foundation for enhancing curriculum design, teaching practices, and overall educational outcomes in Philippine public schools. These insights have broader implications, suggesting that similar approaches could be beneficial in other educational contexts aiming to improve curriculum effectiveness and student learning experiences.

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There is only one author for this research.

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7.0 Conflict of Interests

The author declares no conflicts of interest

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An Application of the First-Order Linear Ordinary Differential Equation to Regression Modeling of Unemployment Rates

Denver Q. Narvasa

Saint Louis University, Baguio City, Benguet, Philippines

Author email: narvasaden79@gmail.com

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Abstract. The unemployment rate investigates the relationship between labor market outcomes and poverty, evaluates the effect of labor market policies and programs, and provides ways to improve their performance. This study analyzes data-driven regression modeling for the economy, specifically the first-order linear ordinary differential equation (ODE). Consider a collection of actual data for the Ilocos Region's unemployment rate and calculate the numerical derivative. Then, a general equation for the first-order linear ODE is presented, with two parameters that will be determined using regression modeling. Following that, a loss function is defined as the sum of squared errors to reduce the difference between estimated and real data in the presence of fluctuations. After this, a loss function is defined as the sum of squared errors to minimize the differences between estimated and actual data. A set of necessary conditions is derived, and the regression parameters are analytically determined. Based on these optimal parameter estimates, the solution of the first-order linear ODE, which matches the actual data trend, shall be obtained. The observations show that the relationship between the actual data and the adjusted predicted regression dynamics closely matches. Results also indicate that the new insight includes the analysis of fluctuations in the unemployment rate for regression modeling dynamics. This research helps Filipino economists provide insights and inform policy decisions aimed at the labor market, and they can focus their efforts on improving these indicators to stimulate job creation and reduce unemployment.

Keywords: Unemployment rate; Differential equation; Regression modeling; Parameter estimation; Ilocos region; Philippines.

1.0 Introduction

The unemployment rate is a key economic indicator used to assess the health of an economy. It tends to fluctuate with the business cycle, rising during recessions and falling during expansions. It is one of the statistics most closely monitored by policymakers, investors, and the public (Bondarenko, 2024).

In the Philippines, unemployment and underemployment are the most significant challenges and critical indicators of economic problems. According to Rutkowski (2015), poverty is primarily caused by the poor's low earning ability and lack of regular and successful employment opportunities. Behind these are two connected primary causes of in-work poverty: a lack of education among the poor and an absence of effective employment opportunities.

The Public Employment Services Office of Pangasinan, Ilocos Region, announced that the unemployment rate in the province has decreased. Based on the most recent monitoring of PESO Pangasinan as of April 2023, the unemployment rate of the province decreased, with the working population in the province at 1,950,882, or

equal to 60%. 56,097 are among the unemployed, or 4.5% unemployed. 1,246,613 are in the labor force, 1,190,515 are employed, and 158,319 are underemployed, or 12.7%.

Currently, there is a dearth of research regarding modeling the unemployment rate in the Ilocos Region. Although various studies have used the first-order linear ordinary differential equation to help in understanding and optimizing business systems, there has been minimal research into how the model is utilized in the employment sector. The research aimed to develop a new model that can track actual data from historical data, including fluctuations, which would allow it to analyze the trend of the unemployment rate and provide solutions to the problem of economic system development.

The researcher was motivated by the significance of mathematical modeling, particularly in the dynamics of the economic system. Future researchers, even students, and teachers, must be knowledgeable about how mathematical modeling works to help the economic dynamics. Aside from biological ecosystems, the first-order linear ordinary differential equation for the regression model is most commonly applied in business ecosystems, where population symbolizes the sales or revenue of products, technology, channels, or enterprises.

2.0 Methodology

2.1 Research Design

This study employed applied mathematics, specifically focusing on the First-Order Linear Ordinary Differential Equation for Regression Modeling. To achieve the study's objectives, a comprehensive review of related literature was conducted, encompassing various definitions and methodologies for future reference.

2.2 Data Source

Data were gathered from the Philippines Statistics Authority (PSA), Regional Statistics Services Office I, located in the City of San Fernando, La Union. Computer software such as Microsoft Excel and MatLab were utilized to verify calculations and generate graphs to illustrate the actual phenomenon in the regression modeling system.

2.3 Parameter Estimation

Ordinary and partial differential equations are typically used to represent mathematical models of dynamic processes. They encompass both dependent and independent variables, as well as constants known as parameters. Dependent variables are often directly measured, while parameter estimates rely on input and output data. In differential equations, the equation structure and the measurements of the input and initial conditions are known, but some or all of the parameters may be unknown. The objective is to determine the optimal estimate of these parameters to effectively describe many phenomena in real-world systems (Wang and Barber, 2014).

Gaussian process regression (GPR) predicts based on training data, akin to k-Nearest Neighbors. It performs well with small data sets and provides predictions with uncertainty quantification. Prior mean and covariance must be specified, with the covariance defined through a kernel object. The kernel hyperparameters are optimized during fitting by maximizing the log-marginal-likelihood (LML) using the chosen optimizer. Given that this maximization is non-convex (with many local optima), the optimizer needs to be restarted multiple times. The first iteration starts with the original hyperparameters, followed by subsequent iterations using randomly selected hyperparameters from the allowable range (Sit, 2019).

Gaussian processes offer a method for modeling probability distributions over functions. According to Do (2007), they discuss how probability distributions over functions can be utilized within the framework of Bayesian regression.

Let $S = \{(x^{(i)}, y^{(i)})\}_{i=1}^m$ be training set of independent and identically distributed examples from some unknown distribution. In the Gaussian process regression model,

$$y^{(i)} = h(x^{(i)}) + \varepsilon^{(i)}, \quad i = 1, 2, 3, \dots, m$$

where the $\varepsilon^{(i)}$ are independent and identical distributed "noise" variables with independent $\mathcal{N}(0, \sigma^2)$ distributions. Similarly, in Bayesian regression, assume a prior distribution over function $h(\cdot)$ in particular, assume a zero-mean Gaussian process prior,

$$h(\cdot) \sim \mathcal{GP}(0, (k(\cdot, \cdot)))$$

for some valid covariance function $(k(\cdot, \cdot))$.

This study applied Gaussian process regression, a form of machine learning algorithm. Gaussian processes do not aim to find "best-fit" data models or, in general, "best guess" predictions for additional inputs to the test. The researcher makes a trial and error for Gaussian Process Regression codes in MatLab online software to experiment with the parameters to create a second distribution across models or prediction distributions for new test data. These distributions help in measuring uncertainty in model estimations, improving predictions for additional test locations, and comparing the solution to the first-order linear ordinary differential equation.

3.0 Results and Discussion

3.1 The Mathematical Model

Consider a set of actual data, given by

$$y = \{y_1, y_2, y_3, \dots, y_n\}, \quad (1)$$

for time t_i , $i = 1, 2, 3, \dots, n$, where n is the number of data points, and the derivative of data is expressed by

$$y'_i = \frac{y_{i+1} - y_i}{t_{i+1} - t_i}, \quad i = 1, 2, 3, \dots, n-1, \quad (2)$$

Define a loss function

$$\partial J_{se}(\alpha, \beta) = \sum_{i=1}^n (y'_i - \alpha - \beta y_i)^2, \quad (3)$$

with a first-order ordinary differential equation

$$\frac{dy}{dt} = \alpha + \beta y, \quad (4)$$

Where α and β are unknown parameters, and y is the solution set for the first-order linear ODE in system (4). Therefore, this problem is referred to as a regression problem with a first-order linear ODE, and the parameters α and β are known as the regression parameters to be determined later.

Now, consider the gradients of loss function in system (3)

$$\frac{\partial J_{se}}{\partial \alpha} = -2 \sum_{i=1}^{n-1} (y'_i - \alpha - \beta y_i), \quad (5)$$

$$\frac{\partial J_{se}}{\partial \beta} = -2 \sum_{i=1}^{n-1} (y_i)(y'_i - \alpha - \beta y_i), \quad (6)$$

Setting these gradients to zero and doing some algebraic manipulations to gain

$$\hat{\alpha} = \bar{y}' - \hat{\beta} \bar{y}, \quad (7)$$

$$\hat{\beta} = \frac{\sum_{i=0}^n y_i (y'_i - \bar{y}')}{\sum_{i=0}^n (y_i)(y_i - \bar{y})}, \quad (8)$$

Substitute $\hat{\alpha}$ and $\hat{\beta}$ into system (4), we have

$$\frac{dy}{dt} = \hat{\alpha} + \hat{\beta}y, \quad (9)$$

Notice that the analytical solution for system 9 is presented by

$$\hat{y}(t) = \begin{cases} y(\tau)e^{\hat{\beta}(t-\tau)} - \frac{\hat{\alpha}}{\hat{\beta}}[1 - e^{\hat{\beta}(t-\tau)}], & \text{for } t > \tau \\ y(\tau)e^{\hat{\beta}(t-\tau)} + \frac{\hat{\alpha}}{\hat{\beta}}[e^{\hat{\beta}(t-\tau)} - 1], & \text{for } t < \tau \end{cases} \quad (10)$$

for $t > \tau$, where $\hat{y}$ is the estimated point to the actual point in system (1). Thus, system (10) represents the regression model for the actual data in system (1), which closely tracks the actual data trend. This is done for mathematical manipulations purposes (Kek, Chen, and Chan 2024).

3.2 Regression Equilibria Analysis and Existence Conditions

In most mathematical models through differential equations, some equations are nonlinear or contain a higher-order derivative that is difficult and time-intensive to solve (Ming, 2017). According to Khalil (2002), one technique for assessing the model's behavior is to first identify the stability states or places where the rate of the dependent variable with respect to the independent variable(s) equals zero. These equilibria represent the points at which the regression model reaches balance or stability.

For analyzing equilibria in first-order ODEs for regression models, find the values of the independent variables at which the dependent variable's derivative is zero (Braun, 1983). These points provide insights into the regression model's long-term behavior or steady states, which aids in understanding the dynamics and stability of the modeled interaction (Lunt, 2013). Lastly, when dealing with first-order ODEs in regression models, stable points are those where the dependent variable's rate of change is zero, indicating that the variables' connection is balanced or stable (Khalil, 2002).

The following mathematical manipulations below represent possible dynamics of the modified model:

Theorem 1.

(Parameter $\hat{\alpha}$) If the $\frac{\partial J_{se}}{\partial \alpha} = -2 \sum_{i=1}^{n-1} (y'_i - \alpha - \beta y_i)$, then the solution of $\hat{\alpha} = \bar{y}' - \hat{\beta}\bar{y}$.

Proof: At the system (5), suppose that the right-hand side of the equation is equated to zero, and the solution for $\hat{\alpha}$ that will satisfy this equation is determined. Doing so, system (2) becomes

$$-2 \sum_{i=1}^{n-1} (y'_i - \alpha - \beta y_i) = 0$$

This implies that,

$$\begin{aligned} -2 \sum_{i=1}^{n-1} y'_i + (-\alpha) \left(-2 \sum_{i=1}^{n-1} 1 \right) - \left(-2\alpha\beta \sum_{i=1}^{n-1} y_i \right) &= 0 \\ -2 \sum_{i=1}^{n-1} y'_i + 2\alpha \sum_{i=1}^{n-1} 1 + 2\alpha\beta \sum_{i=1}^{n-1} y_i &= 0 \end{aligned}$$

Then,

$$2[-(n-1)\bar{y}' + \alpha(n-1) + \beta(n-1)\bar{y}] = 0$$

According to James (2023) the transition from y'_i to $\bar{y}'$ occurs when moving from the individual data points y'_i to the mean value $\bar{y}$, which can be simplified to

$$\begin{aligned} -2(n-1)\bar{y}' + 2\alpha(n-1) + 2\beta(n-1)\bar{y} &= 0 \\ \left(\frac{1}{2(n-1)}\right)[-2(n-1)\bar{y}' + 2\alpha(n-1) + 2\beta(n-1)\bar{y}] &= 0 \\ -\bar{y}' + \alpha + \beta\bar{y} &= 0 \\ -\alpha &= -\bar{y}' + \beta\bar{y} \\ \hat{\alpha} &= \bar{y}' - \beta\bar{y} \end{aligned}$$

In the third equality, the researcher simplifies the expression, factors out common terms, and often represents the entire summation in a more compact form for this instance. The researcher observed that there is a transition from using the individual term y'_i to the sample mean $\bar{y}'$ between the second and third equalities. Initially, this transition is made to simplify the notation and focus on the average behavior of the system. So, according to Kutner (2005) y'_i refers to the rate of change of each individual data point, while $\bar{y}$ refers to the rate of change to the mean value.

However, according to Larsen and Marx (2012), in the many mathematical manipulations, it is often useful to work with average values rather than individual ones. This is where a sample $\bar{y}'$ comes into play. The sample mean represents the average of the derivatives of data point.

Hence, the solution for intercept α is $\bar{y}' - \beta\bar{y}$. Observe that the difference between the mean of the predicted values of the dependent variable $\bar{y}'$ and the product of the slope term in the linear regression model β and the mean of the observation values of the dependent variable $\bar{y}$ (Fox, 2016).

Theorem 2.

(Parameter $\hat{\beta}$) Show that $\frac{\partial J_{se}}{\partial \beta} = -2 \sum_{i=1}^{n-1} (y_i)(y'_i - \alpha - \beta y_i)$, then $\hat{\beta} = \frac{\sum_{i=0}^n (y_i)(y'_i - \bar{y}')}{\sum_{i=0}^n (y_i)(y_i - \bar{y})}$.

Proof: Evaluating the system (6), the right-hand side of the equation is equated to zero, and the solution for $\hat{\beta}$ that will satisfy this equation is determined, which would give

$$\begin{aligned} -2 \sum_{i=1}^{n-1} (y_i)(y'_i - \alpha - \beta y_i) &= 0 \\ -2 \sum_{i=1}^{n-1} (y_i)(y'_i) + \left[(-2)(-\alpha) \sum_{i=1}^{n-1} y_i \right] + (-2)(-\beta) \sum_{i=1}^{n-1} y_i^2 &= 0 \end{aligned}$$

Then

$$-2 \sum_{i=1}^{n-1} (y_i)(y'_i) + 2\alpha \sum_{i=1}^{n-1} y_i + 2\beta \sum_{i=1}^{n-1} y_i^2 = 0$$

Substituting α to $\bar{y}' - \beta\bar{y}$ leads to

$$\begin{aligned} -2 \sum_{i=1}^{n-1} (y_i)(y'_i) + 2(\bar{y}' - \beta\bar{y}) \sum_{i=1}^{n-1} y_i + 2\beta \sum_{i=1}^{n-1} y_i^2 &= 0 \\ -2 \sum_{i=1}^{n-1} (y_i)(y'_i) + (2\bar{y}' - 2\beta\bar{y}) \sum_{i=1}^{n-1} y_i + 2\beta \sum_{i=1}^{n-1} y_i^2 &= 0 \end{aligned}$$

Simplifying further

$$\begin{aligned} -2 \sum_{i=1}^{n-1} (y_i)(y'_i) + 2 \sum_{i=1}^{n-1} y_i \bar{y}' - 2\beta \sum_{i=1}^{n-1} y_i \bar{y} + 2\beta \sum_{i=1}^{n-1} y_i^2 &= 0 \\ -2 \sum_{i=1}^{n-1} (y_i)(y'_i) + 2 \sum_{i=1}^{n-1} y_i \bar{y}' &= -2\beta \sum_{i=1}^{n-1} y_i^2 + 2\beta \sum_{i=1}^{n-1} y_i \bar{y} \end{aligned}$$

$$-2 \left[\sum_{i=1}^{n-1} (y_i)(y'_i) - \sum_{i=1}^{n-1} y_i \bar{y}' \right] = -2 \left[\beta \sum_{i=1}^{n-1} y_i^2 - \beta \sum_{i=1}^{n-1} y_i \bar{y} \right]$$

By cancellation law

$$\sum_{i=1}^{n-1} (y_i)(y'_i) - \sum_{i=1}^{n-1} y_i \bar{y}' = \beta \sum_{i=1}^{n-1} y_i^2 - \beta \sum_{i=1}^{n-1} y_i \bar{y}$$

According to Montgomery (2021) both summations are now from $i = 0$ to n , which includes all relevant terms or observations. This extension might be done for mathematical convenience or to insure that all data points, including the first one $i = 0$, are considered in the derivation. In the dynamics of regression analysis, this summation typically involves the calculation of the numerator or denominator in the solution for $\hat{\beta}$, where each term corresponds to a specific data point or observation in the data set.

$$\sum_{i=0}^n (y_i)(y'_i) - \sum_{i=0}^n y_i \bar{y}' = \hat{\beta} \left[\sum_{i=0}^n y_i^2 - \sum_{i=0}^n y_i \bar{y} \right]$$

Finally, obtaining

$$\begin{aligned} \hat{\beta} &= \frac{\sum_{i=0}^n (y_i)(y'_i) - \sum_{i=0}^n y_i \bar{y}'}{\sum_{i=0}^n y_i^2 - \sum_{i=0}^n y_i \bar{y}} \\ \hat{\beta} &= \frac{\sum_{i=0}^n (y_i)[(y'_i) - \bar{y}']}{\sum_{i=0}^n (y_i)(y_i - \bar{y})} \end{aligned}$$

The solution for parameter $\hat{\beta} = \frac{\sum_{i=0}^n (y_i)[(y'_i) - \bar{y}']}{\sum_{i=0}^n (y_i)(y_i - \bar{y})}$. Therefore, when substituting $\hat{\alpha}$ and $\hat{\beta}$ into the system (4), the solution of the rate of change of y with respect to time is $\frac{dy}{dt} = \hat{\alpha} + \hat{\beta}y$.

Theorem 3

The modified model admits two (2) possible analytical solutions for $\frac{dy}{dt} = \hat{\alpha} + \hat{\beta}y$. These are

$$\hat{y}(t) = \begin{cases} y(\tau)e^{\hat{\beta}(t-\tau)} - \frac{\hat{\alpha}}{\hat{\beta}}[1 - e^{\hat{\beta}(t-\tau)}], & \text{for } t > \tau \\ y(\tau)e^{\hat{\beta}(t-\tau)} + \frac{\hat{\alpha}}{\hat{\beta}}[e^{\hat{\beta}(t-\tau)} - 1], & \text{for } t < \tau \end{cases}$$

where $\hat{y}$ is the estimated point to the actual point in system (1).

Proof: Suppose that $\hat{\alpha}$ and $\hat{\beta}$ are real numbers

This implies that

$$\begin{aligned} \frac{dy}{dt} &= \hat{\alpha} + \hat{\beta}y \\ dt &= \frac{1}{\hat{\alpha} + \hat{\beta}y} dy \end{aligned}$$

Then applying the indefinite integral both sides leads to

$$\begin{aligned} \int dt &= \int \frac{1}{\hat{\alpha} + \hat{\beta}y} dy \\ t + C &= \frac{1}{\hat{\beta}} \ln |\hat{\alpha} + \hat{\beta}y| \\ \hat{\beta}(t + C) &= \ln |\hat{\alpha} + \hat{\beta}y| \end{aligned}$$

$$\hat{\beta}t + \hat{\beta}C = \ln |\hat{\alpha} + \hat{\beta}y|$$

Since $\hat{\beta}C$ is a constant, it follows that

$$\hat{\beta}t + C = \ln |\hat{\alpha} + \hat{\beta}y|$$

Applying the exponential e to both sides

$$\begin{aligned} e^{\hat{\beta}t+C} &= e^{\ln_e |\hat{\alpha}+\hat{\beta}y|} \\ e^{\hat{\beta}t}e^C &= \hat{\alpha} + \hat{\beta}y \end{aligned}$$

$$Ce^{\hat{\beta}t} = \hat{\alpha} + \hat{\beta}y \quad (11)$$

The expression $Ce^{\hat{\beta}t}$ represents an exponential function where C is a constant and $\hat{\beta}$ is another constant raised to the power of t , a variable (Montgomery, 2021) this function grows or decays exponentially depending on the sign of $\hat{\beta}$. According to Fox (2016) considering that when $\hat{\alpha} + \hat{\beta}y > 0$, the predicted value is positive, this means that it falls above the regression line. Conversely, when $\hat{\alpha} + \hat{\beta}y < 0$, the predicted value is negative, which means it falls below the regression line.

According to Harrell (2015) in regression analysis, time is usually modeled as a predictor variable with the potential to be negative. Time is usually considered as a continuous variable that moves in a positive direction, representing the order of time of observations. However, depending on the point of reference or basis used, associated with time variables in a dataset may take on negative values.

It is important to note that, even when using a relative time scale, negative values only serve as labels for a position in time relative to a certain point in time and do not carry the same mathematical importance as negative numbers in other instances (Chatterjee, and Hadi, 2012). The regression model would continue to handle time as a continuous variable, with coefficients and predictions interpreted from the specified starting point.

