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The Oro Journal of Sustainability and Development Research (OJSDR) is the official research journal of the City College of Cagayan de Oro, published semiannually. It serves as a platform for the dissemination of peer-reviewed scholarly works in sustainability, development, and interdisciplinary research, promoting knowledge that addresses local and global challenges in alignment with the Sustainable Development Goals (SDGs).

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Study Packet: Photo-Based Problem-Solving Worksheets in Force, Motion, and Energy

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Abstract. *Persistent difficulties in translating Physics concepts into systematic problem-solving steps continue to hinder junior high school learners' performance. This study examined the effectiveness of a photo-based, visually scaffolded study packet in improving Grade 9 students' understanding of force, motion, and energy. A quasi-experimental design was employed involving two comparable intact classes assigned to control and experimental conditions. Pretest analysis confirmed no statistically significant difference between groups, $t(50) = 0.95$, $p = .35$, indicating baseline equivalence. Following a four-week implementation of the instructional strategy, the experimental group demonstrated a significant improvement from pretest ($M = 9.69$, $SD = 3.00$) to posttest ($M = 16.85$, $SD = 2.44$), $t(25) = -9.42$, $p < .001$, with a very large effect size (Cohen's $d = 2.62$). The control group, in contrast, attained a posttest mean of 12.04 ($SD = 2.85$). Between-group comparison further revealed a statistically significant difference in posttest performance favoring the experimental group, $t(50) = -6.53$, $p < .001$, with a very large effect size ($d = 1.81$). Qualitative findings indicated that learners perceived the photo-based visuals, real-life contexts, and structured solution guides as instrumental in reducing abstraction and enhancing problem-solving confidence. Overall, the results demonstrate that contextualized, visually supported worksheets significantly improve conceptual understanding and problem-solving proficiency in Physics. The findings highlight the value of low-cost, teacher-developed instructional materials in strengthening science learning outcomes, particularly in resource-limited settings, and contribute to efforts aligned with Sustainable Development Goal 4 (Quality Education).*

Keywords: *Photo-based worksheets; physics education; problem-solving skills; quasi-experimental design; visual scaffolding*

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A. Introduction

Physics remains one of the most challenging subjects in the secondary curriculum due to the abstract nature of its concepts and the mathematical reasoning required to apply them. In many classrooms, learners can recall definitions or identify known quantities in a problem, yet struggle to determine which principle, equation, or process is appropriate for solving tasks related to force, motion, and energy. This difficulty is well-documented: high school students often recognize problem elements but fail to execute the necessary steps to arrive at a solution, largely due to challenges in distinguishing equations and interpreting symbolic representations (Qotrunnada, 2022). Learners also find it difficult to visualize abstract ideas, which contributes to poor problem-solving performance in Physics topics that require conceptual–mathematical translation (Badmus & Jita, 2024).

These issues are reflected at the national level, as shown by the Philippines' performance in PISA 2022. Filipino learners scored significantly below the OECD average, with the majority demonstrating only basic proficiency in identifying scientific explanations—equivalent to a learning lag of five to six years (OECD, 2023). Such persistent underperformance suggests deeper gaps in scientific reasoning, numeracy, and the ability to interpret real-world phenomena through scientific principles. Local classroom observations at the junior high school level echo these findings, in which teachers commonly note students' hesitation to analyze multi-step Physics problems, despite students' familiarity with the everyday contexts embedded in these tasks. Research affirms that students frequently struggle to identify key relationships, organize problem components, and reason systematically through solution steps (Franestian et al., 2020).

Literature underscores the need for instructional materials that help learners visualize concepts and reduce cognitive demands in problem-solving. Cognitive Load Theory posits that learning improves when instructional materials are designed to reduce extraneous cognitive load and support efficient processing within learners' limited working memory

capacity (Sweller, Ayres, & Kalyuga, 2011). Similarly, the Cognitive Theory of Multimedia Learning emphasizes that students learn more deeply when verbal explanations are paired with relevant visuals (Mayer, 2024). Studies confirm that worksheets enriched with photographs, diagrams, or real-life scenarios enhance comprehension and engagement by helping learners connect abstract Physics concepts with concrete experiences (Anggraeni et al., 2021; Wicaksono et al., 2023). Despite these benefits, many teacher-made modules remain text-heavy and offer limited visual scaffolding, leaving a gap in accessible, context-rich resources tailored to junior high school Physics.

Addressing these challenges aligns with Sustainable Development Goal 4, which calls for equitable access to quality learning opportunities supported by inclusive and engaging instructional resources (Adipat & Chotikapanich, 2022). In response, the researchers developed the Study Packet: Photo-Based Problem-Solving Worksheets for Grade 9 Physics. Anchored on the 7E Instructional Model, the packet integrates real-life photographs, guided examples, and structured problem-solving activities intended to make abstract concepts more accessible and to scaffold learners through systematic reasoning. Through its contextualized and visually rich design, the study packet aims to strengthen learners' conceptual understanding while encouraging independent analysis and meaningful engagement with Physics problems.

This study examined the effectiveness of the photo-based study packet in improving Grade 9 learners' problem-solving performance and explored their perceptions of the material. By employing both quantitative and qualitative methods, the research provides evidence on how contextualized, visually supported learning tools can enhance comprehension, engagement, and problem-solving proficiency in secondary Science classrooms.

B. Methodology

This study utilized a quasi-experimental design with pre-test and post-test assessments to determine the effectiveness of the Study Packet: Photo-Based Problem-Solving Worksheets in improving Grade 9 learners' performance in Physics. Quasi-experimental designs are appropriate for school-based research in which intact classes must be used, and random assignment is not feasible (Thomas, 2024). To complement the quantitative findings, qualitative data were gathered through semi-structured interviews, following recommendations to integrate qualitative insights for deeper contextual interpretation of instructional interventions (Oranga & Matere, 2023).

Two intact Grade 9 sections from a public secondary school in Candaba, Pampanga, were selected through purposive sampling. This sampling approach is suitable when groups must meet predetermined criteria, such as comparable academic performance and similar learning environments (Nikolopoulou, 2022). Each class consisted of 26 learners. One section served as the experimental group, while the other functioned as the control group. Approval to conduct the study was granted by the school principal, and informed consent was obtained from parents and learners prior to data collection.

The instructional strategy consisted of implementing the Study Packet: Photo-Based Problem-Solving Worksheets in the experimental group for four weeks. The material was designed following the 7E Instructional Model, which emphasizes sequential engagement, exploration, and conceptual consolidation to promote deeper learning. The packet incorporated real-life photographs, guided examples, and structured problem-solving tasks. Visual and contextual scaffolds were intentionally embedded in the material, consistent with research demonstrating that image-supported and context-rich learning resources improve students' comprehension and problem-solving ability in Physics (Anggraeni et al.,

2021; Wicaksono et al., 2023). Excerpts from the study packet are presented in Figure 1 to illustrate the photo-based design and problem-solving scaffolds used in the strategy.

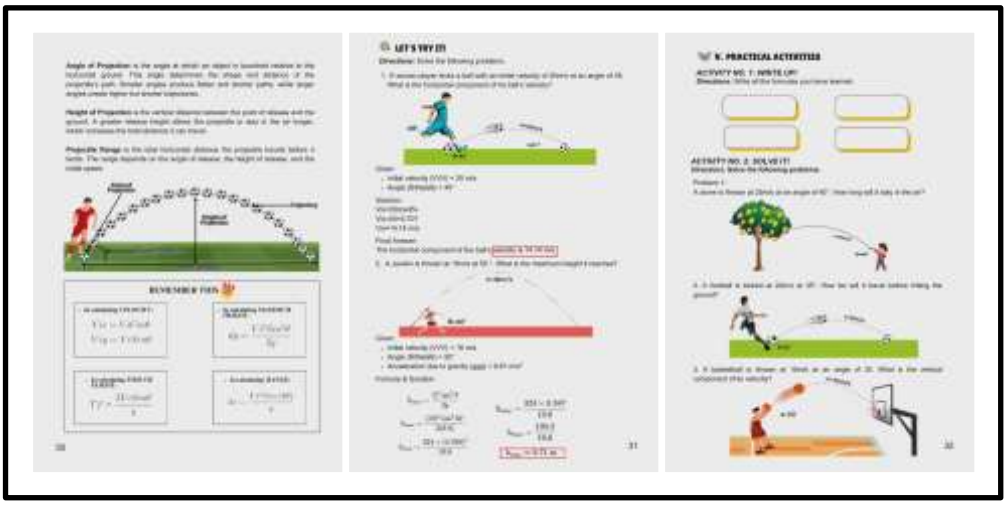

Figure 1. Selected Excerpts from the Photo-Based Study Packet

The packet was reviewed by a Physics teacher, a science coordinator, and an instructional materials specialist, who assessed the accuracy of concepts, clarity of instructions, appropriateness of visuals, and overall alignment with curriculum competencies. Refinements were made in response to their feedback. A cooperating teacher monitored the implementation to ensure fidelity in pacing and instructional flow. Meanwhile, the control group received traditional instruction consisting of teacher-led explanations and textbook-based activities.