Considering the following cases:

Case 1. When $t > \tau$ and $Ce^{\hat{\beta}t} = \hat{\alpha} + \hat{\beta}y$

The equation in system (11) is satisfied, which utilizes as follows

$$Ce^{\hat{\beta}t} = \hat{\alpha} + \hat{\beta}y$$

In this case, substitute the system 10.1 to y and simplify the right hand side

$$\hat{\alpha} + \hat{\beta} \left[y(\tau)e^{\hat{\beta}(t-\tau)} - \frac{\hat{\alpha}}{\hat{\beta}}(1 - e^{\hat{\beta}(t-\tau)}) \right]$$

By distributive property, we have

$$\begin{aligned} & [\hat{\alpha} + \hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)}] + \left[-(\hat{\alpha} + \hat{\beta}) \frac{\hat{\alpha}}{\hat{\beta}}(1 - e^{\hat{\beta}(t-\tau)}) \right] \\ & [\hat{\alpha} + \hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)}] + \left\{ (-\hat{\alpha} - \hat{\beta}) \left[\frac{\hat{\alpha}}{\hat{\beta}}(1 - e^{\hat{\beta}(t-\tau)}) \right] \right\} \end{aligned}$$

Simplifying further

$$\begin{aligned} & \hat{\alpha} + \hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)} - \hat{\alpha} - \hat{\alpha}(1 - e^{\hat{\beta}(t-\tau)}) \\ & \hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)} - \hat{\alpha}(1 - e^{\hat{\beta}(t-\tau)}) \end{aligned}$$

Which gives the following

$$\begin{aligned} & \hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)} - \hat{\alpha}[1 - e^{\hat{\beta}(t-\tau)}] \\ & \hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)} = \hat{\alpha}[1 - e^{\hat{\beta}(t-\tau)}] \end{aligned}$$

Divide to both sides by $\hat{\beta}$

$$y(\tau)e^{\hat{\beta}(t-\tau)} = \frac{\hat{\alpha}}{\hat{\beta}}[1 - e^{\hat{\beta}(t-\tau)}]$$

Finally, obtaining the system (10.1)

$$y(\tau)e^{\hat{\beta}(t-\tau)} - \frac{\hat{\alpha}}{\hat{\beta}}[1 - e^{\hat{\beta}(t-\tau)}]$$

The first term $y(\tau)e^{\hat{\beta}(t-\tau)}$ is the transient or decaying part of the solution, while the second term $\frac{\hat{\alpha}}{\hat{\beta}}[1 - e^{\hat{\beta}(t-\tau)}]$ represents the steady state or equilibrium part of the solution. Comparing this with the left-hand side $Ce^{\hat{\beta}t}$, observed that the equation holds.

Case 2: When $t < \tau$ and $Ce^{\hat{\beta}t} = -(\hat{\alpha} + \hat{\beta}y)$

Utilizing the system

$$Ce^{\hat{\beta}t} = -(\hat{\alpha} + \hat{\beta}y)$$

Substitute the system (10.2) to y

$$\begin{aligned} & -(\hat{\alpha} + \hat{\beta}) \left[y(\tau)e^{\hat{\beta}(t-\tau)} + \frac{\hat{\alpha}}{\hat{\beta}}(e^{\hat{\beta}(t-\tau)} - 1) \right] \\ & (-\hat{\alpha} - \hat{\beta}) \left[y(\tau)e^{\hat{\beta}(t-\tau)} + \frac{\hat{\alpha}}{\hat{\beta}}(e^{\hat{\beta}(t-\tau)} - 1) \right] \end{aligned}$$

By distributive property,

$$[(-\hat{\alpha} - \hat{\beta})y(\tau)e^{\hat{\beta}(t-\tau)}] + \left[(-\hat{\alpha} - \hat{\beta})\frac{\hat{\alpha}}{\hat{\beta}}(e^{\hat{\beta}(t-\tau)} - 1) \right]$$

Simplifying further

$$\begin{aligned} & -\hat{\alpha} - \hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)} + -(\hat{\alpha} - \hat{\alpha})[e^{\hat{\beta}(t-\tau)} - 1] \\ & -\hat{\alpha} - \hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)} - \hat{\alpha} + \hat{\alpha}[e^{\hat{\beta}(t-\tau)} - 1] \\ & -\hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)} - \hat{\alpha}[e^{\hat{\beta}(t-\tau)} - 1] \end{aligned}$$

Which yields the following

$$-\hat{\beta}y(\tau)e^{\hat{\beta}(t-\tau)} = \hat{\alpha}[e^{\hat{\beta}(t-\tau)} - 1]$$

Divide to both sides $-\hat{\beta}$

$$y(\tau)e^{\hat{\beta}(t-\tau)} = -\frac{\hat{\alpha}}{\hat{\beta}}[e^{\hat{\beta}(t-\tau)} - 1]$$

Finally, obtaining the system (10.2)

$$y(\tau)e^{\hat{\beta}(t-\tau)} + \frac{\hat{\alpha}}{\hat{\beta}}[e^{\hat{\beta}(t-\tau)} - 1]$$

Therefore, both cases are valid solutions for $\hat{y}(t)$ given the initial condition $y(\tau)$ and the parameters $\hat{\alpha}$ and $\hat{\beta}$ in the system (11), where $t > \tau$.

3.3 The Actual Parameters

To verify the theoretical result, the researcher shows the time series data plot of Unemployment Rate in Ilocos Region, Philippines quarterly from January 2018 to October 2023. This means that the quarterly rate of unemployment rate was plotted against time. The time series data plot shown in Figure 1 shows that between January 2018 and April 2019, the unemployment rate changed moderately. However, in April 2020, there was a considerable increase, reaching 22.3%, which was most likely due to the economic consequences of the COVID-19 pandemic, which resulted in big job losses and economic instability. According to Austria (2020), during the pandemic, the Department of Labor and Employment (DOLE), in collaboration with the Pangasinan Public Employment Services Office (PESO), recently held the first face-to-face (F2F) job fair, catering to around 300 Pangasinense job seekers. From July 2022 to October 2022, the unemployment rate dropped gradually showing a job market bounce back as economic activity restarted and economic stimulus strategies were implemented to help organizations and workers. This declining trend peaked in October 2022, when the unemployment rate reached its lowest point of 4%. Between January 2023 and October 2023, the unemployment rate remained stable, ranging between 4.4% and 4.7%. This stability reflects a time of job market equilibrium, in which the unemployment rate does not significantly increase or fall.

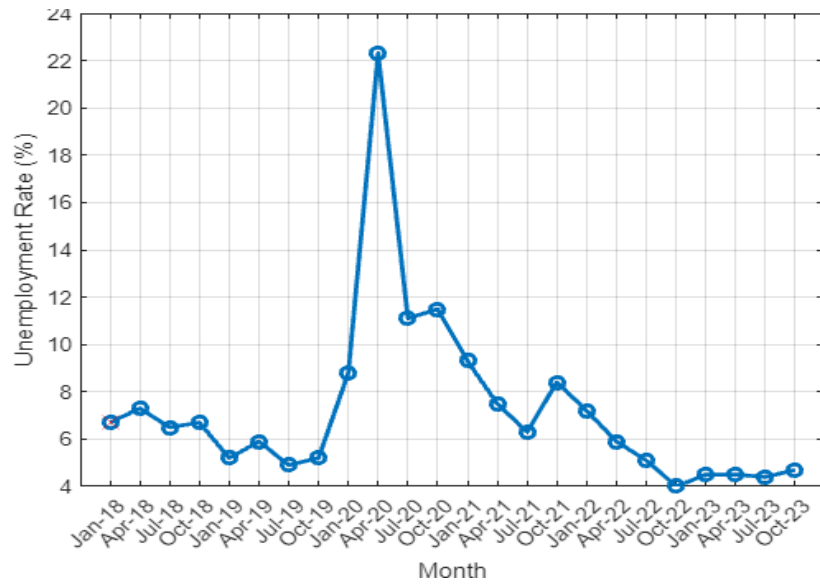


Figure 1. Time series data plot of unemployment rate in Ilocos Region

Table 1 presents the following values for the derivative of data points.

Table 1. Computations for derivative of data observations

Derivatives of Data Points			
y'_1	0.6	y'_{13}	-1.8
y'_2	-0.8	y'_{14}	-1.2
y'_3	0.2	y'_{15}	2.1
y'_4	-1.5	y'_{16}	-1.2
y'_5	0.7	y'_{17}	-1.3
y'_6	-1	y'_{18}	-0.8
y'_7	0.3	y'_{19}	-1.1
y'_8	3.6	y'_{20}	0.5
y'_9	13.5	y'_{21}	0
y'_{10}	-11.2	y'_{22}	-0.1
y'_{11}	0.4	y'_{23}	0.3
y'_{12}	-2.2	y'_{24}	-4.7

For computations in Table 1, the mean of the derivative of data observations $\bar{y}'$ is -0.2792 .

The y'_i is the rate of change of the data values with respect to time, calculated as the difference in consecutive data points divided by the corresponding difference in time intervals, y'_i quantifies how the values in the dependent are changing per unit time at the specific time point t_i (Kiusalaas, 2016), and used in the formulation of the loss function $J_{se}(\alpha, \beta)$ to measure the deviation between the estimated derivative and the actual, contributing to the overall process of estimating the parameters α and β that define the first-order linear ODE modeling the data.

Mean of the Observation Values Computation:

$$\bar{y} = \frac{173.9}{24} \approx 7.26$$

This means that $\bar{y} \approx 7.26$ reflects a large proportion of data values, serving as a reference point for interpreting the data's overall behavior. This intercept is the most important variable in the model since it represents the beginning point of the relationship between the variables (Mali, 2024). According to Mariotti (2023) this can help improve the model's performance and interpretability while also providing insights regarding its goodness of fit and the need for further development or adjustment. This implies that the intercept value can help determine the need for more model development to better fit the observed data and connection.

Mean of the Derivatives of Data Computation:

$$\bar{y}' = \frac{1}{n} \sum_{i=1}^n y'_i = \frac{-6.7}{24} \approx -0.2792.$$

This means that, on average, -0.2792 values in the dependent variable decrease in the data over time at a rate of around -0.2792 units per unit of time. The negative derivative is important for understanding the overall behavior of the system. According to Tedeshi (2023), this serves as crucial for understanding the underlying dynamics of the system being modeled and can help influence the selection of appropriate modeling techniques or assumptions. The data suggests the mean derivative value of -0.2792 serves as an initial point for this loss function, which is important to the overall process of estimating α and β , which represent the first-order linear ODE model of the data.

According to Solak (2022) observed function values and derivatives may have changing noise levels, which are compensated for by introducing diagonal contributions with adjusted hyper parameters. Inference and prediction are done as usual. This strategy was used to learn in dynamic systems.

Table 2 shows the minimization and computations for parameter $\hat{\beta}$, including the numerator and the denominator.

Table 2. Minimization and Computations for $\hat{\beta} = \frac{\sum_{i=0}^n (y_i)[(y'_i) - \bar{y}']}{\sum_{i=0}^n (y_i)(y_i - \bar{y})}$

Time (t)	Derivative of Data Observation	Numerator	Denominator
1	0.6	5.890439	-3.6570811
2	-0.8	-3.802059	0.3954191
3	0.2	3.114605	-4.8479145
4	-1.5	-8.179561	-3.6570811
5	0.7	5.091684	-10.6383316
6	-1	-4.252897	-7.9404147
7	0.3	2.837933	-11.4945817
8	3.6	20.171684	-10.6383316
9	13.5	121.256696	13.6766696
10	-11.2	-243.534509	335.7079241
11	0.4	7.538787	42.7812537
12	-2.2	-22.089545	48.9229205
13	-1.8	-14.143719	19.1037531
14	-1.2	-6.906225	1.9062525
15	2.1	14.988771	-5.9587479
16	-1.2	-7.734972	9.6950028
17	-1.3	-7.349976	-0.3299976
18	-0.8	-3.072897	-7.9404147
19	-1.1	-4.186233	-10.9437483
20	0.5	3.11668	-12.983332
21	0	1.256265	-12.3562485
22	-0.1	0.806265	-12.3562485
23	0.3	2.548348	-12.5216652
24	-4.7	-20.777901	-11.9654151
SUM	$\sum_{i=0}^n y'_i = -0.27917$	$\sum_{i=0}^n (y_i)[(y'_i) - \bar{y}'] = -157.412337$	$\sum_{i=0}^n (y_i)(y_i - \bar{y}) = 331.9596413$

$\hat{\beta}$ Computation:

$$\hat{\beta} = \frac{\sum_{i=0}^n (y_i)[(y'_i) - \bar{y}']}{\sum_{i=0}^n (y_i)(y_i - \bar{y})} = \frac{-157.412337}{331.9596413} \approx -0.474$$

This means that the value of $\hat{\beta} \approx -0.474$ represents the coefficient of the variable y in the first-order linear ordinary differential equation. A negative value for $\hat{\beta}$ indicates that the rate of change of y with respect to time is

inversely related to the current value of y (Boyce, 2024). In simpler terms, as y increases, the rate of change of y decreases, and vice versa.

$\hat{\alpha}$ Computation:

$$\hat{\alpha} = \bar{y}' - \hat{\beta}\bar{y} = -0.27917 - (-0.474)(7.245833) \approx 3.1568$$

This means that the value of $\hat{\alpha} \approx 3.1568$ corresponds to the constant term in the first-order linear ordinary differential equation. It indicates the starting point for the rate of change of y over time, regardless of y 's current value.

In the simulation result show that the general equation for the first-order linear ordinary differential equation model for the unemployment rate in Ilocos Region from January 2018 to October 2023 quarterly is

$$\frac{dy}{dt} = 3.1620 - 0.474y \quad (12)$$

and the specific solution of the first-order linear ODE is

$$\hat{y}(t) = y(\tau)e^{-0.474(t-\tau)} + \frac{3.1620}{0.474} [1 - e^{-0.474(t-\tau)}] \quad (13)$$

To verify the solution of the first-order linear ODE, the researcher proves the initial condition 6.7 at $\tau = 0$. The standard form of the system (4) for differential equations in a first-order linear ordinary differential equation

$$\frac{dy}{dt} + 0.496y = 3.1620$$

By using an integrating factor. The integrating factor is

$$e^{\int 0.474 dt} = e^{0.474t}$$

Multiply both sides of the differential equation by the integrating factor

$$e^{\int 0.474 dt} \frac{dy}{dt} + 0.474e^{\int 0.474 dt} y = 3.1620e^{0.474t}$$

Now, the left-hand side can be expressed as the derivative of the product of the integrating factor and the dependent variable y .

$$\frac{d}{dt} e^{\int 0.474 dt} y = 3.1620e^{0.474t}$$

Integrate both sides with respect to t

$$\int \frac{d}{dt} e^{\int 0.474 dt} y = \int 3.1620e^{0.474t} dt$$

By applying the formula $\int e^{at} = \frac{1}{a} e^{at} + C$, where $a = 0.474$. It follows that

$$e^{\int 0.474 dt} y = \frac{3.1620}{0.474} e^{0.474t} + C$$

Multiply to both sides of the equations $\frac{1}{e^{\int 0.474 dt}}$

$$y = \frac{1}{e^{0.474t}} (6.670970464e^{0.474t} + C)$$

Finally, obtaining

$$y(t) = 6.670970464 + Ce^{-0.474t}$$

Solving for the value of C when $t = 0$ yields to

$$y(0) = 6.670970464 + Ce^{-0.474(0)}$$

Substituting $y(0)$ to 6.7, gives

$$\begin{aligned} 6.7 &= 6.670970464 + Ce^{-0.474(0)} \\ 6.7 &= 6.670970464 + C \\ C &= 0.02902953586 \end{aligned}$$

Solving the initial condition $y(0)$, when $C = 0.02902953586$

$$\begin{aligned} y(0) &= 6.670970464 + 0.02902953586e^{-0.474(0)} \\ y(0) &= 6.670970464 + 0.02902953586 \\ y(0) &\approx 6.7 \end{aligned}$$

The theorem below presents the initial value, which gives us the solution for the first-order linear ordinary differential equation at the given time.

Theorem 4.

(Initial condition) Show that if the initial condition $y(0) = 6.7$, then $\tau = 0$ for $t > \tau$.

Proof:

Consider the solution of the first-order linear ODE in the system (13)

$$\hat{y}(t) = y(\tau)e^{-0.474(t-\tau)} + \frac{3.1620}{0.474} [1 - e^{-0.474(t-\tau)}]$$

Since $\hat{y}(0) = y(\tau) = 6.7$, this implies that

$$6.7 = 6.7e^{-0.474(t-\tau)} + 6.670970464[1 - e^{-0.474(t-\tau)}]$$

Substituting $e^{-0.474(t-\tau)}$ to x , leads to

$$6.7 = 6.7x + 6.670970464[1 - x]$$

Which can be simplified to

$$\begin{aligned} 6.7 &= 6.7x + 6.670970464 - 6.670970464x \\ 6.7 &= 6.670970464 - 0.02902953586x \\ 6.7 - 6.670970464 &= -0.02902953586x \\ -0.02902953586 &= -0.02902953586x \end{aligned}$$

Obtaining

$$x = 1$$

When $t = 0$, then having

$$e^{-0.474(0-\tau)} = 1$$

Applying the natural logarithmic to the both sides

$$\begin{aligned} -0.474(-\tau) &= \ln 1 \\ 0.474\tau &= \ln 1 \\ \tau &= 0 \end{aligned}$$

Hence, when $\tau = 0$, this relationship holds true as time passes with t moving forward the initial time point τ . To summarize the result when $t = 0$ for $t > \tau$, this means that, the situation where time starts from zero at some point beyond the initial observation time τ and observing the system at a moment in time strictly greater than τ .

The initial value for the solution of a first-order linear ODE if $t = 0$ and $\tau = 0$ is

$$y(0) = 6.7e^{-0.474(0-\tau)} + \frac{3.1620}{0.474} [1 - e^{-0.474(0-\tau)}] \quad (14)$$

Using the parameter values from the ODE solution, the researcher graphs the ODE system's direction fields using MatLab software. This means that the direction fields are required to explain the behavior of the system given such parameters.

Figure 2 shows the dynamics between the actual data and the solution for the first-order linear ordinary differential equation. Using MatLab, the researcher graphs both the direction field and the ODE solution, indicating the direction of all system solutions. Using the direction field, the researcher generated a solution curve with an initial condition of 6.7. As the initial point moves along a solution curve, observe how the relationship between x and y changes over time. Notice that the curve looks to be closed in the sense that the value of approximately 6.67089 remains stable as time passes. Using the ODE solution, the researcher graphs using the Gaussian process regression with adjusted prediction regression dynamics system's direction fields using MatLab software. This means that the direction fields optimize the regression parameters to achieve the best-fit behavior in the presence of fluctuation from the system's real data given such parameters.

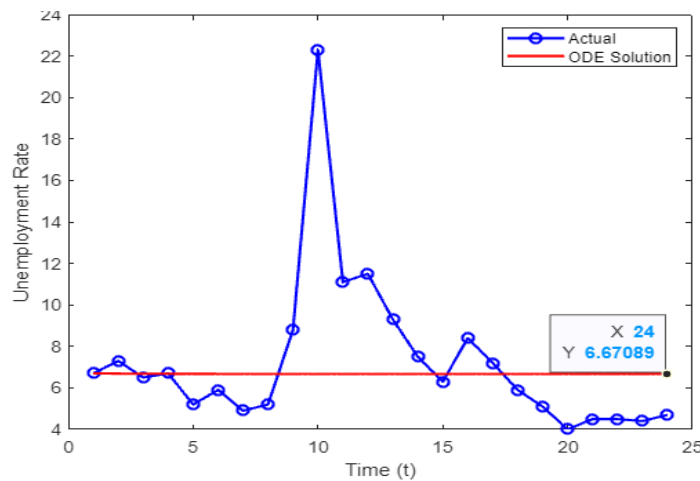


Figure 2. Actual data and solution for the first-order linear ODE of unemployment rate

Figure 3 reveals the behavior of the adjusted prediction with dynamic regression parameter direction fields. By adjusting the regression parameter based on dynamic changes in the unemployment rate, the adjusted values seek to increase model accuracy by considering changing dynamics over time. The GPR with adjusted prediction uses dynamic regression parameter dynamics to extract a more consistent trend from unemployment rate data, facilitating the detection of long-term trends while limiting the impact of short-term fluctuations.

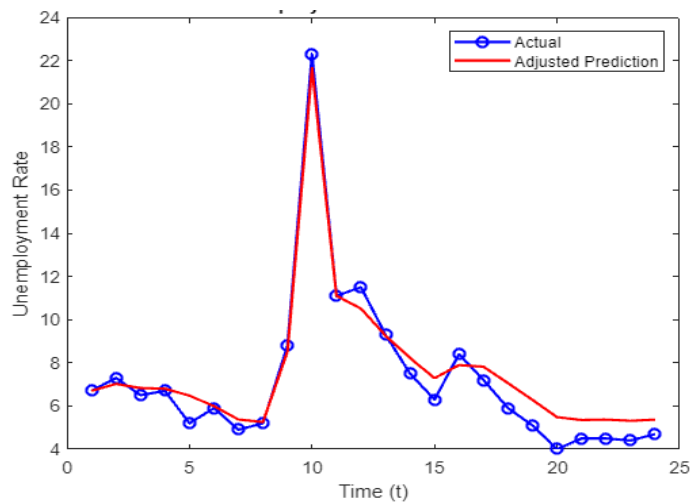


Figure 3. Actual data and adjusted prediction of unemployment rate

This means that the behavior of Gaussian Process Regression (GPR) with adjusted predictions can have a significant impact on unemployment rates in the Ilocos region. Policy effectiveness is how well the GPR model forecasts unemployment rates, which can help policymakers evaluate the efficacy of current regional unemployment-reduction measures. By comparing GPR forecasts to actual rates, policymakers can determine whether their policies are having the desired effect. The Early Warning System means that the GPR predictions can serve as an early warning system for potential increases in unemployment, allowing policymakers to proactively implement interventions or adjust policies to mitigate negative economic impacts. Investment planning means that businesses and investors can use GPR predictions to inform investment decisions in the Ilocos Region. Understanding future unemployment trends can help businesses anticipate labor market conditions and adjust their hiring and expansion plans accordingly. The social implications are that unemployment rates have social implications, including impacts on individual well-being, family stability, and community cohesion. Economic development means that the behavior of the GPR model can provide insights into the broader economic dynamics of the Ilocos Region. By understanding how unemployment rates fluctuate over time, policymakers can tailor economic development strategies to promote job creation and sustainable growth. Policy evaluation means that analyzing the relationship between GPR predictions and actual unemployment rates can facilitate the evaluation of past policy interventions. By assessing how well predictions align with outcomes, policymakers can identify areas where policies may need adjustment or improvement.

The economic relevance of the decrease in the unemployment rate over time suggests an improvement in the region's economic conditions. When unemployment decreases, it indicates that more people are finding jobs, leading to increased consumer spending, higher productivity, and overall economic growth. Gaussian Process Regression (GPR) with adjusted predictions is relevant in this context as it offers a statistical method to analyze and predict trends in data, such as the unemployment rate. By using historical data, GPR can model the relationship between time and the unemployment rate, enabling policymakers and economists to make more accurate forecasts and decisions. Policymakers can assess the effectiveness of their unemployment-reduction programs and actions by comparing GPR projections to actual unemployment rates. Furthermore, GPR can assist policymakers in identifying probable causes impacting unemployment patterns, allowing them to execute tailored measures to address specific labor market concerns. In conclusion, studying the unemployment rate in conjunction with GPR and adjusted forecasts provides useful insights into the region's economic trends. This enables more informed decision-making and policy formation to boost economic success and reduce unemployment.

The figures below represent the study's findings: a comparison of the ODE model and the modified adjusted prediction using dynamic regression.

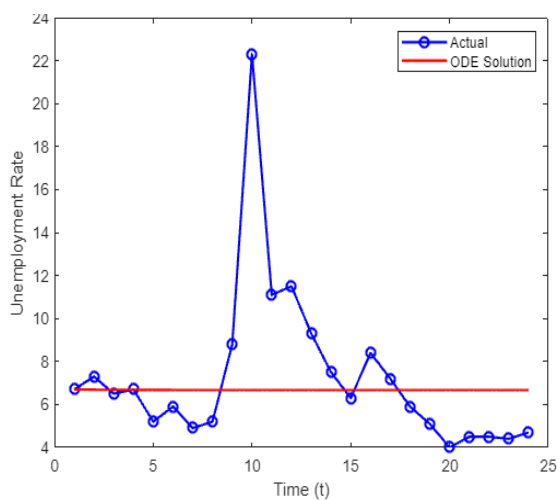


Figure 4a. Solution of the ODE

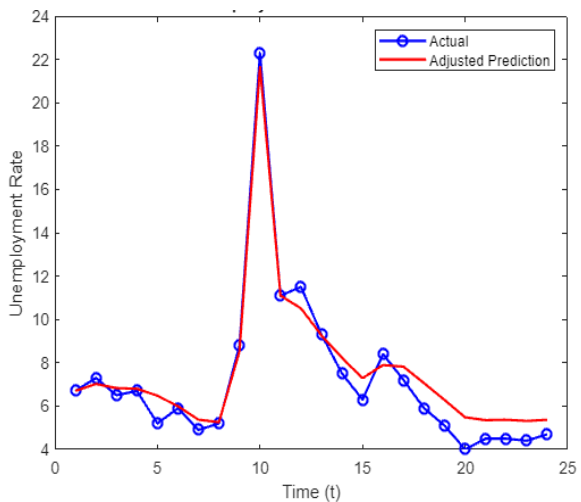


Figure 4b. Adjusted Prediction

Figure 4a shows the Ilocos Region's unemployment rate as well as the solution to the first-order linear ODE model. Prior to applying the modified regression ability, their values appeared to be different. The blue line represents the actual data curve, and the red line is the solution to the first-order linear ODE model, also known as the predicted curve. Figure 4b shows a satisfactory curve-fitting result, with the projected solution matching the actual data trend.

Computation for comparison of the root mean square error (RMSE) between the ODE solution and the adjusted prediction. The root mean squared error (RMSE) is a measure of the differences between values predicted by a model and the values actually observed.

RMSE ODE Solution Computation:

$$\text{RMSE} = \sqrt{\frac{339.8808617}{24}} \approx 3.7632$$

On average, the estimated values from the ODE solution are approximately 3.76 units off from the actual observed values. It means that the ODE solution makes an average error of approximately 3.76 units in predicting the observed values.

RMSE Adjusted Prediction Computation:

$$\text{RMSE} = \sqrt{\frac{13.37647664}{24}} \approx 0.74656$$

An RMSE of approximately 0.75 indicates that the modified predictions are greater than the actual observed values by only 0.75 units on average, indicating that the model fits the data accurately.

This means that the lower RMSE for the adjusted prediction model signifies improved prediction accuracy, better alignment with the observed data, and enhanced reliability for decision-making purposes. It indicates that the model, incorporating additional predictors, provides a more accurate representation of the relationship between variables and can make precise predictions.

4.0 Conclusion

The findings discussed in this study show that the researcher has made significant contributions to increasing our understanding of regression systems and their real-world applications. The comprehensive explanations for formulating regression equilibrium points and stability conditions will help readers better understand ordinary differential equations (ODEs) and regression systems. The researcher developed four theorems for analyzing parameter solutions such as $\hat{\beta}$ and $\hat{\alpha}$, as well as the regression model for actual data and initial conditions, to show the mathematical analysis's accuracy and completeness. Furthermore, using MATLAB simulations to check the model's stability and existence, as well as closely tracking actual data, demonstrate the suggested technique's real-world relevance and reliability. Furthermore, the availability of actual data demonstrates the relevance of mathematical modeling to real-world circumstances, indicating that the study has the potential to guide solutions to local challenges such as the Ilocos Region's unemployment rate.

The findings of this applied mathematics study have important implications for addressing economic challenges, particularly unemployment, in the Ilocos Region. The capacity to model and evaluate unemployment rate trends using regression systems and equilibrium instances can help policymakers and economists gain a better understanding of the underlying reasons for employment shifts, allowing them to design more targeted and successful interventions. The model's successful dynamic simulation, in which changed forecasts closely matched the actual data, implies that this modeling methodology can be used to anticipate and predict future unemployment patterns, allowing for the development of more informed economic plans and activities. Besides, identifying regression equilibrium points and conditions of stability can help determine the primary factors impacting the unemployment rate, allowing for more focused policy decisions and resource allocation to address the underlying reasons. Additionally, the interdisciplinary method, which combines mathematical

analysis, modeling tools, and real-world data, can be used to investigate and address a broader range of economic issues, including labor market dynamics, income distribution, and the impact of economic policies on various sectors. Overall, the findings show how rigorous mathematical modeling can provide useful insights and practical applications for bridging the gap between theoretical economic notions and evidence-based, successful economic policymaking.

The researcher's recommendations based on the conclusions obtained include several important aspects that focus on using the insights obtained from mathematical modeling and analysis of unemployment rate changes in the Ilocos Region to guide more effective authorities and economic actions. First, the researcher proposes that elected authorities and economists use their insight into the underlying reasons for employment trends to build specialized and focused plans to address the unemployment problem. Second, the successful simulation of the model, in which the updated forecasts nearly matched the actual data, indicates the modeling framework's ability to predict future unemployment trends, allowing for preventive economic planning and appropriate interventions. Third, choosing regression equilibrium points and stability needs can help determine the key variables impacting the unemployment rate, guide resource allocation, and guide the design of initiatives to address the core causes. Furthermore, the researcher suggests broadening the interdisciplinary approach by combining mathematical computations, modeling tools, and real-world data to investigate and address a broader range of economic issues other than unemployment, such as labor market dynamics, income distribution, and the impact of economic policies. Finally, the researcher underlines how mathematical modeling may bridge the gap between theoretical economic notions and actual, evidence-based policymaking, resulting in more informed and effective economic initiatives and activities.

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There is only one author for this research.

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7.0 Conflict of Interests

The author declares that they have no conflicts of interest.

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Correlates of Affectual, Associational, and Functional Solidarity among Digitally Literate Adults

Josefina C. Ochoa, Sherwin M. Parinas, Bernadette P. Yalong
Bulacan State University, Bulacan, Philippines

Author email: josefina.ochoa@bulsu.edu.ph

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Abstract. Positive interactions are key to social harmony. Challenges such as unmet needs and cultural mismatches hinder the solidarity necessary in the workplace. Integrating mindfulness, intergenerational solidarity, and relational-cultural theories can help address the need for positive interactions, fostering mutual appreciation and provision of concern, and ensuring needs are effectively met and opportunities seized. This quantitative study involved 279 digitally literate adults and utilized three sets of questionnaires to measure hypothesized correlations between needs attainment, opportunity capture, cultural contextualization, and affectual, associational, and functional solidarity. The findings revealed high mean values for all facets of solidarity: 3.99 for affectual, 3.60 for associational, and 3.61 for functional, explaining 23%, 14%, and 13% of the variance respectively. Significant correlations were observed among needs attainment (0.56), opportunity capture (0.50), cultural contextualization (0.51), and all facets of solidarity, with a probability of 0.001, supporting the hypotheses. The data found a highly acceptable level of affectual solidarity and moderately acceptable levels of associational and functional solidarity, supporting the idea of transitioning from self to others and then to the workplace. A society where needs are met, opportunities recognized, and culture contextualized would interact harmoniously, leading to increased productivity and solidarity. These findings suggest that personal and environmental factors are significantly correlated with solidarity, as the workforce is mindful, expresses mutual concern, and is sensitive to each other's needs. Implications for assessing solidarity in the workplace and providing learning support are discussed.

Keywords: Digitally literate adults; Intergenerational solidarity; mindfulness; Quantitative study; Solidarity.

1.0 Introduction

Across generations, the practice of giving and receiving is observed, but there is a lack of appreciation and unity in the effort, groups are not solid, they fail to show the mutual concern expected by each other in the community, more so in the workplace (Llorito, 2020). This trend is evident in media posts: help-seeking, giving, and taking between the more capable and less capable members of humans, yet adults who claim to be digitally literate often post complaints and grievances rather than cooperating and uniting with others thus provide for what is really needed and provide opportunities that will be appreciated by less capable ones (Beaujot & Ravanera, 2008). Tai, et.al, (2018) interpret these occurrences as manifestations of intergenerational tension, expressing unmet needs, unappreciated opportunities, and relationships that lack context and cultural understanding. Taking on this vantage point, it is deemed noteworthy to explore significant conditions that serve as requisite to solidarity.

The aforementioned trend further highlights the importance of considering the impact or value of solidarity, especially among professionals who tend to distance themselves from each other rather than becoming cohesive, sympathetic, and understanding (Llorito, 2020). The value of solidarity must be exemplified initially by the more capable then onwards to the least as if paying forward favors granted. This situation is disappointingly depicting a lack of solidarity among digitally literate adults who should be champions of this value (The Reader, 2010). Literature remains silent and unclear on whether what is given is truly needed and appreciated, and would lead to satisfaction and self-fulfillment (Kuranchie-Mensah & Boye; Kwesi, 2016). While givers may see their gifts and provisions as uplifting their morale, receivers often fail to fully appreciate such gestures, as evidenced by the prevalence of complaints in posts and blogs (Harman, et.al 2018). It appears that receivers often expect more even after their needs have been provided for (Holland, 2021). Therefore, one must be mindful of one's personal and environmental circumstances to foster unity and cohesion both in the community and in the workplace (Vansteenkiste, et.al, 2020; Kim 2010). Mindfulness can lead to a state of solidarity among individuals who genuinely care for each other's well-being (Landwerlin, 2008).

Solidarity refers to the value of agreeing, uniting, and harmonizing with others to achieve a realized state (Taylor-Gooby, 2011). It entails the receiver obtaining what fulfills their desires, while the giver feels fulfilled by their act of giving. This is evident in the provision of wellness, sustenance, and satisfaction, leading to mutual appreciation and concern for each other (Galuschek, 2017; Neilsen, 1985). Mindfulness about oneself, environment, and culture must be reflected upon, and the prerequisites for achieving solidarity must be explored (Rau, Werner & Schell, 2019).

Liu (2017) argues that digitization serves to separate individuals rather than bind them. Frega (2019) asserts that solidarity must permeate across individual, family, and societal levels. Individually, solidarity relates to valuing self-reflection and making efforts to reach out to others (Sharma, 2013; Ferrera & Burelli, 2019). On a family level, solidarity is achieved by meeting the family's needs first and then extending concern to the neighborhood for the welfare of others. On a societal level, solidarity represents the fulfillment of groups comprising families, leaders, and community organizations (de Miranda & Snower, 2020). These are stages where solidarity should prevail, and it would be beneficial to explore its impact among the more literate adults who are aware of its presence or absence.

Mindfulness theory emphasizes self-reflection and awareness of others, intrinsically and extrinsically, discerning what best represents oneself positively (Adarves-Yorno et al. 2020). Mindfulness is a mental state attained by focusing awareness on the present moment, and calmly acknowledging, and accepting one's feelings, thoughts, and bodily sensations (Carpenter et al. 2019). It involves seeking solutions to observed problems by making constructive efforts and showing appreciation rather than criticism such that feelings are cared for. This approach fosters harmony with others and demonstrates concern for their welfare which is a need of the human race (McGann, 2021).

Individuals within societies have needs ranging from necessities - food, clothing, shelter, money, and livelihood - to higher needs: social, esteem, love, aesthetics, and self-actualization (Perrotte, et.al 2021). As individuals attain these needs, solidarity naturally emerges. Needs are fundamental requirements that, when met, lead to improved living standards (McLeod, 2020). Research on needs emphasizes that while biological needs are significant, they may overshadow the deeper longing for intrinsic gratification within individuals (Kenrick et al., 2010). Tay and Diener (2011) tested Maslow's theory and proposed a universal need for self-actualization, which is fulfilled regardless of the satisfaction of other needs much as individuals are mindful of their state. People possess a profound desire to be at peace with themselves and their environment, a form of solidarity that stems from internal reflection and assistance (Lu, 2001).

Opportunities refer to the chances for growth and self-expression in a particular locale (Marks, et.al 2015). These opportunities encompass various aspects such as education, exposure, employment, childcare, travel, financial capability, social connections, knowledge of potential project sponsors, digital literacy, faith, social status, a deep connection to life, equitable government support, work ethics, and other opportunities available to individuals, families, and societies. Pradhan, et.al, (2015) argue that capturing opportunities in the environment leads to a wealth of knowledge and growth, emphasizing the importance of recognizing one's potential. Individuals in

societies should be able to seize and offer opportunities for those who need in order to foster solidarity (Jordan, 2017; Shogren, et.al 2017).

Cultural contextual structures encompass the ways of life, standards, and styles that characterize a particular group of people (Coyne, 2016). These structures include political systems, economic conditions, laws, and customs (Szydluk, 2012). Donald, et.al, (2019) noted that mindfulness positively influences prosocial and helping behavior by promoting non-judgmental attitudes toward others' experiences. Cultural structures respond to needs, provide opportunities, and facilitate positive relationships among individuals (Marks, Barnett, & Strugnell, 2015; Merkes, 2010). Creswell, et.al (2019) emphasize the importance of understanding these structures for fostering solidarity among adults.

Intergenerational solidarity theory frames both specific and generic behaviors related to belongingness and close bonds between generations (Szydluk, 2012). The theory encompasses several facets categorized into three dimensions: Affectual solidarity (Hwang, Yoon, Silverstein & Brown, 2019), which pertains to emotional closeness; associational solidarity (Fleming, 2021), referring to shared activities among groups; and functional solidarity, involving the exchange of money, time, and resources (Krems, et.al 2017; McLeod, 2020).

According to Szydluk (2012), assistance, care, and bequests represent forms of functional solidarity offered by those more capable and who have achieved self-actualization. Consequently, there exists a connection between individual needs and opportunities, where families and cultural contextual structures act as precursors to achieving solidarity.

Relational-cultural theory proves valuable for integration as individuals grow through and towards relationships throughout their lifespan (Garcia-Guerrero, Lopez, Gonzales & Ceular-Villamandos, 2021). These interpersonal connections are built on mutual empathy, clarity, worth, creativity, and a desire for increased connection. Addressing relational and cultural needs provides opportunities for growth amidst acute interpersonal disconnections, in contrast to chronic disconnections that foster isolation and disempowerment. The relational-cultural theory provides the rationale guiding therapeutic practice and the pursuit of social justice (Jordan, 2017).

The fusion of relational-cultural theory with intergenerational and mindfulness theories could yield a state of solidarity among adults. Mindfulness entails reflecting deeply on circumstances and their underlying causes, such as attained needs and captured opportunities (Garcia-Guerrero et al., 2021). Mindfulness involves responding appropriately to changing circumstances while remaining helpful and concerned about humanity (Adarves-Yorno et al., 2020). Emphasizing relationships and culture would provide an understanding of one's way of life, guiding actions toward fostering appreciation and maintaining harmonious relationships (Krems, Kenrick & Neel, 2017). If these principles are assimilated and applied, it could significantly enhance societal concern and solidarity, serving as a legacy for future generations. However, no studies have integrated and tested these theories, highlighting a lack of attention to the integral value of solidarity.

It is a fact that the simplicity of living was evident in earlier years. During those times, there was a more concerned populace within neighborhoods, people had simple needs, and there were harmonious relations among them. Szydluk (2012) aptly stated that the attainment of simple needs may be the primary action sustaining solidarity. Once community needs are attained and fulfilled, they serve as the fundamental basis for all forms of solidarity, including affectual, associational, and functional. Therefore, it is high time to reflect on those simple ways of living and recognize such simplicity of life as essential. However, opportunities captured also prove to be essential for solidarity, as they inspire individuals to persevere. Cultural contextual structures similarly foster concern among the populace, who should be bound by common values and ways of life.

A niche is being attempted to be filled: identifying and exploring the most significant factors or correlates to solidarity to achieve cohesion (McGann, 2021). Given the interconnectedness of parents and adult children throughout their life courses – from cradle to grave, there is a need for exploration to provide valuable intervention programs that promote solidarity, particularly in this digitally advanced society (Bellamy, 2019).

Conceptually, this endeavor considers needs attainment, opportunities captured, and cultural contextual structures as independent variables or correlates, while affectual, associational, and functional solidarity serve as dependent variables influenced by these correlates. The goal is to quantitatively describe the relationship between the independent variables and the aspects of solidarity. This is important as it would identify important requisites to the value of solidarity that brings in social cohesion and resolve conflicts and issues in societies and workplace.

2.0 Methodology

2.1 Research Design

This study employed a quantitative, correlational study describing the relationship between the independent variables: needs attained, opportunities captured, and cultural contextual structures to the dependent variables affectual, associational, and functional solidarity.

2.2 Research Participants

The participants of the study are young adults aged 19-39 years old, both male and female, who were screened based on their use of gadgets. A total of two hundred seventy-nine (279) individuals participated in the study, a sample size deemed sufficient for this correlational study (Dell et al., 2002). The participants were predominantly aged 19-24 (84%) and 25 & above (16%); males accounted for 27%, while females comprised 72% of the sample. In terms of civil status, 99% claimed to be single, with only 1% reporting to be having a partner, and all participants are identified as digitally literate. Their sources of income included economic support (66%) and income from work, business, and subsidies (34%). The average daily family income was reported as 63% earning less than P500, with 37% earning more than P500. Regarding the number of dependents, 85% reported having 0-4 dependents, while 15% reported having 5 or more.

2.3 Research Instrument

The constructs of the study were measured through item-pooled and author-constructed questionnaires. The first part contained demographics, examining age, sex, civil status, source of income, average daily income, and number of dependents (parents or children). The second part was a survey of Opportunities captured, where a mindful respondent would indicate the extent of capturing environmental opportunities. Responses were measured on a scale ranging from 1 to 5, where 1 indicated a lesser extent and 5 indicated a greater extent. There were seventeen (17) items, with a sample item being, "There are job opportunities available for you." The third part was a needs assessment inventory, which also underwent content validation. The questionnaire comprised twenty (20) items answered on a scale of 1-5, where 1 meant to a lesser extent and 5 meant to a greater extent. A sample item read, "As an individual, you feel the need for clothes that fit you well." The fourth part consisted of items on Cultural Contextual Structures (CCS), comprising ten (10) items, answered on a scale of 1 to 5, ranging from strongly disagree to strongly agree. A sample item read, "You see your environment as having a way of life that fulfills your desires." The final part of the questionnaire consisted of solidarity items, which also underwent content analysis and comprised forty (40) items. A sample item read, "You see yourself happily connected with your entire family." Responses to the question items in each section were subjected to reliability coefficients, resulting in highly acceptable values ranging from 0.75 to 0.92.