To ensure consistency in implementation and minimize instructional bias, both the experimental and control groups were taught by the same cooperating teacher and followed the same class schedule and instructional time allotment throughout the four-week period. Core lesson objectives,

content coverage, and problem sets were aligned across groups, with the primary difference being the use of the photo-based study packet in the experimental group and textbook-based materials in the control group. The teacher followed a standardized lesson flow to maintain consistency in pacing and instructional delivery. Implementation was monitored through regular coordination with the cooperating teacher and periodic classroom observations to ensure adherence to the planned procedures.

A teacher-developed 30-item test was used as both a pre-test and a post-test to assess learners' understanding of force, motion, and energy. The instrument underwent content validation by three subject-matter experts, who assessed its clarity, relevance, and alignment with Grade 9 Science competencies. Consistent with established practices for test development, the instrument was pilot tested with another class of 30 learners, and item analysis was conducted to refine difficulty and discrimination indices (Pascual, 2024).

Semi-structured interview questions were prepared and validated to gather qualitative feedback from selected learners in the experimental group regarding their experiences with the instructional strategy. Content analysis was used to code and categorize responses into themes, following established procedures for qualitative interpretation (Columbia University, 2023).

Before performing inferential analyses, the normality of pre-test and post-test distributions was assessed using the Kolmogorov–Smirnov test. Since the data met parametric assumptions, paired samples t-tests were used to assess significant changes within the experimental group, while independent samples t-tests were used to compare post-test results between the control and experimental groups. Descriptive statistics, including mean, standard deviation, and frequency distribution, were used to summarize learners' performance levels.

Ethical standards were strictly observed throughout the study. Participation was voluntary, and learners were assured of confidentiality and the right to withdraw at any point. Parental consent and school approval

were secured prior to implementation, and all data collected were used solely for research purposes and handled in accordance with data privacy guidelines.

C. Results and Discussion

1. Results

Table 1
Learners' Scores in the Pre-Test of the Control and Experimental Groups

	Control Group		Experimental Group	
Range	**Frequency**	**Percentage**	**Frequency**	**Percentage**
25-30	0	0	0	0
19-24	0	0	0	0
13-18	4	15.38	7	26.92
7-12	21	80.77	14	53.85
0-6	1	3.85	5	19.23
Standard Deviation	2.55		3.00	
Mean	10.42		9.69	
Interpretation	Fairly Satisfactory		Fairly Satisfactory	

Outstanding (25-30) Very Satisfactory (19-24) Satisfactory (13-18) Fairly Satisfactory (7-12) Did Not Meet Expectations (0-6)

As shown in Table 1, both groups demonstrated comparable performance levels prior to the implementation of the strategy. The control group attained a mean score of 10.42 (*SD* = 2.55), while the experimental group obtained a slightly lower mean of 9.69 (*SD* = 3.00). Both means fall within the "*Fairly Satisfactory*" range, indicating that both groups were struggling with problem-solving tasks at baseline.

Frequencies also show that more than half of the students in the experimental group and more than 80% of the students in the control group scored in this range. Only a small number of students dropped into the "*Did Not Meet Expectations*" category. No students reached the "*Satisfactory*" or higher performance levels.

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Table 2
Test of Difference Between the Pre-test Scores

	Mean	*SD*	*t(50)*	*p*	Decision	Remarks
Control Group	10.42	2.55	0.95	0.35	Fail to reject H_o	NS
Experimental Group	9.69	3.00				

Note. *The level of significance was set at a = .05 (two-tailed). Results were considered statistically significant when p < .05.*

The independent samples t-test indicates that the pre-test scores were not statistically different between the two groups ($t(50) = 0.95$, $p = .35$; Table 2). These results clearly depict that the two groups had a similar performance before implementation of the strategy.

The similarity in pre-test means and variability between groups further supports baseline equivalence, strengthening internal validity and increasing confidence that subsequent differences may be attributed to the instructional strategy rather than pre-existing academic disparities.

Table 3
Post-Test Results of Control and Experimental Group

	Control Group		Experimental Group	
Range	**Frequency**	**Percentage**	**Frequency**	**Percentage**
25-30	0	0	0	0
19-24	1	3.85	6	23.08
13-18	7	26.92	20	76.92
7-12	18	69.23	0	0
0-6	0	0	0	0
Standard Deviation	2.85		2.44	
Mean	12.04		16.85	
Interpretation	Fairly Satisfactory		Satisfactory	

Outstanding (25-30) Very Satisfactory (19-24) Satisfactory (13-18) Fairly Satisfactory (7-12) Did Not Meet Expectations (0-6)

After the implementation of the instructional strategy, the experimental group demonstrated a significant improvement compared to

the control group. As shown in Table 3, the control group achieved a post-test mean of 12.04 (*SD* = 2.85), which falls under "*Fairly Satisfactory*" indicating a slight improvement from their pre-test results. Moreover, the experimental group attained a mean score of 16.85 (*SD* = 2.44), which is classified as "*Satisfactory*" performance. The increase of more than seven points reflects a notable difference in post-test performance between groups.

This improvement is further reflected in the overall distribution of scores, where learners in the experimental group shifted toward higher performance categories, while the majority of the control group remained within the "Fairly Satisfactory" range. Such movement indicates a broader elevation in student achievement within the experimental group.

Table 4
Test of Difference on the Pre- and Post-test of the Experimental Group

	Mean	***SD***	***t*(25)**	***p***	**Decision**	**Remarks**
Pre-test	9.69	3.00	-9.42	<0.001	Reject H_o	Significant
Post-test	16.85	2.44				

Note. *The level of significance was set at a = .05 (two-tailed). Results were considered statistically significant when p < .05.*

A paired-samples t-test was used to compare the experimental group's performance before and after exposure to the study packet (Table 4). The results showed a significant difference between the pre-test (*M* = 9.69, *SD* = 3.00) and post-test (*M* = 16.85, *SD* = 2.44). The mean difference was 7.16 points, with *t(25)* = −9.42, *p* < .001. The results indicate an improvement in performance from "Fairly Satisfactory" to "Satisfactory". The magnitude of the difference suggests that the observed change was substantial.

To evaluate the magnitude of this improvement, Cohen's *d* was computed using the pooled standard deviation. The resulting effect size of *d*

= 2.62 represents a large effect, suggesting that the learning gains were not only statistically significant but also highly meaningful in practical terms.

Table 5

Test of Difference Between the Post-test Scores

	N	Mean	*SD*	*t(50)*	*p*	Decision	Remarks
Control Group	26	12.04	2.85	-6.53	<0.001	Reject H_o	Significant
Experimental Group	26	16.85	2.44				

Note. *The level of significance was set at a = .05 (two-tailed). Results were considered statistically significant when p < .05.*

An independent samples *t*-test revealed a significant difference in post-test scores between the experimental group (M = 16.85, SD = 2.44) and the control group (M = 12.04, SD = 2.85), $t(50) = -6.53$, $p < .001$ (Table 5). The experimental group obtained significantly higher post-test scores than the control group.

Cohen's d was also computed to determine the practical significance of this difference. The resulting value of d = 1.81 indicates a very large effect, indicating that the difference between groups was substantial. This finding highlights the practical significance of the observed post-test score differences.

Table 6

Insights of Learners on the Study Packet

Code / Meaning Unit	Selected Student Comments
Helpful Pictures	*"The pictures helped me better understand the lessons and made problem-solving easier"* (respondent no. 10).
Clear Formulas	*"The formulas showed me exactly what to do, making it easier to solve problems"* (respondent no. 17).
Real-Life Scenarios	*"It's enjoyable to apply the activities in real life, such as throwing a ball"* (respondent no. 15).
Engaging Design	*"The content is colorful, making it fun to answer questions"* (respondent no. 20).

Sufficient Samples	*"There were quite a lot of problem-solving tasks, but there were also many pictures, which made it somewhat easier"* (respondent no. 25).

The study's qualitative phase generated insightful information about how students used the study packet. Five recurring codes were identified through content analysis of interview responses (Table 6): helpful pictures, clear formulas, real-life scenarios, engaging design, and sufficient practice problems. Students often highlighted how pictures help explain abstract ideas, claiming that they made lessons simpler to understand. Students were able to relate concepts to their everyday lives through real-world scenarios, such as throwing a ball in projectile motion, which was described as entertaining and relatable.

Several students praised the packet's clean and colorful design, describing it as inspiring and interesting. They also stressed how formulas were easy to understand and offered structured direction when solving problems. However, a few respondents said that the number of practice problems could sometimes feel overwhelming, even though the supportive visuals made the tasks easier.

2. Discussion

Improvement in Problem-Solving Performance

The results of this study indicate that the photo-based problem-solving study packet has improved learners' ability to solve Physics problems, enhancing their academic achievement in science. The performance of the experimental group shows substantial progress, as evidenced by the pre- and post-tests, clearly exceeding the control group's test results. This suggests effectiveness in helping learners with their Physics problem-solving activities, consistent with earlier studies that highlight the persistent difficulties of Filipino learners in applying scientific reasoning (Bernardo et al., 2023; Cabural, 2024).