2.4 Data Gathering Procedure

An online survey was conducted using Google Forms.

2.5 Data Analysis Procedure

Jamovi software was utilized in describing central tendencies, percentages, and correlations.

2.6 Ethical Considerations

The entire conduct of the study adhered to the ethical principles of confidentiality and anonymity, ensuring that no risks were imposed in any form on anyone, especially the participants of the study.

3.0 Results and Discussion

3.1 Digitally Literate Adults' Level of Perceiving Correlates to Solidarity

Table 1 displays the respondents' perception levels regarding the hypothesized correlates to solidarity, such as needs attained, opportunities captured, and cultural contextual structures. The table presents the mean values and standard deviations of these correlates. Needs attained yielded a mean score of 4.16, with a standard deviation of 1.03, indicating the highest value (Aleshire, 1988). This suggests that as needs are met, solidarity is achieved, as inferred from one standard deviation away from the mean. Opportunities captured yielded a mean value of 3.56, with a standard deviation of 1.03, suggesting that seizing environmental opportunities is crucial for attaining solidarity. Finally, as cultural contextual structures ($mean = 3.46$, $sd = 0.94$) are recognized, digitally literate adults would also acknowledge solidarity. They would appreciate and engage in cohesive giving, feeling fulfilled by their acts of giving.

Table 1. Digitally literate adults' level of perceiving correlates to solidarity

CORRELATES	MEAN	SD
Needs attained	4.16	1.03
Opportunities captured	3.56	1.03
Cultural Contextual Structure	3.46	0.94

Note: N=279; min -1, max-5

There is a need for mindfulness regarding the availability and access of both personal and environmental resources to utilize them effectively when working towards meaningful goals and contributing to the betterment of humanity. Beaujot & Ravanera (2008) emphasized the need for internal change, extending from the family to the community to foster solidarity. Szydlik (2012) and Garcia-Guerrero et al. (2021) have highlighted the importance of addressing needs and seizing opportunities to cultivate a society that embodies the value of solidarity.

3.2 Digitally Literate Adults' Level of Attaining Solidarity

Table 2 presents the level of solidarity attainment among digitally literate adults across its facets: affectual, associational, and functional. The table indicates high means for all facets of solidarity, with affectual solidarity scoring 3.99, associational solidarity scoring 3.60, and functional solidarity scoring 3.61. Additionally, the table demonstrates highly acceptable items for affectual solidarity, explaining 23% of the variance, moderately acceptable items for associational solidarity, explaining 14% of the variance, and moderately acceptable items for functional solidarity, with responses to the items explaining 13% of the variance. This confirms both the facets of solidarity and the level of perception among the sampled digitally literate adults.

Table 2. Levels of attaining solidarity

SOLIDARITY	NO OF ITEMS	MEAN	LEVEL	%VARIANCE	CUMULATIVE %	DESCRIPTION
Affectual	17	3.99	0.64	22.93	22.93	Highly acceptable
Associational	13	3.60	0.58	14.01	36.94	Moderately acceptable
Functional	13	3.61	0.52	13.21	50.15	Moderately acceptable

Note: N=279, Varimax rotation, cross-loaded items deleted

Table shows the highly acceptable level of affectual solidarity and both moderately acceptable associational and functional solidarity which relate knowledge and sustenance of the *self* initially before being able to reach out to others and function well. Confirming the findings of Hwang, Yoon, Silverstein & Brown (2019), affectual solidarity relates to one's self-enhancement before concerning others' feelings and perspectives on situations. Associational solidarity, which involves sharing activities and actions to maintain cohesiveness among group members, seems to be an end result and relating to solidarity. Szydlik (2012) pointed well the value of solidarity that would tie up community members and family cohesively to be acting in ways that are functionally helpful to one another and thus ensure mutual appreciation.

Intergenerational solidarity, aimed at the more concerned populace, specifically digitally literate adults, is evidenced in their provision of support, care, and needed resources (Krems, et.al 2017; McLeod, 2020). However, before this, individuals must assess their affect and capability to sincerely care and give, fostering peace and prosperity (Szydlik, 2012). A nation must be founded on principles and concerns about individuality, bound by values that promote unity and cohesiveness, thus fostering solidarity. Such willingness to reach out to those in

need must be ingrained within the more capable members of the society, particularly the digitally literates (Hwang, et.al 2019; Szydlik 2012).

3.3 The Relationship of the Correlates to the Facets of Solidarity

Table 3 presents the correlations among needs attained, opportunities captured, and cultural contextual structures with the facets of solidarity: affectual, associational, and functional. The table reveals significant correlations between all variables and all facets of solidarity, all significant at the 0.001 probability level. These correlations are interpreted as follows: one-unit attainment of needs yields an increase of 0.56 in affectual solidarity, 0.45 in associational solidarity, and 0.37 in functional solidarity. Similarly, a one-unit increase in capturing opportunities results in an increase of 0.50 in affectual solidarity, 0.46 in associational solidarity, and 0.41 in functional solidarity. Finally, a one-unit increase in understanding cultural contextual structures leads to an increase of 0.51 in affectual solidarity, 0.64 in associational solidarity, and 0.52 in functional solidarity, all significant at the 0.001 probability level.

Table 3. The relationship of the correlates to the facets of solidarity

	NEEDS ATTAINED	OPPORTUNITIES CAPTURED	CULTURAL CS
Affectual S	0.56***	0.50***	0.51***
Associational S	0.45***	0.46***	0.64***
Functional S	0.37***	0.41***	0.52***

Sig <.001

Confirming the findings of McLeod (2020), hierarchically met needs ensure affectual solidarity, as individuals would no longer be in a state of tension. Kenrick et al. (2010) and Tay and Diener (2011) suggested that the universal need for self-actualization is fulfilled when individuals possess awareness of themselves and their environment, engage in meaningful relationships, and reflect on their thoughts and actions. As people become mindful, within the context of culture, they realize the significance of simplicity and mutual concern and would therefore pursue solidarity (Szydlik, 2012; Lu, 2001).

Pradhan, Fischer, van Velthuis, Reusser & Kropp (2015) findings are confirmed, as captured opportunities relate to solidarity across its facets. When opportunities are effectively communicated, adults are inclined to seize chances to be productive. The most significant correlates are positive constructs related to the self and the environment, reflecting strong individual capabilities and recognizing opportunities in the environment (Marks, et.al 2015).

Further confirming Szydlik (2012), cultural contextual structures relate to all facets of solidarity. Understanding and drawing from reflections on these structures contribute to establishing a better version of the self and fostering positive relationships with others. Solidarity may be achieved through crises and reflections on circumstances, as noted by Ferrera & Burelli (2019), who emphasized the importance of mindfulness and conscientiousness among the more capable adults in the society, expressing and appreciating concern for one another.

The study fulfilled its purpose of establishing the levels of the correlates to solidarity: needs attained (4.16), opportunities captured (3.56) and cultural contextual structures (3.46) accepting the hypothesis that personal and environmental factors would relate to one's developing the value of solidarity. Similarly, the facets of solidarity affectual (0.64), associational (0.58) and functional (0.52) affirms the hypothesis that solidarity may arise from the self then to others and to the workplace. Finally accepting the hypothesis that the correlates relate with the facets of solidarity, the positive and significant correlations affirm that attainment of needs (0.56) capturing opportunities (0.5) and cultural contextualization (0.51) would yield affectual solidarity. As with associational solidarity positive and significant correlations as needs attainment (0.45) capturing opportunities (0.46) and cultural contextualization (0.64). Finally with functional solidarity, needs attained (0.37) capturing opportunities (0.41) and cultural contextualization (0.52) that will be attained when the hypothesized correlates are perceived by the more capable populace. Values confirm phasing from the self to others, and from personal to environmental ways. That attainment of solidarity should permeate from within the self before one can reach out to others well and work functionally and collaboratively with others in the workplace.

3.4 Implications

The integration of three theories—intergenerational solidarity, mindfulness, and relational-cultural theories—is proven to achieve solidarity, a higher level of value or virtue. As adults become mindful of their existence, they reflect and strive to meet their needs while also seizing and communicating opportunities. As needs are met, affectual, associational, and functional solidarity arise. Similarly, as opportunities are seized, solidarity is achieved. Cultural contextual structures attest to the importance of considering cultural ways of life and relationships between those more capable and those in need of assistance.

This learning should not remain mere awareness but should drive actions that benefit society, fostering individuals who serve as role models to exemplify the finest values in life. If this is achieved, intergenerational solidarity becomes attainable as it is initiated and demonstrated by the more caring and capable adults. Socially, people aspire to meet their needs, which are often basic or essential, and these must be provided by those more capable. Attaining these simple needs come by way of relating concern with each other more than the material things provided, these would be more appreciated. Opportunities must be communicated and encouraged for the populace to participate and capture and therefore achieve the purposes for which these are offered. A society that sees in opportunities would be interacting harmoniously as eventually would be giving than merely receiving, thus paying forward what is given and this surely yield productivity and solidarity.

4.0 Conclusion

The hypothesis that needs attainment, opportunities captured and cultural contextual structures would correlate with solidarity is accepted. It is affirmed by the positive and significant mean and Pearson r values. It is affirmed that attaining solidarity entails mindfulness of the self and of the environment, trying well to understand and work to resolve conflicts and minding the culture one is embedded in.

The study may have been limited in terms of data gathering that is online and not personal and the number of items that tend to describe self and societal components that are unlikely fit the operational definition of the variables, thus the tendency to forcibly relate to what are offered before the participants. Had there been personal interaction, an elaboration may be attained.

Further exploration of the variables must be undertaken in the next phase of the study, constructing a solidarity scale where principal components are analyzed. Additionally, items must undergo thorough validation and be adapted into technology for easier access and utility. Thus, technology may be developed to measure solidarity and design interventions aimed at achieving solidarity in each workplace.

5.0 Contributions of Authors

The authors confirm the equal contribution in each part of this work. All authors reviewed and approved the final version of this work.

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7.0 Conflict of Interests

The author declares that they have no conflicts of interest.

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Support Mechanism of School Administrators and Work Engagement of Teachers during the New Normal

San Vielle P. Marcelino

Foundation University, Dumaguete City, Negros Oriental, Philippines

Author email: oracledrive69@gmail.com

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Abstract. This study aims to determine the level of support mechanisms teachers received from their school supervisors during the New Normal and its impact on their work engagement. The respondents of this study are 90 teachers in Bacong District, Negros Oriental. The method used in the study is descriptive-correlational and employed a validated self-made questionnaire. Results revealed that the level of mental support teachers receive is high, while instructional and technological support levels are very high. The level of work engagement among the teachers is also high. The teaching position held by teachers is significantly and inversely related to their work engagement, indicating that the higher the teaching position held by the teacher, the lower their work engagement. Additionally, this study reveals that there is no significant relationship between the teachers' highest educational attainment, length of service, or number of training hours and their work engagement. These results underscore the importance of continued support for teachers, especially those in leadership roles, to enhance their engagement and effectiveness in the evolving educational landscape.

Keywords: Mental support; Instructional support; Technological support; Work engagement.

1.0 Introduction

The globe has seen tremendous opportunities and difficulties brought forth by the "new normal," which have dramatically altered the educational landscape in recent years. International occurrences such as the COVID-19 epidemic have compelled educators worldwide to swiftly adapt to new approaches to instruction, learning, and administrative procedures. The COVID-19 pandemic has had a significant impact on global supply chains (SCs) many areas, including lead times, production efficiency, finance, and demand variations. (Moosavi, Dulebenets, & Fathollahi-Fard, 2022). The usual approach to classify the economic effects of the pandemic is into supply and demand effects. Reduced working hours affect supply, while lockdown-related unemployment lowers income, which lowers aggregate demand (Padhan & Prabheesh, 2021). While necessary to prevent a worsening public health emergency, prolonged periods of social isolation and home confinement can have detrimental impacts on mental health and well-being both now and in the future (Samji et al., 2020).

The COVID-19 pandemic has had an impact on the Department of Education as well, causing discomfort and making it more challenging for teachers to provide in-person instruction to pupils in classroom settings. Temporary school closures have resulted in a notable loss of learning, particularly for underperforming students. Teachers encountered challenges in distant learning environments, as students spent less time studying (Schult, et al., 2022). Subsequently, educational establishments were encouraged to relaunch by employing a virtual learning environment incorporating many media platforms, such as Zoom, Google Meet, television, and radio. However, Di, Giorgio, Patricia, Zbigniew, and Jacopo (2020) found that such distant

learning is likely to harm student performance due to the altered nature of peer interaction, shorter study time, decreased motivation, and psychological discomfort brought on by confinement.

Given the current situation, school administrators must prioritize safeguarding vulnerable human resources, such as children, teachers, and visitors. It is critical to shield educators and kids with positive diagnoses from prejudice and stigma, and this is particularly true for new student admissions and transfers. The current study focused on the challenge of getting conclusive proof of both work engagement and the degree of support mechanisms obtained, while previous studies primarily explored elements other than these.

In light of this, the current study's objective was to identify particular shortcomings in the support that school administrators gave teachers during the COVID-19 pandemic. Both this study and the one conducted in 2020 by Beteille, Ding, Molina, Pushparatnam, and Wilichowski support the efficacy of teachers. However, this study went above and beyond by assessing instructors' levels of work participation. The purpose of the study is to shed light on how engaged and supportive school administrators were of their teachers during the pandemic.

2.0 Methodology

2.1 Research Design

The descriptive-correlational survey was used in the study. The following schools in the Negros Oriental Division were used for the study: Bacong Central School, Buntod Elementary School, Calangag Elementary School, Fausto M. Saron-Tubod Elementary School, Isugan Elementary School, Nazario Tale Memorial Elementary School, Sacsac Elementary School, San Miguel Elementary School, Timbanga Elementary School, and Timbao Elementary School. The study's responders were the Bacong District instructors who were randomly chosen to teach during the COVID-19 epidemic.

2.2 Research Locale

The following schools in the Negros Oriental Division were used for the study: Bacong Central School, Buntod Elementary School, Calangag Elementary School, Fausto M. Saron-Tubod Elementary School, Isugan Elementary School, Nazario Tale Memorial Elementary School, Sacsac Elementary School, San Miguel Elementary School, Timbanga Elementary School, and Timbao Elementary School. Teachers from these schools were taken into account in the study. Because of the COVID-19 epidemic, the schools employed personalized education, or modular distance learning. The schools listed above have all the amenities, including a water supply and an electricity connection. They also feature computer labs and Internet access, which are crucial for encouraging pupils to be computer literate.

2.3 Research Participants

The respondents of the study were the randomly selected teachers in Bacong District who experienced teaching during the COVID-19 pandemic. A total of 10 random teachers from Bacong Central School, Buntod Elementary School, Isugan Elementary School, Nazario Tale Memorial Elementary School, Sacsac Elementary School, and San Miguel Elementary School, 8 random teachers from Calangag Elementary School, and Timbao Elementary School, and 7 random teachers from Fausto M. Saron-Tubod Elementary School and Timbanga Elementary School were chosen as respondents. These teachers served as the main source of information.

2.4 Research Instrument

The study made use of a questionnaire to assess the level of support mechanisms teachers received during the COVID-19 pandemic. For part A, the researcher used self-made questions that were based on the teachers' profiles such as gender, teaching position held, highest educational attainment, length of service, and the number of hours training in activities attended. For part B, the researcher used another set of self-made questions about school administrators' support mechanisms. Lastly, for Part C, the researcher used self-made questions about teachers' work engagement. The researcher also read articles and publications regarding school administrators' support mechanisms for teachers during the COVID-19 pandemic. The whole questionnaire was presented to at least three experts for content validity and cross-checking if the items were aligned with the specific problems of the study. The suggestions of the experts were considered in the refinement of the items in the questionnaire.

2.5 Data Gathering Procedure

To ensure item reliability, a dry run was conducted. 30 selected teachers took part in the dry run. The items were tested for reliability using the Cronbach's alpha test. This was calculated to verify the internal consistency and reliability of the items. It is a measure of the extent to which all the variables in the scale are positively related to each other and its theoretical value varies from 0 to 1. Higher values of alpha are more desirable and a value of 0.70 is considered acceptable. Results of the dry-run on the level of support mechanism of school administrators and work engagement of teachers during the new normal yielded a reliability coefficient of 0.848 for Mental Support, 0.909 for Instructional Support, 0.936 for Technological Support, and 0.904 for Work Engagement. Since all items have Cronbach's Alpha Coefficients greater than 0.70, then they are reliable.

2.6 Ethical Considerations

The researcher practiced all the necessary ethical considerations during the entire period of the study. Since humans were chosen as the research respondents, confidentiality of information was observed. Ensuring the dignity and privacy of respondents is also a must. Further, minimizing potential risks to the participants should always be observed. The researcher followed the ethical protocols stipulated in the Ethics Committee of Foundation University. To ensure that the research topic is evidently sound, significant, and ethically correct, consultation was pursued. The researcher also displayed a non-judgmental attitude during the entire interview process to ensure that censure would be avoided. Moreover, the participants signed a consent form along with a full understanding of the risks and benefits of the study being conducted.

3.0 Results and Discussion

Table 1. Level of mental support to teachers during the new normal education (n = 90)

During the new normal period, my school administrator ...				wx	VD	LoS
1.	Encouraged me to continue to grow as a teacher in school.			4.47	A	VH
2.	Encouraged me to ask for help from others when I need it.			4.37	A	VH
3.	Encouraged me to always move forward and avoid getting stuck at a certain point in teaching.			4.34	A	VH
4.	Encouraged me to avoid toxic people, departments, committees, and events in school.			3.91	F	H
5.	Encouraged me to set a boundary between school and home life.			3.83	F	H
6.	Encouraged me to attend a Mental Health and Wellness program organized by the higher education.			3.78	F	H
Composite				4.12	F	H
Legend:						
	Scale	Verbal Description (VD)	Level of Support (LoS)			
	4.21 – 5.00	Always (A)	Very High (VH)			
	3.41 – 4.20	Frequent (F)	High (H)			
	2.61 – 3.40	Sometimes (S)	Moderate (M)			
	1.81 – 2.60	Rare (R)	Low (L)			
	1.00 – 1.80	Almost Never (AN)	Very Low (VL)			

The level of mental support that teachers received from their school administrators during the New Normal is shown in Table 1. The instructors in the Bacong District's various schools are, as the table shows, "very highly" inspired to continue developing as educators because their school administrators have supported them (wx = 4.47), which comes in first among other indicators. Additionally, their administrators "very highly" encourage them to ask for assistance from others if they run into any problems at work (wx = 4.43). Out of the six indications, this comes in second. Teachers are urged by administrators to seek assistance whenever necessary, especially considering the New Normal. Having good people skills is one trait that makes a principal successful. Respect is shown to everyone by effective principals, just as it is by excellent instructors. (Whitaker, 2008). Considering this, the administrators made it clear that they are ready to support educators in need. The teachers were grateful for their principals' assistance.

Table 1 also shows that when teachers face a challenge, they are "extremely highly" driven to move forward and avoid turning around in circles (wx = 4.43). Rather than circling back to reflect on their mistakes and challenges, the teachers decide to succeed. Their principals instilled in them the belief that even if they make mistakes or encounter challenges at work, they shouldn't waste time attempting to rationally address it; instead, they should go on and take the lesson to heart. The data also shows that the principal of their school "highly" encourages teachers to remove toxicity from the classroom (wx = 3.91). Negativity in the workplace would arise from avoiding disagreement with their coworkers, having a poor relationship with the parents, and handling the students poorly. For this reason, administrators urge teachers to stay away from conflict and toxic situations at work to keep the workplace peaceful. Although they don't have to, teachers are unlikely to affect positive

changes in students' personalities. By bringing more flexibility and reactivity to conditions and smoothing over rough spots, the quality of the work environment and output can be greatly enhanced. Lubit, 2004).

Furthermore, the administration "highly" encourages the teachers to draw a line between their personal and professional lives ($wx = 3.83$). Sometimes teachers bring their issues from home to the classroom, which makes it difficult for them to do their jobs effectively. One excellent example would be if a teacher arrived at school already in a sour mood, took that mood over to the classroom, and ended up snapping at the pupils, which had a bad effect on her job. Work-life balance has long been a concern for those who are interested in working life quality and how it connects to the borderline quality of life (Guest, 2002). For this reason, the principals would request that the teachers draw a line between work and personal life.

Table 1 shows that the principal "highly" encourages teachers to participate in a higher education-organized program on mental health and wellness ($wx = 3.73$). Teachers' New Normal became extremely chaotic due to the abrupt changes brought about by the epidemic, and it is understandably that this caused them to feel anxious and dissatisfied. Their principals urged them to look after their mental health because of this. Egdaahl et al. assert that worker mental health is a fundamentally vital matter for each of us, our businesses, our professions, and the nation. (2012). According to research, it is cost-effective for businesses and society at large to invest in the health and well-being of employees as well as in good working practices, as these measures increase production. (Max and Coast, 2005).

Table 2. Level of instructional support to teachers during the new normal education (n = 90)

During the new normal period, my school administrator ...		wx	VD	LoS
1.	Encouraged me to identify what the students need.	4.68	A	VH
2.	Encouraged me to observe proper health protocols during seminars.	4.60	A	VH
3.	Encouraged me to participate in faculty training, and multi-level training programs, including live training, video-based training, and course-based training.	4.57	A	VH
4.	Encouraged me to bring our laptop, extension wires, and other learning resources during seminars.	4.49	A	VH
5.	Encouraged me to consult her in the development of teaching and learning strategies.	4.48	A	VH
6.	Encouraged me to seek any instructions and announcements through DepEd Memoranda.	4.41	A	VH
Composite		4.54	A	VH

The level of instructional support that instructors received from their school administrators under the New Normal is seen in Table 2. Practices that encourage teachers at work, extend learning, and foster higher-order thinking skills are included in Table 1.2 under the heading of instructional support. The administrators' instructional support is vital to help the teachers navigate the challenging circumstances brought on by COVID-19 and the abrupt change to the New Normal.

It is discovered that the instructors have given all indicators a "very highly" rating, indicating that their principal has supported them with the instructional support provided. To guide the pupils, the principal urged the instructors to determine the needs of the students ($wx = 4.68$). Every teacher should put students and their learning first; it is vital to review what is currently understood about pupils and what they ought to learn. Because of this, they were urged to be well-versed in their students' requirements and to recognize them to help the teachers by providing guidance on what the pupils should avoid and focus on.

Table 2 data also show that the principal encourages teachers to follow appropriate health precautions during seminars ($wx = 4.60$) to prevent the sickness from spreading. Maintaining health protocols became increasingly important as a result of the COVID-19 pandemic, particularly during the New Normal for all of the nation's schools. All employees at the school were required to abide by health regulations to prevent the possibility of unintentionally infecting kids, instructors, or even parents who visited the school. Health precautions have been put in place by the school, such as mask use when commuting, maintaining a safe distance, and washing hands with soap under running water (Gandamayay, et al., 2022). Therefore, for teachers to stay safe and healthy, they must follow these fundamental guidelines even when attending seminars and/or training.

Additionally, Table 2 shows that the principal of the school encouraged teachers to participate in many forms of training ($wx = 4.57$), including live, video-based, in-faculty, and multi-level programs. Students were forced to rely on online distance learning for a considerable amount of time as they were unable to attend classes because

of COVID-19. Students and instructors eventually returned to school during the New Normal, although a lot changed during the academic break. For this reason, the principal urged the instructors to enroll in various training programs so they could broaden their horizons during the New Normal. For instance, teachers are highly expected to be technology literate, thus they should be familiar with and learn how to use information and communication technology (ICT), particularly in light of the New Normal. The best way to learn about it would be to attend ICT training. By connecting the curriculum and technique to the needs, values, and goals of the older participants, teachers can effectively support them in integrating new talents into their daily lives (Schirmer et al., 2022). Thus, it is advantageous for teachers to participate in various forms of training, especially in the context of the New Normal.

The table also demonstrates that when instructors attend seminars or join them, they are encouraged by their principal to bring personal items or materials, such as computers, power banks, extension cables, notes, and any other learning resources (wx = 4.49). This is to make it simple for teachers to access the workshops' activities, particularly those that include ICT. This is because they won't find it difficult to follow the lecture and will just need to encode the topics covered. Asking other participants how something is done is another way to prevent them from disturbing the other participants.

Table 2 also shows how principals support their teachers' growth as educators and learners (wx = 4.48). Teachers need to refresh their expertise on this because the New Normal was unfamiliar to them all, it is predicted that they will encounter new challenges or adjustments. As a result, to adapt to the changes, they must refine their methods of instruction and learning. Innovative approaches to teaching and learning can aid students in understanding complex, interrelated, and systemic social, economic, and environmental challenges. (Drolet & associates, 2015). During the New Normal, teachers can effectively educate students by implementing enhanced teaching and learning practices. The educational development of a teacher is crucial to the student's education. For this reason, educators must always be learning new things and refining their methods of instruction.

The chart also shows that DepEd Memoranda instructions and announcements were checked by teachers, as requested by school administrators (wx = 4.41). Teachers must be made aware of all announcements and revisions. For them to be ready for and react to the changes and instructions, students were therefore urged to often visit the DepEd website for updates. It is said that attempts to implement educational innovation and reform are lacking in one essential component: understanding the processes of educational change. Whether these initiatives involve grassroots creativity or large-scale social transformation, the overall inability to improve education can be linked to a failure to recognize and act upon existing understanding of the change process (Fullan, 2012). As a result, all educators must be updated.

Table 3. Level of technological support to teachers during the new normal education (n = 90)

During the new normal period, my school administrator ...		wx	VD	LoS
1.	Encouraged me to make proper preparations so that there would be no problem in printing the Modules.	4.48	A	VH
2.	Encouraged me to learn how to use the Depednegor website.	4.43	A	VH
3.	Encouraged me to seek the aid of a technician if there are ICT tools that are broken.	4.32	A	VH
4.	Encouraged me to attend informal training on the use of software packages and web-based applications.	4.19	F	H
5.	Encouraged me to contact her during work from home if I ever happen to meet any technological difficulties.	4.18	F	H
6.	Encouraged me to ask questions involving Zoom and Google Meet.	4.08	F	H
Composite		4.28	A	VH

The degree of technology assistance that school administrators provided to teachers under the new normal is seen in Table 3. The amount of technology support that school administrators provided to teachers under the new normal is displayed in Table 3. Many developments over the past ten years have encouraged and assisted educators in implementing technology into the classroom (Iftakhar, 2016). The use of technology by educators and students became critical as the new normal emerged. For this reason, school administrators must provide instructors with technological help, particularly if they are not well-versed in ICT.

The school administrator "very highly" urged the teachers, as shown in Table 1.3, to take the appropriate steps to ensure that there are no issues when printing the modules (wx = 4.48). Modules are crucial in the new normal, and teachers must carefully prepare them to prevent mistakes that may impede students' ability to learn. The fact that parents are now aware of their involvement in their children's education and learning is a great

illustration of the module's significance. They now realize how challenging teaching is. Some parents have also adapted to the current situation and do not place the obligation on instructors because they are now their children's teachers at home (Anzaldo, 2021). Principals thus urge educators to put effort into creating the modules.

Additionally, Table 3 shows that school administrators "very highly" encourage teachers to use the DepedNegor website ($wx = 4.43$). Important announcements will be posted on the Deped Negor website, so educators should be familiar with how to access it. They must be informed of any news and any potential adjustments. They are therefore urged to become familiar with the website so that they won't experience difficulties or run into issues that will make it harder for them to use it effectively. For teachers, the website's contents are quite meaningful and helpful. It is therefore essential to have access to it.

The table also shows that administrators at the schools "very highly" encourage teachers to seek assistance from specialists or technicians if they run into a glitch or issue when utilizing ICT resources in the classroom ($wx = 4.32$). In the digital age, ICT use in the classroom is essential for giving students the chance to learn and utilize the 21st-century skills they will need (Ghavifekr et al., 2016). Because of this, it's critical that the teachers who use it the most take care of it, particularly in light of the new normal. It is often impossible to prevent issues or malfunctioning ICT gadgets, and teachers who lack the necessary experience or confidence to handle these kinds of circumstances are inevitably confronted with them. Therefore, the administrator of the school advised them to consult a specialist or technician if they ran across such problems. The right people to solve the issue and prevent it from getting worse are IT specialists.

Additionally, as can be shown in the table, school administrators "strongly" recommended that instructors get in touch with them if they had any issues or concerns about working from home ($wx = 4.18$). Teachers would inevitably run into issues when doing some chores that are given to them at home. As a result, they were instructed to use Messenger chat, messages, or phone calls to approach their principals for assistance. Teachers get a much better understanding of their responsibilities thanks in large part to the principal's coaching.

Additionally, Table 3's data shows that during Zoom or Google sessions, school administrators "highly" encouraged teachers to raise questions ($wx = 4.18$). Teachers will inevitably have questions during online sessions, even if some of them may be reluctant or bashful to voice their concerns. The principal urged the instructors to raise queries during virtual meetings to prevent this issue and ensure that issues were resolved promptly. Although it's acceptable to send a personal mail with questions after the meeting, some teachers could forget. It is therefore best to raise queries in meetings.

Table 4. Level of teachers' work engagement (n = 90)

Despite the pandemic, ...		wx	VD	LoWE
1.	Preparing the lesson based on the MELC is not a problem	4.29	A	VH
2.	Making follow-ups with the parents regarding their children is not a problem.	3.96	F	H
3.	Addressing the reading comprehension of the students is not a problem.	3.93	F	H
4.	Motivating and getting the attention of the students is not a problem.	3.91	F	H
5.	Preparing the auxiliary duties aside from teaching is not a problem.	3.82	F	H
Composite		3.98	F	H

The degree of work involvement among teachers in the new normal is displayed in Table 4. It reveals how engaged instructors are at work in the new normal. Work engagement is a cheerful, fulfilling, affective-motivational state of work-related well-being that is the opposite of job burnout (Leiter & Bakker, 2010). The teacher's job involvement when planning a lesson based on the MELCS is "very high," according to the results ($wx = 4.18$). In the new normal, a student's lesson should always be based on the MELCS, and research indicates that teachers should make an effort to ensure that their lessons are in line with the most important learning competencies.

The table also demonstrates that when it comes to following up with parents regarding their children's performance, teachers' work engagement is "high" ($wx = 3.96$). Following up with the parents is crucial to ensure that the learners continue to learn at home because their parents know what's expected of them. Students will undoubtedly see a significant improvement in their academic performance if they are observed by both their

parents and academic professors. Since the instructor cannot always be there to help, parental support is crucial for students who are having difficulty in certain areas. Here's where parents step in: they assist with the learner's at-home education.

The table also demonstrates that when it comes to helping students with their reading comprehension, the teacher's work involvement is "high" ($w_x = 3.91$). Teachers work hard to help every student with their reading comprehension since reading is a highly important ability that every student should have, especially at the primary school level. Thus, one of the most crucial things a teacher should be doing is assessing the students' reading comprehension skills. As a result, instructors are really engaged in this topic.

Additional data show that when it comes to inspiring and grabbing pupils' attention, a teacher's work engagement is "high" ($w_x = 3.93$). This aspect of the job is essential because it can be somewhat difficult for teachers to catch students' attention for them to pay attention in class. Because of this, educators should use their creativity to engage students in engaging learning activities during class and ensure that they are paying attention. To obtain all of the students' cooperation, teachers must ensure that each student is actively participating in the class. A student's learning may likely suffer and they will miss out on some material throughout the conversation if they are not paying attention in class.

Additionally, Table 4 shows that when preparing for auxiliary tasks outside of teaching, the teacher's job involvement is "high" ($w_x = 3.82$). Most of the time, teachers conduct auxiliary activities in the same manner as they instruct the students. Since these auxiliary activities—such as but not limited to titles like department head, grade level head, canteen coordinator, etc.—are similarly significant, being fully immersed in them results in their high level of job engagement. The instructors will be gathering information and creating reports that will be turned in to the division or district. Because every item of information that the teachers include in the report is crucial, these reports demand time, effort, and careful planning. When something goes wrong, they have to redo the task, which could increase their workload. Auxiliary tasks are crucial because of this.

Table 5. Relationship between the level to which teachers receive the support mechanisms and their level of work engagement ($n = 90$)

Variables Correlated to Work Engagement	r_s	p-value	Decision	Remark
• Mental Support	0.141	0.187	Fail to reject H_{o1}	Not significant
• Instructional Support	0.205	0.052	Fail to reject H_{o1}	Not significant
• Technological Support	0.247	0.019	Reject H_{o1}	Significant

Level of significance = 0.05

The data demonstrating the correlation between teachers' levels of engagement and the extent to which they get the three support mechanisms is presented in Table 5. The results of Table 3's Spearman's Rank Order Correlation analysis indicate that, of the three support mechanisms, only technological support ($p = 0.019 < \alpha = 0.05$) has a significant relationship with instructors' work engagement levels. Thus, there is a correlation between increased technology support and higher levels of work engagement among teachers. Teachers are more likely to show better levels of engagement at work when they receive additional support, resources, or training in using technology in their professional duties. This suggests that teachers' passion, dedication, and involvement in their teaching duties are positively impacted by technology support, which may result in more successful and efficient teaching methods.

Teachers saw the digitalization of education as both a challenging and motivating part of their jobs. It was postulated that greater techno-work involvement is linked to employment resources related to technology, based on earlier research. Modeling based on structural equations was used to test the theories. The main conclusions showed that the greatest influence on techno-work engagement was found in self-efficacy related to technology. The findings also suggest that when talking about techno-work engagement, similar workplace resources—a good measure of total job engagement—are relevant (Makiniemi et al., 2019).

On the other hand, there is no significant correlation between their level of work engagement and mental support ($p = 0.187 > \alpha = 0.05$) or instructional assistance ($p = 0.052 > \alpha = 0.05$). This indicates that their degree of work involvement cannot be predicted by these factors. There was a slight impact of work involvement on the relationships between health and work-related variables. The principal's leadership did not directly affect

employee engagement, according to the findings. Nonetheless, they provided evidence to support the theory that indirect factors including job characteristics, teacher empowerment, and school culture could influence a principal's perception of how engaged teachers are at work. By encouraging teachers to work together, encouraging collective leadership, and sharing a shared vision, principals can contribute to the development of a friendly and active school culture (Zahed-Babelan et al., 2019).

Table 6. Relationship between the profile and level of work engagement of the teachers (n=90)

Variables Correlated to Work Engagement	r_s	p-value	Decision	Remark
• Teaching Position Held	-0.323	0.002	Reject H_{02}	Significant
• Highest Educational Attainment	-0.139	0.190	Fail to reject H_{02}	Not significant
• Length of Service	0.006	0.952	Fail to reject H_{02}	Not significant
• No. of Training Hours	-0.077	0.473	Fail to reject H_{02}	Not significant

Level of significance = 0.05

Table 6 shows a significant adverse relationship between the instructors' work involvement and their teaching position ($p = 0.002 < \alpha = 0.05$). According to Table 4, the correlation coefficient's negative sign ($r_s = -0.323$) indicates that teachers' work engagement decreases with increasing teaching positions. This implies that educators in higher positions may not be as dedicated to their work as educators in lower positions, particularly those who handle administrative duties. In their research, Carlos Gamero-Buron and Gerard Lassibille (2018) found that school administrators who also manage administrative duties perform significantly fewer important tasks than their colleagues. According to researchers Perera et al. (2018), elementary teachers exhibit higher levels of work engagement and, more specifically, student engagement than secondary instructors.

However, there is no significant correlation between their level of job involvement and the highest educational attainment, duration of employment, or number of training hours (all p-values $> \alpha = 0.05$). This shows that traditional markers like years of service, training, and educational background might not be the primary determinants determining work engagement in this particular study. The results of Anhui Zhang et al. (2021), however, showed that teachers with fewer than five years of experience had the highest levels of work engagement, while those with 16 to 25 years of experience had the lowest. This conclusion contradicts their findings. Conversely, more work involvement was linked to a better educational background. Master's degree holders in education scored noticeably better than less educated teachers.

4.0 Conclusion

In summary, the study offers insightful information about teachers' work engagement and support systems in the context of the "New Normal." The results show that teachers' supervisors provided them with very high levels of technological, instructional, and mental assistance, which suggests a supportive atmosphere for adjusting to the demands of the new teaching paradigm. Additionally, there was a high degree of work engagement among teachers overall. Higher-ranking teaching positions, however, may be linked to lower levels of engagement, according to research that showed a substantial and inverse relationship between work engagement and teaching positions. Conversely, there was no discernible relationship between work engagement and variables like duration of employment, number of training hours, or greatest educational attainment. These findings highlight the need to provide teachers with ongoing assistance, particularly for those in leadership positions, to increase their effectiveness and level of participation in the rapidly changing educational environment.

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7.0 Conflict of Interests

The author declared that he has no conflicts of interest as far as this study is concerned.

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Issues, Challenges, and Coping Mechanisms of Out-of-Field Physical Education Teachers in Subject Delivery

Josua A. Rivero

Teacher III, San Pascual National High School, San Pascual, Masbate, Philippines
PhD Student, Naga College Foundation Inc., Naga City, Camarines Sur, Philippines

Author email: josua.rivero@deped.gov.ph

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Abstract. This study explored the challenges and coping mechanisms of out-of-field Physical Education (PE) teachers. A descriptive-correlational design was employed with 30 out-of-field PE teachers as respondents. Data gathering tools included a survey questionnaire, while statistical treatments comprised Weighted Mean, Pearson Product-Moment Correlation Coefficient, and Determination of Coefficient. It was found that most respondents encountered issues, with the learning environment being less of a concern. Additionally, most respondents disagreed that supervisory assistance was evident in the curriculum, posing a challenge for out-of-field PE teachers. Seeking support from colleagues was identified as the most prominent coping mechanism, indicating a strong need for collaboration. However, other coping mechanisms were not strongly utilized by teachers. The influence of coping mechanisms varied across different issues and challenges. Finally, policy recommendations were developed based on the study's findings to support out-of-field PE teachers.

Keywords: Physical education; Out-of-field teachers; Challenges; Coping mechanisms.

1.0 Introduction

The Philippine educational system has proactively incorporated a wide range of tactics and methods to help teachers fulfill their roles as knowledge providers. However, due to poor preparation in their respective fields, many teachers in our educational system today struggle with teaching and dealing with challenging situations. The demand for teachers underscores the significance of the teaching profession, which many educators embrace with love and commitment. Nevertheless, particularly among newly hired teachers, there are significant levels of stress experienced.

Teaching Physical Education (PE) is particularly crucial as it pertains to improving the physical health of students. Therefore, various methods and strategies should be adopted in teaching PE. Physical education stands out as the only subject in schools that directly contributes to the physical and emotional well-being of students, underscoring the necessity for teachers to be well-equipped with knowledge and expertise in the field. However, some schools, especially in rural areas, face challenges in hiring PE major teachers, leading to situations where teachers instruct students in areas or grade levels for which they have not received official training, known as "out-of-field teaching."

The phenomenon of teaching outside of one's profession often stems from structural problems related to teacher availability and demand. deCourcy et al. (2022) have attributed the insufficient number of teachers in the Philippines to various factors, including the stressful work environment and inadequate compensation. According to Hobbs et al. (2019), addressing the challenges of initial teacher preparation is crucial to equipping educators with the skills, coping strategies, and personal resources needed to manage teaching outside of one's

field. Ahmad (2016) has highlighted several difficulties in teaching physical education, including diminishing teaching time, curriculum constraints, lack of equipment, and disapproval from students, parents, and even teachers themselves regarding the importance of physical education.

Support for physical education is enshrined in the Philippine Constitution, particularly in Article XIV Section 19, which emphasizes the promotion of physical education and sports programs to foster discipline, teamwork, and excellence among citizens. Furthermore, the Department of Education (DepEd) has established minimum qualifications for teachers, ensuring that school personnel possess appropriate educational qualifications and pass the Licensure Examination for Teachers (LET). Memos released by DepEd, such as No. 76 s. 2022 and No. 019 s. 2022, emphasize the importance of merit-based selection and competency in the recruitment and retention of teachers.

Given the importance of physical education in promoting holistic development, the study aimed to assess the issues and challenges encountered by out-of-field Physical Education teachers, as well as their teaching methods. Conducted in San Pascual North, where instances of PE subjects being taught by non-PE majors are observed, the research seeks to determine the impact of this phenomenon on teaching effectiveness in the subject area.

2.0 Methodology

2.1 Research Design

This study employed a descriptive-correlational design. The descriptive method was utilized to identify the issues that arise in teaching PE subjects for out-of-field PE teachers. Additionally, it was used to assess the challenges faced in teaching PE subjects and the coping mechanisms applied to address them. The correlational design was employed to determine and evaluate the relationship between coping mechanisms and their influence on the issues and challenges faced by both non-PE and PE teachers.

2.2 Research Participants

The respondents of the study are the out-of-field PE teachers of secondary schools in San Pascual North District, Masbate, Philippines. This study employed total enumeration, meaning all eligible individuals within the population were included as respondents. The demographic profile of the respondents was also assessed by identifying their educational attainment, subjects taught, length of years teaching PE, and relevant PE training attended. Purposive sampling was utilized in the study to select respondents who fit the established criteria.

2.3 Research Instrument

The researcher utilized a survey questionnaire to collect data from the respondents. The questionnaire consisted of three parts: the first part addressed the issues, the second part tackled the challenges, and the third part focused on coping mechanisms. The questionnaire underwent validation by experts. After validation, it underwent a dry run to determine the clarity of the included items. The results from the dry run were analyzed using Cronbach's alpha to assess the reliability of the instrument.