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The findings highlighted in this study align with the 7E Instructional Model, allowing for flexibility in engagement and exploration. Moreover, the study packet was guided by constructivist learning principles, emphasizing self-directed learning and meaningful interactions, which aligned well with the purpose of this study: building effective problem-solving strategies rather than relying on textbooks. Franestian et al. (2020) also observed comparable outcomes, thereby demonstrating that the use of systematic scaffolding significantly improved middle school students' problem identification and solving.

The substantial effect sizes provide strong support for the study packet's impact, demonstrating that the improvement was not merely statistically significant but also meaningful in practical terms. This aligns with the principles of the 7E Instructional Model, in which guided exploration and structured engagement promote deeper understanding and improved problem-solving performance.

Role of Visual and Contextual Learning

The quantitative results were reinforced by qualitative findings, suggesting the importance of illustrations and experiential learning. This is reflected in Dual Coding Theory, which argues that learning deepens when information is processed through both verbal and visual channels (Paivio, as cited in Christiansen, 2022). Making physics concepts less abstract through visual scaffolding demonstrates how visual engagement enhances cognition, as noted by Balas (2024).

The qualitative findings further clarify how visual supports function across specific physics concepts. Learner comments categorized under "*Helpful Pictures*" were most frequently associated with topics involving motion and force, where students reported difficulty visualizing trajectories, directions, and interactions in text-based problems. The inclusion of real-life photographs helped learners form mental representations of these abstract situations, thereby reducing cognitive demands during problem

interpretation and solution planning. In addition, responses coded as "*Clear Formulas*" and "*Sufficient Samples*" suggest that guided visual cues supported learners in organizing given information and selecting appropriate equations, particularly in multi-step problems involving energy and motion.

These findings can be further explained through Cognitive Load Theory, which posits that learning is hindered when instructional materials impose unnecessary extraneous cognitive load on learners' limited working memory. In traditional text-based Physics problems, students must simultaneously visualize abstract situations, interpret symbolic representations, and perform mathematical calculations, often overwhelming cognitive resources. The photo-based worksheets mitigated this challenge by providing concrete visual references that served as mental models of physical situations, such as force interactions and motion trajectories. By externalizing key visual information, the photographs reduced the need for learners to mentally construct scenarios from text alone, thereby freeing working memory for equation selection, manipulation, and calculation. This suggests that the instructional value of the photos lies not merely in increased engagement, but in their role in managing extraneous cognitive load during problem-solving.

Furthermore, real-life contexts also played a crucial role in learning, as students enjoyed applying concepts such as analyzing motion in familiar situations. This aligns with Ajani's (2023) findings that experiential learning heightens motivation and strengthens comprehension by embedding abstract knowledge in tangible situations. With these visuals and contextual tasks, the study packet functioned as an interactive learning resource rather than a traditional worksheet.

Learner Engagement and Motivation

Learner engagement was strongly shaped by the aesthetics and organization of instructional materials. Students remarked that the study

packet's vivid colors and systematic arrangement heightened both enjoyment and accessibility in problem-solving tasks. This observation reflects the argument of Pals et al. (2023), who maintain that formative assessment must simultaneously monitor skill development and cultivate motivation. Hence, instructional resources that are thoughtfully designed advance cognitive growth while also supporting affective outcomes, underscoring the indispensable role of design in effective teaching practice.

Learners were also able to persist through demanding problem sets because supportive visuals reduced the sense of difficulty. While a number of students expressed concern about the quantity of practice tasks, their overall evaluation of the materials was favorable. Such results suggest that engagement is strengthened when instructional design maintains equilibrium between rigor and accessibility.

The research transcends its immediate results, yielding implications for addressing long-standing concerns in Philippine Science education. As stated by PISA (OECD, 2023), persistent low scores by Filipino learners on global assessments reveal gaps in content knowledge and limitations in analytical and problem-solving skills. The study shows that affordable, locally made study packets can improve learners' performance, highlighting the importance of using visuals and real-life examples in teaching Science.

In schools with limited laboratories and digital tools, photo-based problem-solving packets can be a practical and inclusive option. These materials aim to enhance traditional teaching methods by promoting fairness and quality in education. Additionally, evidence shows that Science learning is more meaningful and engaging when teaching approaches are based on constructivist principles, supported by visuals, and closely connected to real-life experiences.

D. Conclusion

This study examined the effectiveness of a photo-based problem-solving packet in enhancing the performance of Grade 9 students in Science.

Results showed that while both groups began at an equivalent baseline, the experimental group demonstrated significant improvement after using the instructional material, progressing from a "Fairly Satisfactory" to a "Satisfactory" performance level. Between-group comparisons further confirmed that learners exposed to the packet significantly outperformed those taught through conventional instruction. Qualitative findings supported these results, as students expressed that the visuals, real-life contexts, and clear step-by-step formulas made problem-solving more understandable and engaging.

The findings contribute to the growing body of evidence supporting the integration of constructivism, visual, and contextualized strategies in Science education. They highlight that low-cost, teacher-developed instructional materials can produce measurable gains in problem-solving ability, even in resource-limited settings. For practice, Science teachers may consider adopting similar approaches to supplement textbook instruction, particularly in topics where learners struggle with abstraction. For policy, curriculum planners may encourage the development of instructional materials that contextualize content and integrate visual supports, especially in Physics, where Filipino students consistently underperform.

Future research may extend this work by examining long-term retention of learning through delayed posttests administered several weeks after the instructional strategy implementation, testing the strategy across different grade levels, or comparing it with digital alternatives. Employing placebo-controlled designs using worksheets identical in structure but

without photographic elements may further clarify the specific contribution of visual scaffolding beyond novelty effects. Studies involving larger and more diverse samples across multiple schools, districts, or regions may also help establish the broader applicability of photo-based problem-solving packets. Finally, future investigations may refine the balance between instructional rigor and learner motivation to sustain engagement without overwhelming students.

This study adds to the limited body of research on the use of contextualized, photo-based problem-solving materials in junior high school Physics. Its demonstrated effectiveness provides evidence that low-cost, visually supported instructional tools can serve as viable alternatives to technology-heavy approaches, especially in resource-constrained contexts.

In conclusion, the study packet proved to be an effective, practical, and student-centered strategy that improved learners' problem-solving skills while fostering engagement. Its success demonstrates that innovative, yet accessible instructional strategies can play a vital role in addressing persistent gaps in science education.

Limitations of the study

This study was limited to two intact classes from a single public secondary school with relatively small group sizes, which may restrict the generalizability of the findings. Although significant results were obtained, the modest sample and non-random assignment limit broader conclusions. Future studies with larger, randomly selected samples across multiple schools are recommended to strengthen external validity.

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Hot Seat: Intervention for Writing Persuasive Speeches

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Abstract. *This action research examined the effectiveness of the Hot Seat Vocabulary Icebreaker in enhancing students' persuasive speech writing competence. Employing a collaborative, practical action research design, the study utilized rubric and a focus group discussion (FGD) protocol as primary tools for data collection. Conducted in a private secondary school in Cagayan de Oro City, Philippines, the research involved Grade 8 students studying persuasive speech writing during the third quarter. Participants were selected through non-probability purposive sampling based on criteria aligned with the study's objectives. Findings indicated that while the Hot Seat activity effectively engaged students and fostered a dynamic classroom environment, it had a limited impact on vocabulary development. The newly introduced words were not consistently integrated into their written outputs. Nonetheless, the activity's interactive nature fostered confidence, collaboration, and enthusiasm, thereby indirectly improving students' persuasive writing performance. These results highlight the importance of integrating engaging and targeted strategies to support both language development and effective writing instruction.*

Keywords: *classroom engagement, hot seat activity, icebreaker, persuasive speeches vocabulary development*

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A. Introduction

A strong vocabulary is fundamental to academic success as it enhances communication across the four macro skills: listening, speaking, reading, and writing. (Simamora & Oktaviani, 2020). In the Philippine context, many secondary learners continue to struggle to articulate ideas clearly due to limited lexical resources, particularly in productive tasks such as persuasive writing (Oktaviani & Mandasari, 2020). Alqahtani (2015) emphasizes that grammatical competence alone is insufficient for effective communication without adequate vocabulary knowledge. This challenge is particularly evident among Grade 8 students, who often struggle to write persuasive speeches because of limited vocabulary, thereby impeding their overall academic performance.

Vocabulary functions as a cornerstone of English language mastery, enabling meaningful expression and comprehension (Endarto & Subekti, 2020; Nation, 2022). Li (2015) further explains that limited vocabulary knowledge not only constrains writing fluency but also undermines learners' confidence and motivation. These findings suggest that vocabulary limitations affect writing performance holistically, influencing not only lexical choice but also learners' willingness to express ideas and sustain written argumentation.

In response to persistent vocabulary and writing challenges, language pedagogy increasingly emphasizes game-based and interactive instructional approaches (Richards & Rodgers, 2020). Nunan (2017) advocates for purposeful strategies that embed vocabulary learning within meaningful and engaging contexts. Games have been shown to reduce anxiety, sustain attention, and promote active participation, thereby creating more supportive learning environments (Masri & Najar, 2014).

Empirical studies further indicate that interactive activities enhance collaboration and enjoyment in English classrooms. Harati (2018) and Damara (2016) report that game-based strategies encourage participation and help learners engage more confidently in speaking and vocabulary-related tasks. These findings underscore the pedagogical value of games not merely

as motivational tools, but as mechanisms for increasing learners' involvement in language use.

Within the broader category of game-based learning, icebreakers play a distinctive role in shaping affective classroom conditions. Icebreaker activities help establish a low-anxiety environment that supports participation, especially among adolescent learners (Harati, 2018). By incorporating movement, teamwork, and spontaneous responses, icebreakers reduce learners' fear of making mistakes and promote communicative risk-taking.

Damara (2016) highlights that icebreaker activities such as the Hot Seat game foster interaction and enjoyment while encouraging learners to access and use vocabulary in real time. Rather than emphasizing memorization, such activities foreground engagement and shared meaning-making, which are critical for developing confidence in language use. Consequently, icebreakers serve as effective scaffolds that prepare learners for more demanding, productive tasks, including persuasive speech writing.

Research Gap and Purpose of the Study

Despite the promising use of interactive strategies, classroom practices in secondary English instruction often emphasize rote memorization rather than experiential vocabulary learning. This gap underscores the need for learner-centered interventions that integrate engagement, movement, and contextually relevant language use. Addressing this need, the present action research introduces the **Hot Seat Vocabulary Icebreaker**, a movement-based and team-oriented activity designed to support vocabulary engagement and persuasive speech writing among Grade 8 students.

The primary aim of this study is to examine the effectiveness of the Hot Seat Vocabulary Icebreaker in improving students' vocabulary engagement and their ability to compose persuasive speeches. Findings from

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this research may inform classroom practices that bridge engagement and vocabulary application in writing instruction.

Theoretical Positioning of the Intervention

Vocabulary-focused interventions do not always result in immediate measurable lexical gains, particularly when implemented through short-term or game-based activities. From an affective perspective, Krashen's Affective Filter Hypothesis suggests that reduced anxiety and increased motivation facilitate language production even when explicit linguistic gains are limited. Engagement-based and social constructivist perspectives similarly emphasize that collaborative and movement-oriented tasks enhance learners' confidence, willingness to express ideas, and participation in shared meaning-making.

In writing tasks such as persuasive speech composition, these affective and social conditions may contribute to improvements in organization, clarity, and persuasiveness without necessarily producing immediate vocabulary growth. Teng, Mizumoto, and Takeuchi (2024) emphasize that vocabulary development is a cumulative, self-regulated process that requires sustained exposure, strategic engagement, and repeated opportunities for use to achieve depth of word knowledge. Accordingly, the Hot Seat Vocabulary Icebreaker is positioned in this study not as a direct vocabulary instruction strategy, but as an **affective and motivational scaffold** that may indirectly enhance persuasive writing performance by fostering engagement, lowering anxiety, and strengthening communicative confidence.

B. Methodology

This study employed a collaborative action research design to enhance Grade 8 students' vocabulary acquisition and persuasive speech writing skills. Action research was selected for its practical orientation and its emphasis on reflective teaching improvement in authentic classroom settings. The research was conducted in a private secondary school in Cagayan de Oro City, Philippines, involving two Grade 8 sections handled

by the same English teacher. Participants were selected through purposive sampling, with parental consent and student assent.

Data collection utilized two assessment rubrics and a focus group discussion (FGD) protocol. The first rubric evaluated persuasive speeches on credibility, language use, persuasion, and emphasis, with a maximum score of 16 points. The second rubric assessed vocabulary usage based on correctness and quantity. The FGD gathered qualitative insights into students' perceptions of the Hot Seat Vocabulary Icebreaker as a classroom strategy. To ensure instrument validity, the rubrics and protocol were reviewed by experienced English teachers.

Prior to implementation, approval was obtained from the school principal, followed by informed consent from parents and assent from students. The intervention introduced ten vocabulary words through a Hot Seat activity conducted over two sessions, promoting active recall and collaborative participation. Pre- and post-intervention persuasive speeches were evaluated using validated rubrics.

Ethical standards were strictly observed, ensuring confidentiality, voluntary participation, and transparency throughout the research process. Quantitative data were analyzed using paired t-tests to determine significant differences in student performance, while qualitative FGD data were subjected to content analysis to identify recurring themes. Initial open coding was then conducted to identify recurring ideas related to students' perceptions of engagement, vocabulary learning, and writing support. Similar codes were subsequently grouped into broader categories, from which key themes were generated. To enhance trustworthiness, the researchers reviewed and refined the themes collaboratively to ensure consistency and alignment with the data. Representative quotations were selected based on their clarity and relevance in illustrating each identified theme.

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C. Results and Discussion

1. Results

The first research question examined students' persuasive speech performance across four components—language, emphasis, credibility, and persuasiveness—prior to the intervention. Table 1 presents the pre-test results.

Table 1

Scores of Students' Persuasive Speech (Pre-Test)

Writing Components	Average Scores	Description
Language	1.93	Unsatisfactory Use of Language
Emphasis	2.15	Beginning Use of Emphasis
Credibility	1.20	Very Uncredible
Persuasiveness	2.30	Unpersuasive
Total	**7.58**	**Developing Persuasive Speech**

As shown in Table 1, students' pretest scores were generally low across all components, indicating that their persuasive speech writing skills were still developing. The average score of 7.58 reflects an early stage of proficiency, which aligns with Berry's (2014) assertion that pre-test results serve primarily to establish a baseline of learners' existing knowledge and skills prior to formal instruction.

1.1B. Students' Performance After the Intervention

Following the Hot Seat Vocabulary Icebreaker, students showed significant improvement in persuasive writing.

Table 2
Scores of Students' Persuasive Speech (Post-Test)

Writing Components	Average Scores	Description
Language	3.58	Satisfactory Use of Language
Emphasis	3.58	Competent Use of Emphasis
Credibility	3.15	Credible
Persuasiveness	3.55	Persuasive
TOTAL	**13.85**	**Proficient Persuasive Speech**

As seen in Table 2, all components showed marked improvement, with mean scores nearly doubling from the pre-test. Students demonstrated greater clarity, stronger structure, and increased persuasiveness in their writing.

1.2. Significant Differences in Persuasive Speech Components

The second research question determined whether there was a significant difference between the pre- and post-test scores for each writing component.

Table 3.
Test of Difference Between Pre-Test and Post-Test Scores

Writing Components	Pre-Test	Post-Test	t-Stat
Language	**1.93**	**3.58**	**-12.08****
Emphasis	**2.15**	**3.58**	**-12.06****
Credibility	**1.20**	**3.15**	**-17.27****
Persuasiveness	**2.30**	**3.55**	**-9.41****
TOTAL	**7.58**	**13.85**	**-16.49****

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All components exhibited statistically significant improvement at the $p < .001$ level. The highest gains were in credibility ($t = -17.27$) and language use ($t = -12.08$), confirming the positive effect of the intervention on students' persuasive writing abilities

Notably, the significant improvements observed in students' persuasive speech performance occurred despite limited evidence of vocabulary uptake from the intervention. While post-test results revealed substantial gains across all writing components—particularly in language use, credibility, and persuasiveness, the newly introduced vocabulary words were not consistently integrated into students' written outputs. This contrast between enhanced writing performance and minimal vocabulary application is a salient finding of the study and is intentionally highlighted in the results to distinguish the intervention's differential effects on writing quality and vocabulary acquisition.

1.3. Vocabulary Acquisition After the Intervention

Despite improved writing performance, students demonstrated limited vocabulary uptake. None of the 14 vocabulary words introduced through the activity were incorporated into their post-test speeches. Observation and FGD data indicated that while students were engaged during the Hot Seat sessions, many were distracted or treated the activity as a game rather than a learning exercise. This lack of focus may have contributed to their minimal vocabulary retention.

1.4. Students' Perceptions of the Intervention

Based on Table 4, the focus group discussion revealed diverse student perceptions of the Hot Seat Vocabulary Icebreaker. Thematic analysis of the FGD responses yielded four major themes reflecting students' perceptions of the Hot Seat Vocabulary Icebreaker: (1) perceived effectiveness of the strategy, (2) perceived limitations in vocabulary learning, (3) suggested improvements to the intervention, and (4) overall enjoyment and engagement. These themes were generated through systematic coding and categorization of participants' recurring responses. Representative student

quotations were selected to illustrate each theme and to demonstrate how students' experiences supported the identified patterns.

Most participants found the activity engaging and enjoyable, noting that it made classroom sessions livelier and encouraged collaboration among peers. They appreciated how the game introduced new vocabulary in an interactive way, describing it as an effective icebreaker that fostered motivation and participation. However, some students expressed that while the activity was entertaining, it did not effectively facilitate a deeper understanding of word meanings. They observed that the emphasis on guessing and memorization limited their ability to apply the vocabulary in meaningful contexts. To enhance the strategy's effectiveness, students suggested providing explanations or follow-up discussions of word meanings after the game and categorizing vocabulary to improve clarity and recall. Overall, as summarized in Table 3, the Hot Seat activity positively influenced classroom engagement but showed limited impact on sustained vocabulary acquisition without structured reinforcement.