2.4 Data Gathering Procedure

The researcher secured permission from the school heads of San Pascual North District to conduct the survey. The survey questionnaires were administered face-to-face to the respondents. Upon completion, the questionnaires were retrieved, coded, tallied, and tabulated for statistical treatment.

2.5 Data Analysis

The collected data was processed using appropriate statistical tools to facilitate accurate analysis and interpretation. After analyzing the results, the researcher interpreted them in the context of the initial research problem, contributing to knowledge in the field.

2.6 Ethical Considerations

Ethical considerations, such as obtaining informed consent from participants, ensuring confidentiality and anonymity, and adhering to ethical guidelines for research involving human subjects, were followed throughout the study.

3.0 Results and Discussion

3.1 Issues Encountered in Teaching Physical Education Subject

Issues in terms of learning environment, student assessment, mastery of content, and pedagogy are encountered by out-of-field physical education teachers in teaching Physical Education subjects.

Learning Environment

Table 1 presents the results of the issues encountered in teaching PE subjects in terms of the learning environment. It also includes the weighted means and the corresponding ranks of the statements given.

Table 1. Issues encountered in teaching physical education in terms of the learning environment

	INDICATORS	MEAN	INTERPRETATION	RANK
1.	The teacher provides support to the students and makes them feel comfortable.	3.97	Disagree	1
2.	Teachers provide positive social values.	3.57	Disagree	2.5
3.	Administration provides a climate of support.	3.57	Disagree	2.5
4.	The classroom is large enough to fit all students.	3.37	Moderately Agree	4
5.	The classroom environment is appropriate to the subject (MAPEH) taught.	2.93	Moderately Agree	5
AVERAGE WEIGHTED MEAN		3.48	Disagree	

Legend: 5.00-4.21- SD, 4.20-3.41 D, 3.40-2.61 MA, 2.60-1.81 A, 1.80-1.00 SA

As per the results, the first indicator, which is "the teacher provides support to the students and makes them feel comfortable," was ranked first with a weighted mean of 3.97, interpreted as disagree. Two indicators, "teachers provide social values" and "administration provides climates of support," both ranked 2.5, with a weighted mean of 3.57, interpreted as "disagree." This was followed by the indicator that "classroom is somehow large enough to fit all the students," with a weighted mean of 3.37, interpreted as moderately disagree. The lowest rank was "classroom environment is somehow appropriate to the subject taught," which obtained a weighted mean of 2.93, interpreted as moderately disagree.

Overall, in terms of the learning environment, the average weighted mean was 3.48, interpreted as disagree. This indicates that the majority of the respondents regarded most of the statements on issues negatively and disagreed with the indicators given in terms of the learning environment. The discussion of the result in the learning environment is also reflected in the study of Bucholz and Sheffler (2017), which states that one of the most significant aspects influencing a student's learning is the classroom atmosphere. In essence, when students perceive the learning environment as encouraging and positive, they perform better academically. Students who experience a sense of community, trust in others and are inspired to take on challenges, take risks, and ask questions thrive in a positive atmosphere.

Student Assessment

Table 2 shows the results of issues encountered by out-of-field physical education teachers teaching physical education in terms of student assessment.

Table 2. Issues encountered in teaching physical education in terms of student assessment

	INDICATORS	MEAN	INTERPRETATION	RANK
1.	The chosen assessment process helps the students to learn.	4.13	Disagree	1
2.	Assessment criteria are all set on a clear basis.	4.03	Disagree	2
3.	The assessment process through physical education is done.	4.00	Disagree	3
4.	Chosen assessments are communicated clearly.	3.97	Disagree	4
5.	Teacher facilitates practical assessments in the classroom.	3.80	Disagree	5
AVERAGE WEIGHTED MEAN		3.99	Disagree	

The results revealed that the highest-ranked indicator was "chosen assessment process helps the students to learn," with a weighted mean of 4.13, interpreted as disagree. It was followed by "assessment criteria are all set for clear basis," which obtained a weighted mean of 4.03. Moreover, "assessment process through physical education" was next with a weighted mean of 4.00, interpreted as disagree. Two more indicators that ranked lower were "chosen assessments are communicated clearly" and "teacher facilitates practical assessment in the classroom," with obtained weighted means of 3.97 and 3.80, respectively. Both were interpreted as disagreeing.

Overall, issues encountered in teaching physical education in terms of student assessment gained an average weighted mean of 3.99, which is interpreted as disagree. This suggests that the respondents were not in favor of

all the student assessments currently practiced. This finding is supported by the study of Subang (2022), which states that the level of education, how students are taught, their willingness to study, and how teachers teach are all significantly influenced by assessment practices.

Mastery of Content

Table 3 presents the issues encountered in teaching physical education in terms of mastery of the content. Based on the results, the highest was on providing learning and complete activities to the students with a weighted mean of 4.03 interpreted as disagree. This was followed by gauging student comprehension of what had been taught with a weighted mean of 3.93 interpreted as disagree.

Table 3. Issues encountered in teaching physical education in terms of mastery of content

INDICATORS		MEAN	INTERPRETATION	RANK
1.	Providing learning and complete activities to the students.	4.03	Disagree	1
2.	Gauging student comprehension of what had been taught.	3.93	Disagree	2
3.	Provide an example or explanation whenever a student has questions.	3.80	Disagree	3
4.	Knowing the necessary steps in teaching the concepts.	3.67	Disagree	4
5.	Having enough training to deal with almost any learning problems.	3.23	Moderately Agree	5
AVERAGE WEIGHTED MEAN		3.73	Disagree	

Moreover, providing an example or explanation wherever a student has questions obtained a weighted mean of 3.80, also interpreted as disagree. Two more indicators that ranked lower were "knowing the necessary steps in teaching the concepts" and "having enough training to deal with almost any learning problems," with obtained weighted means of 3.67 and 3.23, respectively. The former was interpreted as disagreeing, while the latter was interpreted as moderately disagreeing.

Overall, the average weighted mean was 3.73, interpreted as disagree. This indicates that most respondents encountered issues in terms of mastery of the content. This finding is supported by the article of Silvestre et al. (2020), which states that instructors must use a variety of teaching techniques, educational tools, mastery of content knowledge, and evaluation methods by various MAPEH components. Additionally, teachers must possess the background knowledge required to successfully administer the K-12 Curriculum.

Pedagogy

Table 4 presents the issues encountered in teaching physical education in terms of pedagogy.

Table 4. Issues encountered in teaching physical education in terms of pedagogy

INDICATORS		MEAN	INTERPRETATION	RANK
1.	Encouraging learning through group interaction.	4.23	Strongly Disagree	1
2.	Providing student-centered lessons.	4.17	Disagree	2.5
3.	Using different approaches based on students' characteristics.	4.17	Disagree	2.5
4.	Using effective strategies and techniques that actively engage students.	4.13	Disagree	4
5.	Providing timely constructive feedback to the students.	4.03	Disagree	5
AVERAGE WEIGHTED MEAN		4.15	Disagree	

It can be gleaned from the table that the highest-ranked indicator was "encouraging learning through group interaction," with a weighted mean of 4.23, interpreted as strongly disagree. It was followed by "providing student-centered lessons" and "using different approaches based on students' characteristics," both obtaining a weighted mean of 4.17, interpreted as disagree. Two more indicators ranked lower: "using effective strategies and techniques to actively engage students" and "providing timely constructive feedback to the students," with weighted means of 4.13 and 4.03, respectively. Both were interpreted as disagreeing.

Overall, the issues encountered in teaching physical education in terms of pedagogy gained an average weighted mean of 4.15, interpreted as disagree. This indicates that the majority of respondents regarded the issues negatively. This finding is supported by the study of Daga (2021), which claimed that the availability of teaching materials and teachers' lack of pedagogical content expertise were the main issues in teaching Physical Education.

Table 5 presents the summary of the issues encountered by Physical Education Teachers in terms of Pedagogy, Student Assessment, Mastery of Content, and Learning Environment.

Table 5. Summary of the issues encountered

DIMENSION		MEAN	INTERPRETATION	RANK
1	Pedagogy	4.15	Disagree	1
2	Student Assessment	3.99	Disagree	2
3	Mastery of Content	3.73	Disagree	3
4	Learning Environment	3.48	Disagree	4
AVERAGE WEIGHTED MEAN		3.83	Disagree	

The results revealed that Pedagogy gained the highest average weighted mean of 4.15, which was interpreted as disagreeing. The lowest average weighted mean was for learning environment, with a score of 3.48. Overall, the average weighted mean of the four dimensions under issues encountered by the physical education teachers was 3.83, interpreted as disagree. This indicates that teachers who encountered issues in all four dimensions were regarded negatively by themselves.

3.2 Challenges Faced by Out-of-Field Physical Education Teachers

The most important problems that out-of-field physical education teachers face may be listed as follows: school administration's underestimation of the physical education course, lack of the qualifications needed to instruct this course, parents' focus on academic achievement, and therefore their underestimation towards the physical education course, as well as competence level, student learning outcomes, activities, and student assistance.

Competence Level

One of the challenges encountered by out-of-field physical education teachers is competency level. Competency level refers to the combination of knowledge, skills, attitudes, values, and personal characteristics that enable the teacher to act professionally and appropriately in each situation. Table 6 illustrates competence level as a challenge faced by out-of-field physical education teachers.

Table 6. Competence level as challenges faced

INDICATORS		MEAN	INTERPRETATION	RANK
1.	Accessibility can be communicated with.	4.37	Strongly disagree	1
2.	Allowing and encouraging student participation.	4.23	Strongly disagree	2
3.	Giving appropriate solutions to conflicts that arise in the classroom.	4.17	Disagree	3
4.	Presenting the minimum content of the subject matter.	3.97	Disagree	4
5.	Providing scientific information that allows students to gain better comprehension.	3.93	Disagree	5
AVERAGE WEIGHTED MEAN		4.13	Disagree	

It can be gleaned from the table that the highest-ranked indicator was "accessibility," with a weighted mean of 4.37, interpreted as strongly disagree. This was followed by "allowing or encouraging student participation," with a weighted mean of 4.23, also interpreted as strongly disagree. Moreover, giving appropriate solutions to conflicts that arise in the classroom came next with a weighted mean of 4.17, interpreted as disagree. Two indicators ranked lower: "presenting the minimum content of the subject matter" and "providing scientific information that allows students to gain better comprehension," with obtained weighted means of 3.97 and 3.93, respectively, both interpreted as disagree. The average weighted mean was 4.13, also interpreted as disagree. This means that the teachers disagreed with the indicators on the challenges faced in teaching the subject content, as the competence level was proven to be high. This finding is supported by the study of Augusto (2019), which claimed that teachers' assertions that they lack the knowledge and competence necessary for the given subject contribute to the difficulties faced by out-of-field mentors.

Student Learning Outcomes

It is a statement that describes what a student should know or be able to do at the end of a general education course. Table 7 presents the student learning outcomes as challenges faced by out-of-field physical education teachers.

Table 7. Student learning outcomes as challenges faced

INDICATORS	MEAN	INTERPRETATION	RANK
1. Giving feedback on student assessment.	4.27	Strongly disagree	1
2. Informing students how they will be assessed.	4.23	Strongly disagree	2
3. Nurturing the knowledge of the students through assessment.	4.13	Disagree	3
4. Being able to develop student skills.	4.10	Disagree	4
5. Having a thorough knowledge of the subject content.	3.97	Disagree	5
AVERAGE WEIGHTED MEAN	4.14	Disagree	

As per the results, the highest-ranked indicator was "giving feedback on student assessment," with a weighted mean of 4.27, interpreted as strongly disagree. This was followed by "informing students how they will be assessed," with a weighted mean of 4.23, also interpreted as strongly disagree. Moreover, nurturing the knowledge of the students through assessment came next with a weighted mean of 4.13, interpreted as disagree. Two indicators were found at the bottom: "being able to develop student skills" and "having a thorough knowledge of the subject content," with obtained means of 4.10 and 3.97, respectively, both interpreted as disagree. The average weighted mean was 4.14, also interpreted as disagree.

This indicates that the respondents disagreed that the following statements were done regularly, hence, it has been considered challenging to teach the subject matter. This is in contrast to the study of Paolini (2015), which has claimed that successful teachers vary instruction for a range of student learning styles by utilizing a variety of learning modalities. The ability of the instructor to communicate course expectations, design assignments that support student learning, plan lessons that show content knowledge, and emphasize pertinent course concepts.

Activities

A learning activity poses a challenge for out-of-field physical education teachers in terms of methods and strategies. Classroom activities entail tasks performed by students inside the classroom as part of applying or practicing the practical aspects of a lesson following the theoretical instruction provided by the teacher. Table 8 displays the activities considered as challenges faced by out-of-field physical education teachers.

The table reveals that the highest-ranked indicator was "students work with other students for interaction," with a weighted mean of 4.13, interpreted as disagree. This was followed by "students can perform well due to proper learning of the activities," with a weighted mean of 4.03, also interpreted as disagree. Moreover, "students can work with other classmates for the activities" had a weighted mean of 3.97, interpreted as disagree. Two indicators were found at the bottom. These were "students have reached the standards for the activities to be done after the lectures" and "students were not able to gauge the activity and instructions on how to do it," with obtained weighted means of 3.80 and 2.73, interpreted as disagree and moderately disagree, respectively. The average weighted mean was 3.73, interpreted as disagree.

Table 8. Activities as challenges faced

INDICATORS	MEAN	INTERPRETATION	RANK
1. Students work with other students for interaction.	4.13	Disagree	1
2. Students can perform well due to proper learning of the activities.	4.03	Disagree	2
3. Students can work with other classmates on the activities.	3.97	Disagree	3
4. Students have reached the standards for the activities to be done after the lectures.	3.80	Disagree	4
5. Students were not able to gauge the activity and instructions on how to do it.	2.73	Moderately Agree	5
AVERAGE WEIGHTED MEAN	3.73	Disagree	

The average weight mean indicates that the respondents disagreed that the students were truly engaged in the activities, thereby posing challenges in teaching the subject matter. This contrasts with the claim of Hobbs (2013), who conducted a study where respondents felt less out of their element because there was a curriculum or syllabus outlining what needed to be taught, along with suggested teaching methods and exercises. This suggests that conducting activities is not a challenge for out-of-field teachers, as it helps in learning the subject content and facilitates knowledge transfer.

Student Assistance

Table 9 presents the challenges faced by out-of-field physical education teachers in terms of student assistance.

Table 9. Student assistance as challenges faced

INDICATORS	MEAN	INTERPRETATION	RANK
1. Encouraging interaction with students.	4.40	Strongly disagree	1
2. Explaining the importance of each topic.	4.33	Strongly disagree	2
3. Interacting with students actively.	4.23	Strongly disagree	3
4. Demonstrating and teaching well the activities to students.	4.03	Disagree	4
5. Being able to exhibit the instructions for physical activities.	3.87	Disagree	5
AVERAGE WEIGHTED MEAN	4.17	Disagree	

As reflected in the table, the highest-ranked indicator was "encouraging interaction with students," with a weighted mean of 4.40, interpreted as strongly disagree. It was followed by "explaining the importance of each topic," with a weighted mean of 4.33, also interpreted as strongly disagree. Moreover, "interacting with students actively" came next with a weighted mean of 4.23, also interpreted as strongly disagree. Two indicators found at the bottom were "demonstrating and teaching activities to students" and "being able to exhibit instructions for physical activities," with weighted means of 4.03 and 3.87, respectively, both interpreted as disagree.

Overall, the average weighted mean obtained was 4.17, interpreted as disagree. This indicates that most respondents disagreed that student assistance is evident in the curriculum employed by out-of-field teachers and thus, it has been a subject of challenges faced by out-of-field teachers. This finding is also related to the study of Du Plessis et al. (2015), which claimed that the principal acknowledged that four of the new teachers were placed in positions outside of their areas of expertise while still expressing concern about "the unpreparedness" of new teachers. "Our young teachers do not know how to manage and control pupils," he says, expressing his worries about behavioral issues and poor classroom management in these settings. Student assistance has indeed been a challenge for out-of-field teachers.

Overall, table 10 summarizes the challenges faced by out-of-field teachers in terms of the following indicators: student assistance, student learning outcomes, competence level, and activities.

Table 10. Summary of the challenges encountered

ASPECTS	MEAN	INTERPRETATION	RANK
1. Student Assistance	4.17	Disagree	1
2. Student Learning Outcomes	4.14	Disagree	2
3. Competence Level	4.13	Disagree	3
4. Activities	3.73	Disagree	4
AVERAGE WEIGHTED MEAN	4.04	Disagree	

Among the aspects, the highest was on student assistance with an average weighted mean of 4.30 while the lowest was on activities with an average weighted mean of 3.73. The former was interpreted as disagree while the latter was interpreted as disagree. Its overall weighted mean was 4.23 which was interpreted as strongly disagree.

3.3 Coping Mechanism

Table 11 presents different coping mechanisms used to lessen the issues and challenges encountered by out-of-field physical education teachers.

Table 11. Coping mechanisms

INDICATORS	MEAN	INTERPRETATION	RANK
1. Asking for support from colleagues to teach efficiently.	4.30	SA	1
2. Managing time efficiently for learning subject contents and teaching.	4.27	SA	2
3. Assessing students to develop skills.	4.23	SA	3
4. Staying optimistic throughout teaching.	4.23	SA	4
5. Giving time to gauge all needed improvements and take constructive criticisms positively.	4.10	A	5
AVERAGE WEIGHTED MEAN	4.23	Strongly Agree	

It was revealed in the table that the highest-ranked indicator was "asking support from colleagues to teach efficiently," which obtained a weighted mean of 4.30, interpreted as strongly agree. It was followed by "managing time efficiently for learning subject contents and teaching," with a weighted mean of 4.27, also interpreted as strongly agree. Moreover, "giving assessment to students to develop skills" came next with a weighted mean of 4.23, interpreted as strongly agree. Two indicators found at the bottom were "staying positive and optimistic throughout teaching" and "giving time to gauge all needed improvements and take constructive criticisms positively," with weighted means of 4.23 and 4.10, interpreted as strongly agree and agree, respectively.

Overall, the average weighted mean is 4.23, which was interpreted as strongly agree. Although previous results indicated that little to no challenges were experienced, out-of-field physical education teachers still employed coping mechanisms in various scenarios. This finding was supported by the study of Lagria (2021), which stated that some coping mechanisms include (1) training to become competent, (2) seeking support from fellow teachers, and (3) self-learning/motivating. The ability to manage stress is a crucial skill that should be incorporated into all teacher education programs as it is key to professional competency, given that teaching is a challenging job. All of these mechanisms are utilized as coping mechanisms, and hence, the out-of-field teachers exhibited similar responses and actions for their coping mechanisms amidst the issues and challenges experienced.

3.4 Influence of Coping Mechanism on the Issues Encountered by Out-of-Field Physical Education Teachers

Table 12 shows the significant relationship between coping mechanisms and the issues encountered by the respondents. According to the results of the Pearson correlation coefficient, coping mechanisms and the learning environment have a high positive relationship, as revealed by its r-value of 0.98 and a p-value of 0.013. This implies that a genuine relationship exists between the two variables. Further, it suggests that when the level of coping mechanism of teachers is high, issues in terms of learning are addressed.

Table 12. Influence of coping mechanism on the issues encountered

DIMENSIONS		R-VALUE	P-VALUE	R ² -VALUE	INTERPRETATION
Coping Mechanisms	Learning Environment	0.98	0.013	0.90	Strong
	Student Assessment	0.98	0.003	0.96	Very Strong
	Mastery of Content	0.99	0.001	0.98	Very Strong
	Pedagogy	0.57	0.317	0.33	Weak

As per the results of the Pearson correlation, coping mechanism and learning environment exhibit a positive relationship, with an r-value of 0.98 and a p-value of 0.013. This implies a genuine relationship between the two variables, suggesting that higher levels of coping mechanisms among teachers correspond to better addressing of issues in the learning environment. Similarly, when the level of coping mechanism was correlated with student assessment, it yielded an r-value of 0.98 and a p-value of 0.003, indicating a very high positive relationship. With a p-value less than 0.05, this suggests a genuine relationship between coping mechanisms and student assessment.

The same trend was observed between the level of coping mechanism and the mastery of content, resulting in an R-value of 0.99 and a p-value of 0.001. This indicates a very high positive relationship, with a significant correlation between the two variables. However, coping mechanisms and pedagogy yielded an r-value of 0.57 with a p-value of 0.317. Although the computed r-value indicates a low positive relationship, the p-value, which is greater than 0.05, suggests a relationship that is not significant.

Regarding the influence of coping mechanisms on the issues encountered by out-of-field physical education teachers, it was found that coping mechanism has a strong influence on the learning environment, with an r^2 -value of 0.90. Similarly, coping mechanisms have a very strong influence on student assessment, with an r^2 -value of 0.96, and on the mastery of content, yielding an r^2 -value of 0.98, interpreted as a very strong influence. However, when the coping mechanism was correlated with pedagogy and an r^2 -value was computed, it yielded 0.33, indicating a weak influence. This finding aligns with the research of Kebbi (2018), which found that

most stress sources had weak positive correlations with coping mechanisms, while most stress impacts had weak negative correlations with coping mechanisms, according to Pearson's correlation coefficient (r).