Table 4
Thematic Summary of Students' Perceptions of the Hot Seat Vocabulary Icebreaker

Question	Emergent Themes	Subthemes	Sample Responses
What do you think of the "Hot Seat" strategy in acquiring vocabulary ?	**Perceived Effectiveness of the Strategy**	Vocabulary acquisition through gameplay	"Through the game, we gain new vocabulary words." "I discover new words and also understand their respective meanings."
		Engagement and enjoyment in learning	"It was fun and exciting." "The game is an ideal icebreaker for our generation." "I want this

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Question	Emergent Themes	Subthemes	Sample Responses
			interactive game to be integrated as an icebreaker before starting the class."
		Instructional usefulness	"The icebreaker is effective."
	Perceived Limitations of the Strategy	Lack of emphasis on meaning	"I discover new words, but I don't understand their meanings.""It highlights the game through guessing and not by conveying its meaning."
		Surface-level learning (memorization/guessing)	"It's more on memorization."
		Ineffective instructional delivery	"The medium of delivering this concept of students' vocabulary doesn't work.""The icebreaker is not effective.""It may be fun but the meanings are not really important to the actual purpose of the intervention."
How do you think the strategy can be improved?	**Suggested Pedagogical Improvements**	Emphasis on meaning-based learning	"The intervention should focus more on understanding the meaning and not memorizing.""It should dwell on the meaning of the words.""It is better to present the meaning, not just to guess the words.""Meanings should be given after the activity."
		Use of categorization for scaffolding	"There should be categories included for the game to be not too difficult.""Words

Question	Emergent Themes	Subthemes	Sample Responses
			should be categorized.""Categorization helps provide clues."
Did you enjoy the game?	**Affective Engagement in Learning**	Positive emotional response	"I enjoyed the game and I wish to have more activities like this.""It was so exciting and energized us.""It awakened us from being bored and sleepy."
		Social interaction and collaboration	"It allowed us to build companionship with our group mates."
		Enjoyment with perceived instructional limitation	"I enjoyed the game, but in acquiring vocabulary, it's a no for me." "It was exciting, but it doesn't work in acquiring vocabulary."

2. Discussion

The results demonstrate that the Hot Seat Vocabulary Icebreaker significantly improved students' persuasive speech writing skills but had a limited impact on vocabulary acquisition. The substantial increase in post-test scores supports the idea that engaging, movement-based activities can enhance students' focus and writing performance by increasing active participation and lowering performance-related anxiety (Bennett, 2019). This aligns with Masri and Najar's (2014) findings that game-based learning promotes motivation and reduces anxiety, thereby encouraging students to participate more confidently in classroom tasks. In the present study, these affective and interactional conditions appeared to support students' ability to

organize ideas, establish credibility, and communicate persuasively in writing, even in the absence of consistent vocabulary integration.

However, while the Hot Seat activity successfully fostered engagement and peer interaction, it did not translate into measurable vocabulary uptake. This finding echoes Jafari, Aghaei, and Khatony (2019), who emphasized that effective vocabulary learning requires focused attention and cognitive processing rather than mere exposure. From a theoretical perspective, this outcome may be explained through Krashen's Affective Filter Hypothesis, which posits that reduced anxiety and increased motivation facilitate language output without necessarily ensuring linguistic acquisition. Moreover, the fast-paced, game-oriented nature of the activity may have increased cognitive load, as students' attention was divided among guessing words, collaborating with peers, and maintaining game momentum. As a result, students may have prioritized the expression of ideas and writing flow over the deliberate processing and retention of new vocabulary. Taken together, these findings suggest that the Hot Seat Vocabulary Icebreaker functioned primarily as an affective–cognitive support that enhanced persuasive writing performance, rather than as a direct vocabulary acquisition tool.

The limited vocabulary gains observed in this study may be attributed to several design- and implementation-related constraints rather than to the intervention's ineffectiveness. First, the number of vocabulary items introduced during the Hot Seat activity was relatively small, thereby restricting opportunities for repeated exposure and consolidation. Second, the intervention was brief, comprising only two sessions, limiting sustained engagement with the target vocabulary. In addition, the structure of the activity emphasized rapid guessing over contextualized and meaningful use, constraining deeper cognitive processing necessary for durable vocabulary development. Finally, the absence of structured post-activity reinforcement—such as follow-up exercises, contextual writing tasks, or reflective discussions—further limited students' opportunities to internalize and transfer newly encountered vocabulary into their written outputs. Consistent with Teng, Mizumoto, and Takeuchi (2024), vocabulary

development is a cumulative and self-regulated process that requires sustained exposure, strategic engagement, and repeated opportunities for use to achieve depth of word knowledge. While the Hot Seat strategy effectively enhanced learner engagement and persuasive writing performance, vocabulary acquisition appears to require longer implementation periods and more explicit instructional support to yield measurable outcomes.

Despite this, the improvement in persuasive writing suggests that the activity indirectly enhanced other aspects of communication—confidence, collaboration, and idea organization. These outcomes align with Harati's (2018) assertion that icebreakers build camaraderie and increase students' willingness to participate. Similarly, Nunan (2017) stresses the value of contextual, interactive tasks in promoting communicative competence.

Overall, the findings reveal that while Hot Seat activities effectively energize and motivate students, their contribution to vocabulary learning depends on structured reinforcement and explicit instruction. Integrating follow-up exercises—such as contextual writing, reflection journals, or peer discussions—may strengthen vocabulary retention and application in writing tasks. This study contributes to the growing body of evidence that engagement-focused pedagogies must be balanced with depth-oriented strategies to achieve sustainable language-learning outcomes.

D. Conclusion

The present study examined the effectiveness of the Hot Seat Vocabulary Icebreaker in enhancing vocabulary acquisition and persuasive writing skills among Grade 8 students at a private school in Cagayan de Oro City, Philippines. While the results showed that the intervention did not significantly improve students' acquisition or correct use of new vocabulary, it did have a meaningful impact on their overall writing performance. Notably, students demonstrated substantial progress in key components of

persuasive speech—credibility, language use, emphasis, and persuasiveness, indicating that the activity fostered greater engagement, confidence, and coherence in their written outputs. These findings suggest that although the Hot Seat strategy is limited in promoting direct vocabulary learning, it can serve as an effective pedagogical tool for stimulating motivation and improving students' writing communicative competence.

The findings highlight the importance of designing classroom interventions that integrate both engagement and comprehension. Future research may refine the Hot Seat strategy by incorporating explicit vocabulary instruction, such as contextualization and meaning-focused feedback, to strengthen word retention and application. Expanding the study to include a larger, more diverse sample, longer implementation periods, and mixed-method data collection techniques—such as surveys, interviews, and classroom observations—could yield more comprehensive insights. Comparative studies exploring the Hot Seat alongside other interactive strategies would further clarify its relative effectiveness in vocabulary development and writing improvement. Finally, examining its use among learners with varying English proficiency levels may uncover differentiated effects, guiding teachers in adapting similar approaches to meet diverse linguistic needs.

Overall, the Hot Seat Vocabulary Icebreaker underscores the value of integrating engaging and participatory learning experiences into language instruction. While it may not independently ensure vocabulary mastery, its capacity to energize learners, enhance classroom interaction, and elevate the quality of persuasive writing reaffirms its pedagogical worth within communicative and student-centered frameworks of English language teaching.

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Pre-Service Teachers' Preparedness in Early Childhood Education: Disposition, Cognition, and Self-Reflection

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Abstract. *This study examined pre-service teachers' dispositions and cognitions and their implications for preparedness in teaching early childhood education. The descriptive research design involved 160 Bachelor of Elementary Education students from a private teacher education institution in Northern Mindanao, selected through simple random sampling. Primary data were collected through researcher-made questionnaires on expectations, self-reflection, and teaching competencies, while secondary data were obtained from the Philippine Aptitude Test for Teachers. Descriptive and inferential statistics were applied to analyze the relationships among variables. Findings revealed that, regardless of specialization, pre-service teachers exhibited varying levels of teaching potential, with scholars showing higher readiness to teach. Intrinsic and altruistic motivations led them to view teaching as fulfilling and impactful, while extrinsic motivations led them to associate it with job security. Preschool Education majors and scholar students showed greater preparedness to teach young children. However, the majority were least prepared in the domains of Physical and Natural Environment and Language, Literacy, and Communication. The study concludes that pre-service teachers' content and pedagogical competencies are still developing, underscoring the need for enhanced early childhood training in teacher education programs.*

Keywords: *cognition; disposition; early childhood education; pre-service teachers; teaching preparedness*

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A. Introduction

The first years of life are critical in shaping a child's attitudes, values, and learning dispositions, which influence lifelong cognitive, socioemotional, and academic development (UNESCO, 2024). Early childhood education (ECE) teachers play a vital role in providing supportive learning environments that foster holistic growth (AEDC, 2014). In the Philippines, while Teacher Education Institutions (TEIs) are mandated by the Commission on Higher Education to deliver quality preparation for future educators, there remains a pressing concern regarding the limited number of teachers with specialized training in early childhood education. The Department of Education has attempted to close this gap through bridging programs and policy interventions, such as Department of Education Order Numbers 32 series 2012 (sections 10, 11, 16.2, and 16.3 of the IRR) (April 17, 2012) and 81 series 2012 (October 29, 2012), yet teacher readiness and competence remain uneven across regions and institutions.

Recent findings from the Second Congressional Commission on Education (Second Congressional Commission on Education [EDCOM II], 2024) underscores these persistent challenges in teacher preparation and deployment. The report revealed that TEIs across the country exhibit significant misalignment between their curricula and the competency standards prescribed by the Early Childhood Care and Development (ECCD) Council, resulting in pre-service teachers who are insufficiently prepared to meet the demands of early childhood classrooms. EDCOM II likewise found that many teacher education programs continue to operate despite chronically low or even zero licensure examination passing rates, reflecting systemic weaknesses in the quality assurance of teacher training. Moreover, the same report noted the prevalence of teacher–subject mismatches, where educators are assigned to levels or subjects outside their specialization—an issue that underscores the lack of alignment between pre-service preparation and actual teaching needs (EDCOM II, 2024).

These structural problems contribute to a deeper learning crisis, as revealed by the widening literacy and numeracy deficits among Filipino

learners. EDCOM II noted that Filipino students are performing several years behind expected curriculum levels, particularly in reading and numeracy, a concern that is intricately linked to the competence and preparation of teachers in foundational learning stages. Despite this, very few empirical studies have investigated the preparedness of pre-service teachers in the early childhood domain, especially in terms of their disposition, cognition, and reflective capacities. Existing research in the Philippine context has largely centered on general education or secondary-level teaching, leaving a gap in understanding the unique challenges of those preparing to teach young children (Alvarez & Galman, 2025).

Furthermore, while national reforms like EDCOM 2 provide broad policy directions for improving teacher education—such as curriculum redesign, strengthened field exposure, and performance accountability, there remains limited evidence from the local or institutional level that captures the lived experiences and self-perceptions of pre-service teachers as they prepare for early childhood teaching roles. The COVID-19 pandemic has also compounded these challenges, exposing weaknesses in teacher preparation programs' ability to equip students for flexible and technology-enhanced instruction in the early grades. This contextual and temporal gap heightens the need to reexamine how teacher education institutions develop not only pedagogical skills but also the dispositions and cognitive readiness essential for nurturing young learners.

Given these gaps, this study seeks to examine the preparedness of pre-service teachers in a teacher education institution in Northern Mindanao, focusing on their teaching disposition, cognition, and self-reflection as predictors of their readiness to teach young learners. By situating this investigation within the broader discourse on teacher quality and EDCOM 2's findings, the study aims to contribute localized, evidence-based insights that can inform reforms in teacher education policy and practice, ensuring

that future teachers are better equipped to respond to the developmental and learning needs of Filipino children.

Research Objectives

This study aimed to examine the preparedness of pre-service teachers in teaching early childhood education in a teacher education institution in Northern Mindanao. Specifically, it sought to:

1. describe the level of pre-service teachers' teaching disposition, cognition, self-reflection, and preparedness in early childhood education.
2. determine differences in preparedness when grouped according to specialization and scholarship status; and
3. identify which aspects of disposition, cognition, and academic aptitude significantly predict preparedness in teaching early childhood education.

B. Methodology

This study employed a **descriptive research design** to examine the relationships among pre-service teachers' dispositions, cognition, and preparedness for teaching early childhood education. The design was appropriate for identifying existing conditions without manipulating variables and for establishing associations among the factors that influence teacher readiness.

Participants and Setting

The study was conducted in a private Catholic university in Northern Mindanao recognized by the Commission on Higher Education as a Center of Excellence in Teacher Education. The participants were 160 Bachelor of Elementary Education students, selected through simple random sampling from a total population of 179 pre-service teachers. They represented three areas of specialization—General Education, Preschool Education, and Special Education—and included both scholar and non-scholar students.

Participation was voluntary, and respondents were informed of the study's purpose and their right to withdraw at any time. Ethical clearance was granted by the university's Research Ethics Committee (Approval Code: #PHDED-000175) prior to data collection.

Research Instruments

Three researcher-developed instruments were used to gather primary data. The Pre-Service Teachers' Expectations (PST-E) scale assessed intrinsic, extrinsic, and altruistic motivations for entering the teaching profession. The Pre-Service Teachers' Self-Reflection (PST-SR) questionnaire evaluated confidence, commitment, and self-assessed readiness to teach young learners. The Pre-Service Teachers' Preparedness in Teaching Early Childhood Education (PST-PTECE) tool measured perceived competencies across the developmental domains outlined in the Department of Education's Kindergarten Curriculum Guide, including Language and Literacy, Physical and Motor Development, and Socioemotional Growth. All instruments were reviewed by experts in education and psychology, pilot-tested with 30 comparable respondents, and achieved Cronbach's alpha coefficients above 0.80, indicating strong internal consistency.

Secondary data were drawn from participants' scores in the Philippine Aptitude Test for Teachers (PATT), which measured teaching disposition across six domains: Verbal English, Verbal Filipino, Numeric Measures, Induction, Situational Judgment, and Information. The use of these standardized results strengthened the validity of the study's assessment of disposition.

Guided by Expectancy–Value Theory, teaching disposition (PATT scores) and teaching cognition (intrinsic, extrinsic, and altruistic motivation) were operationalized as indicators of expectancy beliefs and task value, while self-reflection represented teachers' evaluative beliefs about competence.

Preparedness in early childhood education served as the outcome variable reflecting anticipated performance in teaching young learners.

Content validity was established through expert review, and internal consistency reliability was confirmed through pilot testing, yielding Cronbach's alpha coefficients exceeding .80 for all researcher-developed instruments.

Data Collection Procedure

After securing administrative approval and ethics clearance, the researcher coordinated with class advisers to schedule data collection. Questionnaires were distributed during class hours and retrieved immediately after completion. The researcher personally administered the survey to ensure instructions were clearly understood and to minimize nonresponse errors. The study relied solely on survey data and standardized test results to examine the relationships among disposition, cognition, and preparedness in early childhood education.

Data Analysis

Data were coded and analyzed using both **descriptive** and **inferential statistics**. Frequency, percentage, and mean were used to describe the respondents' profiles and preparedness levels. To determine significant differences and predictors of preparedness, **t-tests**, **ANOVA**, and **multiple linear regression analyses** were employed. Statistical tests were performed at a 0.05 level of significance. These procedures enabled the identification of key variables influencing pre-service teachers' readiness to teach in early childhood settings.

C. Results and Discussion

1. Results

1.1. Profile of Respondents

Table 1 presents the distribution of pre-service teachers according to specialization and scholarship status. A greater proportion of respondents were Special Education majors (42.5%), followed by General Education

(39.4%) and Preschool Education (18.1%). Most were non-scholars (76.3%), while 23.7% were recipients of institutional or external scholarships.

Table 1
Profile of Respondents by Specialization and Scholarship Status

Variable	Category	Frequency (n = 160)	Percentage (%)
Specialization	General Education	63	39.40
	Preschool Education	29	18.10
	Special Education	68	42.50
Scholarship Status	Scholar	38	23.70
	Non-Scholar	122	76.30

The distribution suggests a concentration of students in special education, a trend observed among TEIs in the region that offer SPED as an elective concentration, driven by perceived employment opportunities. The smaller number of Preschool Education majors reflects the ongoing low student interest in early childhood education, a finding consistent with the shortage of qualified ECE teachers reported in national data (EDCOM II, 2024).

1.2. *Teaching Disposition*

Results from the Philippine Aptitude Test for Teachers (PATT) revealed that pre-service teachers demonstrated average aptitude across domains, with strengths in *Induction* and *Information* and weaker performance in *Verbal English* and *Verbal Filipino*.

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Table 2
Mean and Standard Deviation of Teaching Disposition Scores (PATT)

Domain	Mean	SD	Interpretation
Verbal English	71.50	8.34	Average
Verbal Filipino	73.22	7.91	Average
Numeric Measures	76.45	6.83	Average
Induction	84.70	5.76	High
Situational Judgment	80.88	7.10	Average
Information	82.30	6.41	High
Overall	**78.84**	**7.06**	**Average**

Note. Scores are standardized (M = 100, SD = 15).

These results imply that respondents have sufficient reasoning ability and general knowledge but need enhancement in communication-related aptitudes, particularly verbal fluency in English and Filipino. These findings parallel Cruz (2019), who identified verbal proficiency as a predictor of teaching effectiveness among Filipino pre-service teachers.

1.3. ***Teaching Cognition***

Respondents' motivational orientation toward teaching showed predominance of intrinsic and altruistic values over extrinsic motivations.