3.5 Influence of Coping Mechanism on the Challenges Encountered by Out-of-Field Physical Education Teachers
Table 13 illustrates the significant relationship between coping mechanisms and the challenges encountered by these teachers. When coping mechanisms were correlated with the level of competence, it yielded an r-value of 0.51 with a p-value of 0.381. The r-value indicates a low positive correlation. However, with a p-value greater than 0.05, it suggests that there is no significant relationship between the two variables correlated.

Table 13. Influence of coping mechanism on the challenges encountered

DIMENSIONS		R-VALUE	P-VALUE	R ² -VALUE	INTERPRETATION
Coping Mechanisms	Competence Level	0.51	0.381	0.26	Very Weak
	Student Learning Outcomes	0.97	0.007	0.93	Very Strong
	Activities	0.97	0.006	0.94	Very Strong
	Student Assistance	0.92	0.026	0.85	Strong

On the contrary, when the level of coping mechanisms was correlated with student learning outcomes, it resulted in an r-value of 0.97 with a p-value of 0.007. This indicated a very high positive correlation between the variables, with the p-value being less than 0.05, signifying a significant relationship. Similar patterns emerged when the level of coping mechanisms was correlated with activities and student assistance. The computed r-values were 0.97 and 0.92, with p-values of 0.006 and 0.026, respectively. These r-values indicated very high positive correlations, and the p-values, both less than 0.05, suggested a genuine correlation between the variables.

Regarding the influence of coping mechanisms on the challenges encountered by out-of-field physical education teachers, it was revealed that coping mechanisms had a very weak influence on competence level, with an r²-value of 0.26. However, coping mechanisms exhibited a very strong influence on student learning outcomes, as indicated by an r²-value of 0.93. The same trend was observed with coping mechanisms and activities, with an r²-value of 0.94 signifying a very strong influence. Finally, coping mechanisms showed a strong relationship with student assistance, yielding an r²-value of 0.85.

The weak relationship between coping mechanisms and competence level may suggest a potential weakness among out-of-field teachers. This finding aligns with the results of Honra's (2022) study, which indicated no significant connection between perceived challenges and total coping mechanisms. However, when examining the subcomponents of coping strategies, perceived difficulties were positively correlated with problem-focused coping.

4.0 Conclusion

The challenges faced by out-of-field PE teachers vary in their intensity. Firstly, the learning environment appears to be less of an issue for these teachers. Secondly, a significant number of respondents disagreed that supervisory assistance is readily available within the curriculum for out-of-field PE teachers, indicating a lack of support in this regard. Despite these challenges, out-of-field physical education teachers have demonstrated the presence of coping mechanisms to address various scenarios efficiently, with a focus on student needs. Additionally, the influence of coping mechanisms on issues encountered ranges from weak to very strong, suggesting varying degrees of effectiveness. Similarly, the influence of coping mechanisms on challenges faced by out-of-field teachers spans from very weak to very strong, indicating their differential impact on addressing these challenges.

5.0 Contributions of Authors

The author made the research from the beginning until it was defended. The author reviewed and approved the final work.

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7.0 Conflict of Interests

The author declared that he has no conflicts of interest as far as this study is concerned.

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Nurturing Resilient Communities: Unveiling the Transformative Potential of Agroecological Preservation in Sustainable Farming

Rony C. Conadera

Iloilo State University Fisheries Science and Technology, Iloilo, Philippines

Author email: conadera.rony@gmail.com

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Abstract. This study delves into the exploration of agroecological preservation patterns in the Municipality of Lambunao. The main objective is to understand the current practices and their implications on the local environment. To achieve this, a descriptive research method was employed, utilizing a standardized data-gathering instrument to collect information from 500 local community farmers, selected through random stratified sampling across various barangays. The research method involved the use of descriptive statistics, including frequency count and ranking, for data analysis. Additionally, inferential research was conducted using the Mann-Whitney U test and Kruskal Wallis test, with a significance level set at 0.05. The results of the study revealed that the Agroecological System in Lambunao is primarily characterized by plain topography, clay soil type, and rice as the main crop. The farmers predominantly practice organic farming as a tradition. Preservation practices were found to be frequently practiced by the entire group and seldom practiced when considering selected variables. However, when focusing on the tradition of organic farming, it was found that farmers always practiced preservation. The study concluded that there were no significant differences in preservation practices in terms of age, sex, selected educational attainment, and number of years in farming. However, significant differences were found in farm land area and selected categories of educational attainment. In conclusion, the study underscores the importance of organic farming and the need to promote preservation practices among local community farmers, offering valuable insights into the agroecological preservation patterns in the Municipality of Lambunao.

Keywords: Agroecological preservation patterns; Local community farmers; Organic farming; Preservation practices; Descriptive research; Random stratified sampling; Municipality of Lambunao.

1.0 Introduction

The agricultural sector is confronted with various challenges, including climate change, water scarcity, and market volatility. In response to these challenges, innovative farmers are adopting agroecological practices that combine local and scientific knowledge. Agroecology has been shown to outperform chemical fertilizers, particularly in unfavorable environments (Smith et al., 2019). However, alongside the push for sustainable farming practices, there is a growing debate between preservationists and utilitarians regarding land use. Preservationists argue for valuing land for its intrinsic beauty and advocating against its utilization for human purposes (Johnson, 2018).

The agroecological system represents a sustainable farming approach that aligns with resilience thinking and ecological principles. It aims to mitigate climate change, reduce emissions, recycle resources, and prioritize local supply chains (Gliessman, 2015). While modern agriculture has significantly increased food production, it has also contributed to ecological problems such as soil degradation, loss of biodiversity, and the effects of global

warming (Pretty et al., 2018). This highlights the need for alternative farming practices, such as agroecology, to address these issues.

Urban regions face unique challenges, including excessive consumption and the impact of urbanization on ecosystem services (EEA, 2006; Prokop et al., 2011). The expansion of urban areas and soil sealing have resulted in a decline in ecosystem services, necessitating the integration of spatial planning to preserve these services (Hammer et al., 2004; Kasanko et al., 2006). However, current planning instruments often prioritize development over the preservation of ecosystem services (Benedict & McMahon, 2006).

Therefore, this study aims to explore the relationship between agroecological practices, land use policies, and the preservation of ecosystem services in urban regions. By examining the challenges faced by spatial planning in preserving ecosystem services, innovative approaches can be identified to integrate agroecology and land use policies. This research will contribute to the understanding of sustainable farming practices, the role of spatial planning in urban regions, and the potential for preserving ecosystem services through agroecology.

In summary, this study addresses the need for sustainable farming practices in the face of agricultural challenges. By exploring the relationship between agroecology, land use policies, and the preservation of ecosystem services in urban regions, this research seeks to contribute to the development of innovative approaches for integrating agroecology into spatial planning.

2.0 Methodology

2.1 Research Design

This descriptive study determined the agroecological preservation patterns in the Municipality of Lambunao. It includes the data and characteristics of the population or phenomenon being studied. Best (1992) describes that descriptive research that involves the descriptive analyses and interpretation of existing conditions. It also consists of some comparison or contrast and attempts to discover relationships. According to Ardales (2001), descriptive research is designed to study that “what is”. It is the research design that is appropriate for studies that aim to find out what prevails in present conditions or relationships, held opinions and beliefs, processes and effects, and developing trends.

According to Gay (1992), descriptive research involves collecting data to answer the question concerning the status of the subject of the study. Furthermore, Slavin (1984) states that descriptive research is more analytic and often focuses on a particular variable or factor and operates on the bases of a hypothesis. This study used a one-shot survey design using a researcher-made questionnaire. A one-shot survey design is a study design where a single group of individuals (or another exciting unit of analysis) is selected for observation over a single, limited period (Jupp, 2006).

2.2 Research Locale

This study was conducted at the Municipality of Lambunao, Province of Iloilo, with the help of the Local Community Farmers, Local Residents, an Residentst Unit, specifically, the local community farmers. Municipality of Lambunao (Kinaray-a: Banwa Kang Lambunao) is a 1st class municipality in the province of Iloilo, Philippines. According to the 2015 census, it has a population of 73,640 people. Lambunao is the largest Municipality in Iloilo in terms of land area and is 47 kilometers (29 mi) from Iloilo City. It is bounded on the North by the Municipality of Calinog, on the East by the Municipalities of Dueñas and Pototan, on the South by the Municipalities of Janiuay and Badiangan, on the West by a portion of the Municipalities of Janiuay, Iloilo and Valderama, Antique. It is a 1st Class Municipality which has a total land area of 40,709 hectares. Out of this area, 73.88% is alienable and disposable land, while 26.12% is forestlands. It has a total Population of 73,640 (PSA 2015). It is approximately 194 m. above sea level, known to be the highest so far in the province. It lies within 122 34'00" East Longitude and within 11 09'00" North Latitude. It is 45 Kilometers from Iloilo City. Lasmbuiniao has 73 Barangays: Agsirab, Agtuman, Alugmawa, Badiangan, Bagongbong, Balagiao, Banban, Bansag, Bayuco, Binaba-an Armada, Binaba-an Labayno, Binaba-an Limoso, Binaba-an Portigo, Binaba-an Tirador, Bonbon, Bontoc, Buri, Burirao, Buwang, Cabatangan, Cabugao, Cabunlawan, Caguisanan, Caloy-ahan, Caninguan, Capangyan, Cayan, Cayan Este, Corot-on, Coto, Cubay, Cunarum, Daanbanwa, Gines, Hipgos, Lanot Grande, Lanot Pequeño, Legayada, Lumanay (Daanbanwa I), Madarag, Magbato, Maite Grande, Maite Pequeño, Malag-

it, Manaulan, Maribong, Marong, Misi, Natividad, Oeste, Pajo, Pandan, Panuran, Pasig, Poblacion Ilawod, Poblacion Ilaya, Poong, Portigo, Pughanan, Pungsod, Quiling, Sagcup, San Gregorio, Sibacungan, Sibaguan, Sinsiman, Supoc, Tampucao, Tranghaiwan, Tubungan, Tuburan, and Walang. The above-mentioned barangays served the basis of selecting respondents using the stratified random sampling techniques, which served as the respondents' exact location.

2.3 Research Participants

The Respondents of this study were the Five Hundred (500) Local Community Farmers who were stratified randomly selected from different Barangays in the Municipality of Lambunao based on the Official Registered List of Farmers issued by the Municipal Agriculture Office. The techniques used in selecting respondents are stratified random sampling techniques.

2.4 Research Instrument

The investigation employed the instruments, specifically the questionnaire checklist, which served as a primary data-gathering tool for the purpose of the investigation. The statement contained in the research instrument was structural and phrased so that each item would be brief, clear, simple, and easy to understand. The features of the research instrument were designed to obtain the data needed for the study. The standardized published and adopted questionnaire from Dr. Meraluna P. Catinan of WVSU-Lambunao Campus. The said research questionnaire was composed of three parts:

Part one, Personal data sheet. Elicited data on the participants' Name, Sex, Age, and educational attainment; Part two, Agroecological System. Identifying the agroecological system in the Municipality of Lambunao; and Part three, Agroecological System Preservation Patterns. The Response of respondents to Agroecological System Preservation Patterns that they practice and observe within the Municipality. The instrument underwent validation and reliability test. It obtained an r of .957 which, according to Calmorin (1987), it is reliable if the result is higher than 0.7. All data were analyzed using SPSS.

2.5 Data Gathering Procedure

The researcher presented the proposal for hearing to the Faculty of the College of Management, the Thesis Adviser, and the Panel of Evaluators. Upon approval of the proposal, the researcher asked permission from the Adviser to conduct the study with the approval as well from the panel of evaluators. Upon approval to administer the study, the researcher wrote to the corresponding office/s a letter asking for basic data of the said institution. The researcher also asked for an endorsement letter from the Local Government Unit, specifically from the Mayor's Office, which was presented to the Barangay Captains of Different Barangays of Lambunao for the accommodation of the request and to ensure the participation of the said Local Community Farmers.

With the approval of the corresponding individual and offices, the questionnaire was distributed to the respondents by the researchers. Since it was only a data-gathering sheet, it was easy for them to fill it up. A few minutes were allotted for the respondents to fill up. Responses were then tabulated for analysis and interpretation.

2.6 Ethical Considerations

In conducting this study, we, the authors, declare our compliance with ethical guidelines and principles to ensure the well-being and rights of the research participants. We obtained informed consent from all participants, including their parents or guardians, prior to their involvement in the study. The informed consent process provided them with a clear understanding of the study's purpose, procedures, and potential risks and benefits. Participants were informed of their freedom to withdraw from the study at any time without any negative consequences. We ensured the anonymity of the respondents by maintaining confidentiality and protecting their personal information. All data collected were treated with utmost confidentiality, and the identities of the participants were kept strictly confidential. Any identifying information was removed or anonymized during the data analysis and reporting process. The well-being of the participants was safeguarded throughout the study. We took measures to minimize any potential harm or discomfort to the participants. The research procedures were designed to be non-invasive and did not pose any physical or psychological risks to the participants. We always prioritized the safety and welfare of the participants. We declare that there is no

conflict of interest that could potentially influence the conduct or interpretation of the study. The research was conducted purely for academic and research purposes, without any external influences or biases. We maintained objectivity and impartiality in the interpretation of the findings, ensuring that no bias was present in the analysis and reporting of the results.

Furthermore, we strictly adhered to ethical standards regarding plagiarism. All sources and references were properly cited, and any direct quotations or paraphrased information were appropriately attributed to the original authors. The study was conducted with integrity and in accordance with the principles of academic honesty and intellectual property rights. Lastly, we affirm that the results of this study will be used solely for research purposes. The findings will contribute to the existing body of knowledge and serve as a basis for further research and academic discussions. The results will not be used for any other purposes that may compromise the privacy or rights of the participants.

In conclusion, we, the authors, are committed to upholding ethical standards and ensuring the well-being and rights of the research participants throughout the study. We are dedicated to conducting research with integrity, transparency, and respect for the individuals who participated in this study.

3.0 Results and Discussion

3.1 Demographic Characteristics of Local Community Farmers

Table 1 Demographic characteristics of local community farmers

CATEGORY	N	PERCENTAGE (%)
Entire Group	500	100
Ages		
25-35 Years Old	52	10.40
36-45 Years Old	75	15.00
46-55 Years Old	126	25.20
56-65 Years Old	247	49.40
Sex		
Male	257	51.40
Female	243	48.60
Educational Attainment		
Elementary Level	66	13.20
Elementary Graduate	43	8.60
High School Level	96	19.20
High School Graduate	70	14.00
College Level	185	37.00
College Graduate	40	8.00
Number of Years in Farming		
10 Years & Below	75	15.00
Above 10 Years	425	85.00
Farm Land Area		
Hectare and Below	280	56.00
Above Hectare	220	44.00

Table 1 provide valuable insights into the farming community's composition. The age distribution shows that a significant proportion of farmers are aged 46 and above, with the largest group being 56-65 years old (49.4%). This aligns with global trends, as reported by the Food and Agriculture Organization (FAO), which states that the average age of farmers is increasing worldwide due to rural-urban migration among younger populations (FAO, 2014). The gender distribution is almost equal, with males (51.4%) slightly outnumbering females (48.6%). This reflects the important role that both men and women play in agricultural activities, as recognized by the World Bank (2019). In terms of educational attainment, most farmers have reached college level (37.0%), although only a small proportion have graduated (8.0%). This suggests that while formal education is accessible, completion rates may be low. A study by Asenso-Okyere et al. (2011) found that higher levels of education among farmers can lead to increased adoption of sustainable farming practices, indicating the importance of education in promoting agroecological preservation patterns. Most farmers have been farming for more than ten years (85.0%), indicating a high level of experience within the community. According to a study by Wauters et al. (2010), farming experience is a significant factor influencing the adoption of sustainable farming practices.

Lastly, most farmers own a hectare of land or less (56.0%). Land size can influence farming practices, with smaller farms often more able to implement intensive, sustainable practices due to easier management and lower input costs (Ricciardi et al., 2018).

In conclusion, the demographic profile of the local community farmers in Lambunao provides a valuable context for understanding the adoption of agroecological preservation patterns. The high levels of experience, combined with the significant proportion of farmers with college-level education, suggest potential for the further promotion and adoption of sustainable farming practices within this community.

3.2 Agroecological System of the Local Community Farmers

Table 2. Agroecological system of the local community farmers

Category	N	Percentage (%)
Entire Group	500	100
Topography		
Plain	474	94.8
Valley	26	5.2
Soil Type		
Clay	453	90.6
Sandy	29	5.8
Silt	18	3.6
Crop Type		
Rice	478	95.6
Corn	22	4.4
Tradition		
Organic	180	36.0
Conventional	42	8.4
Combination	278	55.6

As shown in Table 2, most of the farmlands are in plain topography (94.8%), which is typically ideal for agricultural activities due to its flat terrain and ease of irrigation. This is consistent with the findings of a study by Foley et al. (2011), which states that plain areas are often the most productive agricultural lands. In terms of soil type, most of the farmlands have clay soil (90.6%). Clay soils are known for their high nutrient content and water retention capacity, which can support a wide range of crops (Brady & Weil, 2008). However, they can also present challenges in terms of drainage and workability. Rice is the predominant crop type (95.6%), which is not surprising given that the Philippines is one of the largest rice producers in the world (FAO, 2017). Rice cultivation is well-suited to the plain topography and clay soil conditions found in the region. The farming traditions reveal an interesting trend towards sustainable practices. More than half of the farmers use a combination of organic and conventional farming (55.6%), while over a third use organic farming (36.0%). This suggests a growing awareness and adoption of sustainable farming practices among local farmers. The least practiced is conventional farming (8.4%), which typically relies on synthetic inputs and may have negative environmental impacts. These findings align with a global trend towards sustainable agriculture, as highlighted by the United Nations' Sustainable Development Goals (SDGs). The SDGs emphasize the need for sustainable food production systems and resilient agricultural practices that increase productivity and production, help maintain ecosystems, and progressively improve land and soil quality (United Nations, 2015).

In conclusion, the findings of this study provide valuable insights into the agroecological system of the local community farmers in Lambunao. They highlight the importance of understanding local environmental conditions and farming traditions in promoting sustainable farming practices.

3.3 Agroecological Preservation Patterns of Local Community Farmers

Table 3 revealed that when the respondents were taken as an entire group ($M=3.86$, $SD=1.01$); when classified according to Plain Topography ($M=3.97$, $SD=0.90$); when classified according to Soil Type, Clay ($M=3.97$, $SD=0.91$) and Silt ($M=3.97$, $SD=0.64$); when classified according to Crop Type, Rice ($M=3.85$, $SD=1.02$) and Corn ($M=3.92$, $SD=0.65$); and as to Tradition, Conventional ($M=3.55$, $SD=0.66$) and Combination ($M=3.62$, $SD=1.02$), results reveal that Local Farmers Often Practiced the Agroecological Preservation Patterns.

Table 3. Agroecological preservation patterns of local community farmers

Category		Mean	Description	SD
Entire Group		3.86	Often	1.01
Topography				
	Plain	3.97	Often	0.90
	Valley	1.83	Seldom	0.65
Soil Type				
	Clay	3.97	Often	0.91
	Sandy	2.01	Seldom	0.82
	Silt	3.97	Often	0.64
Crop Type				
	Rice	3.85	Often	1.02
	Corn	3.92	Often	0.65
Tradition				
	Organic	4.29	Always	0.92
	Conventional	3.55	Often	0.66
	Combination	3.62	Often	1.02

Note: To determine the agroecological preservation patterns of local community farmers, the researchers used this scale and its descriptions: 1.00-1.79- Never Practices; 1.80-2.59- Seldom Practiced; 2.60 -3.39- Sometimes Practiced; 3.40 - 4.19 - Often Practiced; 4.20-5.00 - Always Practiced.

The findings revealed that when the respondents were classified according to Topography, Valley (M=1.83, SD=0.65); and when classified according to Soil Type, Sandy (M=2.01, SD=0.82), results reveal that Local Farmers Seldom Practiced the Agroecological Preservation Patterns. The findings revealed that when the respondents were classified according to Tradition, Organic (M=4.29, SD=0.92), results reveal that Local Farmers Always Practiced the Agroecological Preservation Patterns.

These findings align with the study by Altieri (2018), which suggests that agroecological practices are often adopted in regions with these characteristics due to their benefits in enhancing soil fertility and crop productivity. This is consistent with the findings of a study by Pimentel et al. (2005), which highlights the need for specific agroecological strategies tailored to different environmental conditions. This finding corroborates the study by Reganold and Wachter (2016), which demonstrates the environmental benefits of organic farming practices.

This study probed whether significant difference existed in the Agroecological Preservation Patterns of Local Community Farmers in the Municipality of Lambunao, Province of Iloilo of using Mann-Whitney U test and Kruskal Wallis test with level of significance set at 0.05 alpha. Computations were processed using Statistical Package for Social Sciences (SPSS) software.