Table 3
Teaching Cognition: Mean Scores by Motivation Type and Self-Reflection Level

Variable	Mean	SD	Qualitative Description
Intrinsic Motivation	4.22	0.48	High
Extrinsic Motivation	3.91	0.61	Moderate
Altruistic Motivation	4.35	0.52	High
Self-Reflection	3.47	0.58	Moderate

Note. Scale: 1 = Strongly Disagree to 5 = Strongly Agree.

Results suggest that pre-service teachers are primarily driven by personal fulfillment and service orientation rather than external rewards. Consistent with Yap and Abdullah (2022), such motivation indicates a strong internalized teaching identity. However, the moderate self-reflection score implies incomplete integration of professional awareness—a possible area for mentoring enhancement during practicum.

1.4. *Preparedness in Teaching Early Childhood Education*

Overall, more than half of the respondents (56.25%) were rated as *poorly prepared*, while only 10.62% were rated as highly prepared. Domain-specific results are summarized below.

Table 4.1.
Pre-Service Teachers' Preparedness by Early Childhood Learning Domain

Domain	Mean	SD	Level of Preparedness
Language, Literacy & Communication	2.35	0.61	Poor
Physical & Natural Environment	2.47	0.58	Poor
Physical Health & Motor Development	3.16	0.52	Moderate
Socioemotional Development	3.08	0.55	Moderate
Aesthetic & Creative Expression	2.89	0.49	Moderate
Cognitive & Numeracy Skills	2.78	0.57	Moderate
Overall Preparedness	**2.79**	**0.55**	**Moderate**

Note.

- Scale: 1 = Not Prepared to 4 = Highly Prepared.
- Mean ranges were interpreted as follows: 1.00–1.75 = Poor, 1.76–2.50 = Low, 2.51–3.25 = Moderate, and 3.26–4.00 = High.

Analysis of variance revealed significant differences in preparedness across specializations ($F(2, 157) = 5.42$, $p < .01$) and between scholars and non-scholars ($t(158) = 2.31$, $p < .05$).

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Table 4.2.
Comparison of Preparedness by Specialization and Scholarship Status

Group	Mean Preparedness	SD	Statistical Result
Preschool Education Majors	3.12	0.48	—
Special Education Majors	2.81	0.57	—
General Education Majors	2.66	0.53	$F(2, 157) = 5.42$, $p < .01$
Scholars	3.05	0.51	—
Non-Scholars	2.73	0.56	$t(158) = 2.31$, $p < .05$

These findings confirm that specialization and participation in scholarship programs are positively associated with perceived preparedness, likely due to targeted coursework and structured support.

1.5. *Predictors of Preparedness*

A multiple linear regression model was used to determine which factors predicted preparedness.

Table 5
Regression Analysis on Predictors of Teaching Preparedness

Predictor Variable	β	*t*	*p* Value	Interpretation
Communication Skills	0.29	3.12	.00	Significant
Mathematical Ability	0.22	2.45	.02	Significant
Area of Specialization	0.20	2.11	.04	Significant
Constant / Intercept	—	—	—	—
Model Summary: Adjusted $R^2 = 0.17$; $F(3, 156) = 2.66$; $p < .05$				

The results indicate that communication skills are the strongest statistical predictor of preparedness within the regression model, followed by mathematical ability and specialization. Together, these factors explain 17% of the variance in teaching readiness. The relatively modest R^2 suggests

that other unmeasured influences—such as practicum experiences or mentoring quality—may also play key roles.

2. Discussion

The findings of this study provide a nuanced picture of pre-service teachers' preparedness to teach in early childhood education. Interpreted through Eccles and Wigfield's (2000) Expectancy–Value Theory, the results highlight how teacher disposition, cognition, and contextual supports influence readiness to engage effectively with young learners. This framework posits that individuals' motivation and achievement-related choices are shaped by the value they attach to the task and their expectations of success. Within this lens, pre-service teachers' preparedness reflects not only their skill set and knowledge but also the interplay among self-perception, institutional training, and environmental opportunities.

Beyond academic achievement, Expectancy–Value Theory has been widely applied to understand teacher candidates' career motivations, professional engagement, and instructional readiness. International studies consistently demonstrate that task value and expectancy beliefs are associated with teaching commitment, responsibility, and engagement among pre-service teachers (Paulsen & Svetina Valdivia, 2022; Hails et al., 2023). Longitudinal and cross-national research further indicates that these motivational constructs shape how future teachers interpret their preparedness and professional identity (Beauchamp & Thomas, 2009; Day, 2020). These findings support the use of Expectancy–Value Theory as a robust lens for examining how dispositions and cognition relate to preparedness in early childhood education.

The data suggest that while pre-service teachers possess moderate to high levels of motivation and positive teaching dispositions, these do not necessarily translate into strong pedagogical competence. This supports

Pinnegar & Dulude Lay (2023) argument that teacher education must go beyond cultivating enthusiasm and provide structured opportunities for reflection and practice. The lowest preparedness scores in Language, Literacy, and Communication and Physical and Natural Environment correspond directly to key competencies outlined in the ECCD Council's National Early Learning Framework (2024) and an issue emphasized by EDCOM II emphasizing the continued misalignment with the Early Childhood Care and Development (ECCD) Council's professional standards suggest a critical in TEI coursework.

Choy et al. (2020) found that pre-service teachers in Malaysia and Australia exhibited varying levels of reflective practice, with Malaysian pre-service teachers often demonstrating less structured and critical reflection compared with their Australian counterparts, suggesting that motivation alone is insufficient for developing teaching readiness and professional competence. International ECCD frameworks emphasize competencies in communication, social–emotional development, play-based learning, and learning environments as core indicators of quality early childhood education (UNESCO, 2015; OECD, 2018). Similarly, tools such as the Early Childhood Environment Rating Scales (National Association for the Education of Young Children, 2021; Harms, Clifford, and Cryer, 2015) underscore the importance of language-rich and developmentally appropriate environments. The lower preparedness observed in Language, Literacy, and Communication and Physical/Natural Environment domains in this study mirrors challenges reported in the United Kingdom and Canada, where pre-service teachers have expressed limited confidence in implementing inclusive and developmentally aligned ECCD practices (Miralles-Cardona, Cardona-Moltó, Tichá, & Abery, 2025). This convergence suggests that gaps between teacher preparation and ECCD standards may reflect a broader international pattern rather than an isolated institutional concern.

The observed strengths in Induction and Information domains indicate that pre-service teachers can process and apply abstract

information effectively, yet weaknesses in verbal communication point to a critical shortfall in teaching fundamentals. Verbal aptitude underlies effective early childhood pedagogy because it shapes how teachers scaffold language development, foster socioemotional interaction, and model communicative behavior. Alzahrani & Almalki (2025) argued that linguistic competence forms the "core of enactment" in early literacy instruction. Locally, Dy and Sumayao (2023) reached similar conclusions, noting that pre-service teachers' language skills strongly predict classroom effectiveness. This alignment suggests that communication training must be emphasized in teacher education curricula, particularly for early childhood specialization.

The findings also reaffirm the importance of reflective practice in developing professional identity. While respondents expressed high altruistic and intrinsic motivation, their moderate self-reflection scores suggest limited internalization of teaching as a transformative vocation. This supports Bradburry et al. (2020), who reported that pre-service teachers often struggle to translate reflective awareness into adaptive teaching behaviors. According to the Expectancy–Value framework, the perceived value of teaching (intrinsic and altruistic motivations) enhances engagement only when combined with positive expectancy—confidence built through authentic experience and feedback. Therefore, enhancing practicum mentorship, supervision, and feedback mechanisms would likely strengthen this expectancy component and, in turn, preparedness.

The significant differences in preparedness across specialization and scholarship status also reveal structural insights. Preschool Education majors' higher preparedness may reflect the benefits of a more targeted curriculum, whereas scholars' advantage may be

attributed to the academic support and mentoring often associated with scholarship programs. Alemdar, Cappelli, Gale, et al. (2022) similarly found that scholarship-supported teacher candidates in South Korea displayed greater instructional confidence and professional efficacy. This reinforces EDCOM II's (2024) recommendation to strengthen TEIs' selection and mentoring systems to produce more competent, mission-driven teachers.

Regression analysis confirmed that communication skills, mathematical ability, and area of specialization were the strongest statistical predictors of teaching preparedness within the regression model. This finding echoes OECD (2020) evidence that foundational competencies—particularly literacy and numeracy—are integral to effective teaching performance. The modest proportion of variance explained (17%) indicates that preparedness is influenced by multiple factors beyond those measured in this study, such as the quality of practicum experiences, mentoring relationships, institutional support, and classroom exposure. Future research could extend this work by incorporating longitudinal designs or qualitative inquiry to explore how such contextual factors influence pre-service teachers' development over time.

Overall, the results portray an education system in transition: one where pre-service teacher is highly motivated and value their future profession but are hindered by uneven training quality and limited field-based learning. This condition mirrors EDCOM II's diagnosis of systemic incoherence in teacher education, curricular fragmentation, inconsistent standards, and weak linkages between TEIs and basic education schools. Addressing these requires not only curriculum realignment but also holistic professional formation that integrates disposition, cognition, and reflective capacity.