3.4 Differences in the Agroecological Preservation Patterns of Local Community Farmers

Employing the computer-processed Kruskal Wallis test, the result showed that there was no significant difference that existed in the Agroecological Preservation Patterns of Local Community Farmers in the Municipality of Lambunao, Province of Iloilo in terms of age. The p-value of 0.55 was greater than the set 0.05 level of significance. This means that regardless of their age, the local farmers have similarities in their Agroecological Preservation Patterns.

Table 4. Differences in the agroecological preservation patterns of local community farmers

Category	Mean Rank	Chi-Square	df	p-value	Statistical Decision
25-35 Years Old	209.56				
36-45 Years Old	265.52				
46-55 Years Old	236.81	7.66	3	0.54	Not Significant
56-65 Years Old	261.54				

P-value < 0.05, significant

P-value > 0.05, not significant

3.5 Differences in the Agroecological Preservation Patterns of Local Community Farmers

Employing the computer-processed Mann-Whitney U test, the result showed that there was no significant difference existed in the Agroecological Preservation Patterns of Local Community Farmers in the Municipality

of Lambunao, Province of Iloilo in Terms of Sex. The p-value of 0.55 was greater than the set 0.05 alpha level of significance.

Table 5. Differences in the agroecological preservation patterns of local community farmers

Category	Mean-Rank	Mann Whitney	z-value	p-value	Statistical Decision
Male	244.29				
Female	257.06	29630.50	-0.994	0.32	Not Significant

P-value < 0.05, significant
P-value > 0.05, not significant

3.6 Differences in the Agroecological Preservation Patterns of Local Community Farmers

Employing the computer-processed Kruskal Wallis test, the result showed that there was a significant difference that existed in the Agroecological Preservation Patterns of Local Community Farmers in the Municipality of Lambunao, Province of Iloilo in terms of Educational Attainment of the respondents. The p-value of 0.55 was greater than the set 0.05 level of significance. These are shown in Table 6. The results of your study indicate that the agroecological preservation patterns of local community farmers in the Municipality of Lambunao, Province of Iloilo vary significantly based on their educational attainment.

Table 6. Differences in the Agroecological Preservation Patterns of Local Community Farmers

Educational Attainment	Mean Rank	Chi-Square	df	p-value	Statistical Decision
Elementary Level	313.82				
Elementary Graduate	374.33				
High School Level	215.17				
High School Graduate	256.93	81.38	5	0.00	Significant
College Level	200.81				
College Graduate	316.26				

P-value < 0.05, significant
P-value > 0.05, not significant

To determine the significance of these differences, a pairwise comparison using the Mann-Whitney U Test was conducted. The results reveal several significant differences between different levels of educational attainment. Firstly, there is a significant difference between farmers with an elementary level of education and those who have graduated from elementary school (p-value = 0.000). This suggests that farmers who have completed elementary education are more likely to practice agroecological preservation patterns compared to those who have only reached the elementary level. Similarly, significant differences were found between farmers with an elementary level of education and those with a high school level (p-value = 0.001), high school graduates (p-value = 0.008), and college-level education (p-value = 0.000). These findings indicate that higher levels of education are associated with a greater likelihood of practicing agroecological preservation patterns.

Furthermore, significant differences were observed between farmers who have graduated from elementary school and those with a high school level (p-value = 0.000), high school graduates (p-value = 0.000), college-level education (p-value = 0.000), and college graduates (p-value = 0.015). This suggests that completing elementary education has a positive impact on the adoption of agroecological preservation patterns. Additionally, significant differences were found between farmers with a high school level and college graduates (p-value = 0.001), high school graduates and college-level education (p-value = 0.000), high school graduates and college graduates (p-value = 0.003), and college-level education and college graduates (p-value = 0.000). These findings indicate that higher levels of education beyond high school are associated with a higher likelihood of practicing agroecological preservation patterns.

However, no significant differences were found between farmers with an elementary level of education and college graduates (p-value = 0.312), high school level and high school graduates (p-value = 0.206), and high school level and college-level education (p-value = 0.620). This suggests that the educational difference between elementary level and college graduates, high school level and high school graduates, and high school level and college-level education does not significantly influence the adoption of agroecological preservation patterns.

In conclusion, the findings of this study highlight the significant influence of educational attainment on the agroecological preservation patterns practiced by local community farmers. Higher levels of education,

particularly beyond elementary and high school, are associated with a greater likelihood of adopting these sustainable farming practices.

3.7 Differences in the Agroecological Preservation Patterns of Local Community Farmers

Employing the computer-processed Mann-Whitney U test, the result showed that there was no significant difference that existed in the Agroecological Preservation Patterns of Local Community Farmers in the Municipality of Lambunao, Province of Iloilo, in terms of Number of Years in Farming. The p-value of 0.95 was greater than the set 0.05 level of significance. Table 7 presents the data.

Table 7. Differences in the agroecological preservation patterns of local community farmers

Category	Mean-Rank	Mann Whitney	z-value	p-value	Statistical Decision
10yrs & Below	275.97				
10yrs Above	246.00	14027.00	-1.67	0.95	Not Significant
P-value < 0.05, significant					
P-value > 0.05, not significant					

3.8 Differences in the Agroecological Preservation Patterns of Local Community Farmers

Employing the computer-processed Mann-Whitney test, the result showed that there was significant a difference that existed in the Agroecological Preservation Patterns of Local Community Farmers in the Municipality of Lambunao, Province of Iloilo in terms of Farm Land Area. The p-value of 0.00 was greater than the set 0.05 alpha level of significance. Data are shown in Table 8. These indicate that the Agroecological Preservation Patterns of Local Community Farmers significantly vary depending on the farm area they tilled.

Table 8. Differences in the agroecological preservation patterns of local community farmers

Category	Mean-Rank	Mann Whitney	z-value	p-value	Statistical Decision
Hectare and Below	277.01				
Hectare Above	216.76	23376.50	-4.66	0.00	Significant
P-value < 0.05, significant					
P-value > 0.05, not significant					

The results showed that the farmers having a hectare and above farm land area had better practices in the Agroecological Preservation in their farming. Because they invested so much, and the larger the investment, the greater the risk of insolvency or income. They put a lot of guarantees to avoid a large bankruptcy, that is why, the put a big assurance for their financial gain.

4.0 Conclusion

Based on the findings of the study, several conclusions can be drawn. Firstly, the study aligns with the Republic Act (R.A.) 10068, or the Organic Agriculture Act of 2010, which emphasizes the development and promotion of organic agriculture in the Philippines. The findings indicate that the local community farmers in the study area observe and practice the agroecological system and agroecological preservation patterns. However, there is a need for improvement in their system and practices. The farmers believe in the combination of organic and traditional farming methods that best suit the local topography. Furthermore, the study highlights the importance of organic agriculture as a strategy for sustainable development and rural sector empowerment. However, there is a need for policy interventions to encourage and increase the participation of the private sector. The provision of incentives and the institutionalization of reward systems, including institutional, technical, and financial resources, can attract organic farmers, entrepreneurs, and practitioners.

Based on the findings and conclusions, the study puts forward several recommendations. Firstly, the initial efforts of non-government organizations and the private sector should be complemented by government support through policy measures and expanded engagement for the promotion and development of organic agriculture. There is a need to improve the agroecological system and preservation patterns. This can be achieved through the enhancement and expansion of implemented policies, programs, and regulations that are tailored to the needs of local farmers. Policy interventions should further encourage private sector participation by providing incentives and institutionalizing reward systems. Information dissemination and training of technicians, farmers-adopters, and practitioners are crucial for the wider adoption of organic agriculture. Efforts should be made to disseminate information and provide training to increase awareness and knowledge among stakeholders. Additionally, further policy and institutional support in the form of public investment, guidelines,

standards, information, and arbitration should be provided to enable organic agriculture stakeholders to sustainably increase outputs and benefits from the program.

The findings and recommendations of this study have several implications for practice. Firstly, the government needs to play a more active role in supporting and promoting organic agriculture through policy measures and engagement with the private sector. This can create an enabling environment for the expansion of organic agriculture and the adoption of sustainable farming practices. Improving the agroecological system and preservation patterns can lead to more sustainable and resilient agricultural practices. This can contribute to the conservation of natural resources, reduction of environmental impacts, and the promotion of biodiversity. Furthermore, the recommendations highlight the importance of information dissemination and training to increase awareness and knowledge among stakeholders. This can facilitate the adoption of organic agriculture practices and enhance the capacity of farmers and practitioners. Overall, the findings and recommendations of this study emphasize the need for collaborative efforts between the government, non-government organizations, and the private sector to promote and develop organic agriculture. By implementing these recommendations, the agricultural sector can move towards more sustainable and resilient practices, contributing to the achievement of sustainable development goals and the empowerment of rural communities.

For future studies, this needs to widen the scope to cover the whole Province of Iloilo in order to get a clear picture of the Agroecological Preservation Patterns of Local Community Farmers. As a clear picture of the effects, impacts, and even burdens of the recent study are clearly known, one must widen the orbit of this endeavor. Future studies should narrow down to these prospects, like the adoption of organic agriculture, which is facing challenges such as the lack of financial and technical capacity of smallholder farmers, problems with the marketing and product labeling of organic food products, and the quality of the organically produced agricultural products. Further research would be carried out to determine the best practices that can be adapted and benefited by local community farmers in terms of productivity and sustainability.

5.0 Contributions of Authors

The author assumes full responsibility for all aspects of this research. As the sole author, I took on the tasks of conceiving, designing, implementing, and completing the research paper. This encompassed formulating research objectives, developing research questions, designing the methodology, conducting a comprehensive literature review, collecting and analyzing data, and writing the research paper. The final version of this work has been personally reviewed and approved by the author.

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The author declared that he has no conflicts of interest as far as this study is concerned.

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Information Technology Maturity Level of the Selected Barangays of the City Government of Santa Rosa, Laguna

Owen Harvey Balocon

Polytechnic University of the Philippines, Manila, Philippines

Author email: oh.balocon@pup.edu.ph

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Abstract. This study focuses on the current status of the barangays under the Santa Rosa City Government in Laguna regarding their information technology maturity level. The maturity level of any organization indicates its readiness to adapt to changes and demonstrates its maturity against criteria from a framework or set of areas. The study will utilize the Information Technology Infrastructure Library (ITIL) framework to develop pillars and statements for assessing each barangay. ITIL identifies maturity levels based on six levels (unidentified, initial, defined, managed, quantitative, and optimized). The pillars or areas of focus include E-government services, Technology Infrastructure, community engagement and communication, data security and privacy, and digital literacy and training. ITIL is a proven framework in the field of IT Management, as evidenced by research conducted by Potgieter, B.C., Botha, J.H., and Lew, C. (2005), which indicates that customer satisfaction and operational performance improve as the ITIL framework is implemented. Descriptive research was employed as the research design, and quantitative methods were used to collect data. The questionnaire served as the primary tool for the study. Barangays were selected as participants based on specific criteria. The study's results indicate the current status of the barangays and their corresponding level in each area. These findings will assist the city government in formulating the city's development plan, information system strategy, and information and communications technology plan. The identification of maturity levels also contributes to the body of knowledge by enhancing understanding of the technology framework used and the current status quo of the city.

Keywords: Information technology management; IT maturity assessment; ITIL framework; Digital governance; Santa Rosa; Laguna governance; Quantitative descriptive analysis; Local ICT development strategies.

1.0 Introduction

The Department of Information and Communications Technology (DICT) of the Republic of the Philippines has identified highly urbanized cities in the country to be part of the program digital cities. According to the official site of the DICT, Digital Cities aims to change or leverage the country and eventually the Filipinos to fully utilize the five main programs and digital governance is one of them.

Digital governance is the ability to govern any level of institution in the government with the means and use of technology. This project of the DICT chose cities that will be partnered for this endeavor. The city government of Santa Rosa is one of the identified places in the country to hold this title. It is better to understand the status of the city by identifying the maturity level of its barangay in terms of information technology to help the local government unit (LGU) of Santa Rosa to better assess the needs, strengths, and status quo of the barangay that will yield in developing of plans and projects. The motivation of this paper is that the results be a basis in

developing the city's development plan and be one of the major contributors in developing the ICT plan of the city.

In order to better understand the current level of the city government in terms of information technology, the study used the Information Technology Infrastructure Library (ITIL) as the official framework of the study. Questions and areas were identified in using this framework. According to Maggie Kneller (2010) adopting the ITIL framework ensures that the Information Technologies of companies align with the overall goal of the company. Thus, the IT infrastructure of the barangays is measured against the goals of the city government of Santa Rosa this will help to assess and realize if the goals of the city government in becoming a truly renowned digital city is achieved. This provides ITIL in a gesture of successful frameworks in determining maturity levels of organizations.

The main objective of the study and the gap it addresses is the identification of the information technology maturity level of the barangays of the city government of Santa Rosa in terms of areas determined by the researcher derived from the ITIL framework. To be specific, the study aimed to address the question, What is the level of maturity of the city government of Sta. Rosa in terms of the following areas identified from the ITIL framework; (1) E-Government Services, (2) Technology Infrastructure, (3) Community Engagement and Communication, (4) Data Security and Privacy, and (5) Digital Literacy and Training.

2.0 Methodology

2.1 Research Design

The research used a descriptive design. The population is well defined and has a characteristic that needs to be considered. The proposed research shall have a well-defined population which criteria are stated in the sampling design. The goal of the study is to describe and provide details regarding the level of IT maturity of the barangays which is the way how descriptive research is done. A survey questionnaire shall be done to achieve the goals of the study.

2.2 Research Participants

The population of the study was the five (5) barangays within the city proper of the city who could assess the status of the information technology. Possible samples were the barangay secretary or barangay administrator. The sampling design used was purposive sampling. A total of 5 respondents were considered in the event of data gathering.

2.3 Research Instrument

The main instrument that was used was a validated questionnaire. The questionnaire consisted of five areas, namely, e-government services, technology infrastructure, community engagement and communication, data security and privacy, and digital literacy and training. These areas had 7-9 statements. The questionnaire was administered by the researcher and commenced at the most convenient time for the respondent. The questionnaire underwent a series of revisions with a statistician and a pre-test to similar respondents of the study to assure its reliability and validity.

2.4 Data Gathering Procedure

Data gathering commenced after the validation, testing, and revisions of the instrument. All members of the population were interviewed and analyzed through MS Excel and, if needed, SPSS. The study used mean average in determining and analyzing the results.

3.0 Results and Discussion

The results of the study show the level of maturity of the selected barangays in the five areas identified at the start of the study. Each barangay is classified into different levels depending on the results of the survey which are researcher-administered. The study used the mean average in computing each area. The results of each area are presented in the following table.

Table 1. E-Government services

Barangay	Highest Average	Level
Barangay Kanluran	44.44	Level 4 - Quantitative
Barangay Malusak	55.56	Level 0 - Unidentified
Barangay Ibaba	66.67	Level 5 - Optimized
Barangay Market Area	33.33	Level 2 - Managed
Barangay Tagapo	77.78	Level 0 - Unidentified

E-Government services cover the existing website and other online portals, services offered online, mobile applications being used by the citizens, a system for collection of feedback, and allocation of budget for e-government services. Table 1 show that Barangay Ibaba has the highest level of maturity translated to optimized this means that Ibaba implements and uses standard procedures in their e-government services and continuous development of these services is in place. Meanwhile, Level 0 or unidentified was earned by Barangay Malusak and Tagapo, meaning these barangays have not implemented any e-government services and allocation of budget. For barangays with level 0 it is recommended to visit the IT infrastructure of the barangay and incorporate in the annual plan or executive agenda plan of the current administration the e-government services this could be basic such as website using drag and drop software-as-a-service applications, acquisition of basic record management and financial transactions system as other barangays who earned level 4 have.

Table 2. Technology infrastructure

Barangay	Highest Average	Level
Barangay Kanluran	37.50	Level 4 - Quantitative
Barangay Malusak	50.00	Level 1 - Initial
Barangay Ibaba	87.50	Level 5 - Optimized
Barangay Market Area	62.50	Level 4 - Quantitative
Barangay Tagapo	50.00	Level 2 - Managed

The second area measured in the study is the technology infrastructure. As shown in Table 2, Ibaba earned the highest level which the barangay is level 5 which is optimized meaning that the barangay maintains reliable and functional computer hardware and software, the barangay has a well-defined plan, and it has a centralized location for storing and managing its technology. Level 1 or initial in the interpretation was earned by Malusak meaning that the barangay has already initiated its technology infra however, it lacks monitoring, evaluation, and continuous development. With the existing infrastructure of all barangays it is suggested that those with initiative and managed levels to monitor and assess their current infra to address the needs such as maintenance, replacement and if needed to acquire new sets of IT equipment to provide the best service to its constituents.

Table 3. Community engagement and communication

Barangay	Highest Average	Level
Barangay Kanluran	85.71	Level 5 - Optimized
Barangay Malusak	42.86	Level 3 - Defined
Barangay Ibaba	42.86	Level 5 - Optimized
Barangay Market Area	85.71	Level 3 - Defined
Barangay Tagapo	42.86	Level 3 - Defined

Community engagement and communication was the third area measured in the study. As shown in Table 3, both Barangay Kanluran and Barangay Ibaba gained the top level of optimization. This means that the barangays mentioned are well equipped and has continuous development for communication channels between officials and the citizenry, encourage residents in participating to decision-making using technology as the medium, and effectively address the resident's concerns and complaints. Other barangays are level 3 or defined this implies that all barangays have already initiated, defined, and managed the area of community engagement

which is expected in *Sangguniang barangays*. Visiting the process and continuous improvement of the barangay is the suggestive ideas and action plan of the study as provided the barangays are in level 3 – 5 in communicating to their constituents in utilizing technology.

Table 4. Data security and privacy

Barangay	Highest Average	Level
Barangay Kanluran	42.86	Level 3 – Defined
Barangay Malusak	28.57	Level 2 – Managed
Barangay Ibaba	42.86	Level 3 – Defined
Barangay Market Area	57.14	Level 3 – Defined
Barangay Tagapo	71.43	Level 0 – Unidentified

Second to the last area is data security and privacy. This area measured the barangay to determine if the respondents have a formal data privacy policy, implement security measures in handling their data and technology infrastructures, provide residents with access to their information, and allocate a budget for security purposes. Table 4 shows most of the barangays have a well-defined protocol for data security. This area of the study is one of the most sensitive areas as it deals with security of data and information. The proponent suggests given their level of maturity to maintain and adopt a plan in information security and incorporate the acquisition of security products (hardware and software) in the annual budget of the barangay.

Table 5. Digital literacy and training

Barangay	Highest Average	Level
Barangay Kanluran	42.86	Level 4 – Quantitative
Barangay Malusak	42.86	Level 3 – Defined
Barangay Ibaba	71.43	Level 5 – Optimized
Barangay Market Area	42.86	Level 2 – Managed
Barangay Tagapo	85.71	Level 0 – Unidentified

The last area is the digital literacy and training. Table 5 shows that both barangay Ibaba and Kanluran have a high level of maturity in this area. This implies that the two barangays have already implemented and continuously developed the literacy of the staff and residents about information technology. This provides knowledge that these barangays offer programs or initiatives to promote digital literacy skills, provide basic computer training, and collaborate with other organizations in offering digital programs for their constituents. There are varying results of this area it is suggested to maintain for those barangays with high level of maturity the training being provided and for low level maturity, it is highly recommended to incorporate digital literacy in barangay activities in various ways such as partnering with schools and companies to reduce the cost still achieving the goal of digital literacy.

The results of the maturity levels in information technology shows that even though these barangays are large land areas, high population, high generated investment revenue, strategically located in the city, and especially these barangays are exposed to technological advancement are still lacking or gain low level maturity level. The proponent suggests in general to address the areas of the study which are urgent such as the E-Government services due to the growing number of population and the inclusion of the city in the digital cities project of the national government. Another urgent area is the IT infrastructure, barangays must acquire equipment to fully implement e-governance. Also, the barangay may partner with schools, companies, non0-government organizations, and other stakeholders who promote digital literacy and some who offer CSR on software development. It is suggested that this partnership be planned out seriously to grasp its advantages and benefits.

The study would benefit the barangays in understanding their current situation and could use the study in their planning stages. Also, other stakeholder can use this study to understand the need and propose a project to the barangays to leverage their information technology maturity level. Lastly, this study would help future

researchers to understand the field of information technology management, IT maturity, and the use of IT governance framework such as ITIL.

4.0 Conclusion

This study provides an overview of the information technology maturity level of the barangays of the city government of Santa Rosa. The results show that despite the barangay(s) being one of the growing, economically centered, and large barangays of the city still exist low-level areas of information technology. Several reasons can be attributed to the result of this study it could be the organizational structure, politics, management, budget allocation, etc. The results would provide an avenue to strategize and develop an action plan on how these barangays can create and develop more programs, allocate resources, and manage their information technology well. Also, this shows that there are places where information technology is mature enough, some have initially defined their process, and others are striving to progress. The ITIL framework has provided an avenue to measure the local government units in a quantifiable manner. The researcher suggests that the research be conducted in total enumeration to generalize per area of the IT maturity level.

5.0 Contributions of Authors

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7.0 Conflict of Interests

The author declared that he has no conflicts of interest as far as this study is concerned.

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