Unlike earlier Philippine studies that focused primarily on general teaching efficacy or licensure outcomes, this study integrates motivational (disposition), cognitive, and academic aptitude variables to explain preparedness specifically for early childhood education. By situating these relationships within Expectancy–Value Theory and ECCD standards, the study provides institution-level evidence that highlights where teacher preparation breaks down despite strong motivation.

In essence, this study extends Expectancy–Value Theory by demonstrating that motivation and expectancy operate within institutional ecosystems. When pre-service teachers' intrinsic and altruistic values are reinforced by structured learning environments, accessible mentorship, and communication-centered pedagogy, their preparedness to teach young children significantly improves. Strengthening these conditions aligns with the national imperative to ensure that the first teachers children encounter is not only well-intentioned but also fully competent—a cornerstone for achieving foundational literacy, equity, and the broader Sustainable Development Goals (UNESCO, 2022).

Key Contributions of the Study.

This study extends existing literature in several ways:

1. Contextual specificity. Unlike much of the existing teacher education research that examines general readiness or efficacy, this study focuses specifically on early childhood education preparedness within a Philippine teacher education program — an area with limited prior empirical investigation.

2. Integrated theoretical application. By operationalizing Expectancy–Value Theory in the context of teacher preparedness, this study offers a novel theoretical lens for understanding how motivational beliefs and cognitive orientations interact to shape readiness outcomes.

3. Empirical clarity. Our use of regression modeling to associate specific dispositional and cognitive constructs with preparedness provides a more nuanced understanding than descriptive studies alone, offering empirical evidence of how these constructs relate associatively — rather than causally — to preparedness, with implications for curricular design.

D. Conclusion

This study examined pre-service teachers' disposition, cognition, and preparedness to teach in early childhood education, providing insights into the continuing challenges faced by teacher education institutions in the Philippines. Guided by Expectancy–Value Theory, the study revealed that while pre-service teachers are intrinsically and altruistically motivated to enter the teaching profession, their actual preparedness to teach young learners remains moderate and uneven across domains. The weakest competencies, particularly in language, literacy, and environmental learning, reflect structural misalignments between teacher education curricula and the competency standards required for early childhood education.

These findings underscore that motivation and positive disposition, though necessary, are insufficient to ensure professional readiness. Readiness is most effectively developed through coherent curricular design, structured mentorship, and strengthened practicum experiences that build confidence and reflective capacity. The significant predictive value of communication and mathematical skills further reinforces the importance of strengthening foundational competencies in teacher education programs. In this light, TEIs must reorient their curricula toward practice-based, literacy- and numeracy-intensive formation that reflects the developmental realities of young learners.

At the policy level, the results lend empirical support to the ongoing EDCOM II recommendations for reforming teacher education, particularly

the alignment of TEI curricula with the Early Childhood Care and Development (ECCD) standards, the enhancement of admission and monitoring mechanisms, and the expansion of scholarships tied to quality assurance. Strengthening these systemic linkages can help ensure that future teachers possess both the professional disposition and pedagogical competence necessary for the foundational years of learning.

Finally, the study contributes to the growing discourse on early childhood teacher education in the Philippines by integrating motivational and cognitive dimensions into the assessment of preparedness. Future research may build on these findings by examining longitudinal trajectories of pre-service teachers' growth, exploring the role of mentoring and institutional culture, and comparing preparedness levels across different regions or TEIs. Ultimately, ensuring that early childhood educators are both capable and inspired to teach is essential not only for individual learners' success but also for the broader pursuit of equitable and high-quality education for all.

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The Illusion of Openness: Ideological Conformity and the Crisis of Critique in the Social Sciences

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Abstract. *The paradox in the social sciences lies in their openness and critical thinking, yet they remain closed to others. However, they often operate within the ideological boundaries shaped by Karl Marx, Émile Durkheim, and other scholars both in the Philippines and abroad. This paper adopts a qualitative-descriptive approach, combining historical and theoretical analysis to understand how academic institutions and disciplinary traditions help sustain a left-leaning orientation within the field. Through meta-research on the genealogies of social theory and the textual analysis of contemporary scholarly works, the study identifies recurring rhetorical commitments to power and inequality that, once radical, have become routine disciplinary reflexes, leading to predictability and diminished critical depth. Findings suggest that ideological homogeneity limits the breadth of social inquiry. Therefore, this paper argues for a revival of social science's affiliations with heterogeneity, a renewal of the productive tension between justice and inquiry, and a revival of the discipline's reflexivity.*

Keywords: *academic discourse, critical inquiry, epistemological diversity, ideological conformity, intellectual pluralism, social sciences*

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A. Introduction

The social sciences have long established themselves as the conscience of modernity, the disciplines through which people learn to question their own social and moral structures. Social sciences present themselves as rigorous yet humane, critical yet constructive, theoretical yet practical. This dual position has granted them authority as both an intellectual enterprise and a moral project. However, contained within this same position, we can locate a subtle contradiction. The social sciences often pride themselves on valuing multiplicity, debate, and reflexivity, but they tend to gradually come to embrace a clear ideological uniformity. This ideology, rooted largely in leftist paradigms of critique, has shaped the epistemic and institutional character of modern academic scholarship (Bourdieu, 1998).

Being aware of this pattern is not to charge the social sciences with hypocrisy, but to appreciate how ideas sediment into habits. As Pierre Bourdieu notes, every intellectual formation produces its own habits - a set of dispositions, assumptions, and styles that condition what is sayable, who can speak, and what is credible knowledge. In today's university, this habitus has largely intermingled with progressive values, equality, justice, and emancipation, as well as with the critical vocabulary bequeathed to us by Marxism, feminism, postcolonialism, and critical theory. These theories have been essential in revealing the structural forms of domination that warp our contemporary experience, but their prominence has also led to a constricting of intellectual space.

The problem, then, is not the political content of leftist thought but its institutional naturalization. As Chomsky (1999) notes, power operates most effectively when it becomes invisible. The moment a set of assumptions ceases to appear ideologically, it becomes a background against which all alternatives seem strange or reactionary within many sectors of the social sciences. Progressive thought has achieved precisely this invisibility. Its categories, such as hegemony, intersectionality, neoliberalism, and systemic inequality, constitute a moral grammar that orients scholarly inquiry. To question this grammar is often perceived not merely as an intellectual divergence, but as a moral departure.

As Foucault (1975) recalls, power is productive as well as dictatorial, and it not only silences but also organizes the conditions for what can be said. Within contemporary academic contexts, the prominence of progressive paradigms may, in some cases, contribute to the filtering of dissenting perspectives through routine practices such as hiring committees, peer review, grant funding, and departmental curricula. Over time, ideological homogeneity is reinforced. Students trained within this framework often inherit the assumptions of that same thinking without awareness of alternative possible interpretations. Consequently, those who criticize an assumed linguistic tool pose the danger of becoming an agent of the same conformity.

Recognizing this interpretation does not intend to favor a conservative reactionary position but rather to insist on knowledge pluralism. The vitality of any discipline depends on speculative and other types of diversity. When an inquiry is conducted within a limited framework, it risks becoming predictable. The same terms, such as oppression, domination, or emancipation, are recycled across contexts and flatten the complexities of human experience. Social phenomena that might otherwise be understood through cultural, psychological, or economic lenses are sometimes reduced to a single interpretation of structural injustice. Even as the analyses produced are morally compelling, they also risk becoming shallow, seeing little depth, nuance, or contradiction.

In this light, the issue of ideological homogeneity is closely tied to the issue of academic form. The way we think reflects the structure of our institutions. The dominance of certain discourses, such as critical theory over empirical sociology, implies a larger hierarchy of legitimacy. Bourdieu (1998) explained this as the "field" effect: how institutions produce an internal logic that rewards adherence to institutional standards. The field of social science, by privileging a certain type of critique, reproduces its own ideological conditions. To challenge those conditions is not an external revolt, but an

internal reorientation, and to see ideology where one has been taught to see truth.

However, it is important to recognize the distinction between the paradox of engagement and that of advocacy. Engagement aims to comprehend, but advocacy aims to convince. While advocacy has an important place in certain traditions within the social sciences, the discipline's broader intellectual promise lies in its capacity to sustain inquiry across differences. They have sought to hold opposing truths in tension and comprehend the universe in all its paradoxes. Scholars must retrain themselves to listen to differences in thought, not just demographic differences, but also epistemic differences, to achieve this goal, because a variety of viewpoints is essential to research. Thus, to attain justice risks becoming dogmatic without agreeing to this.

Those ideological beliefs serve as the anchor for this paper, which begins by arguing and criticizing their academic impact. The goal is to shed light on how ideological commitments influence knowledge production rather than criticize the social sciences' ideological homogeneity. It queries whether the field's interpretive scope has been limited by the predominance of socialist frameworks and whether intellectual variety could enhance rather than diminish its moral goal.

The investigation into ideological uniformity is also an exploration of the knowledge of critique. The real question ought not to be whether scholars should be political to prove separateness. Rather, the emphasis should be placed on how these politics organize the ambit of thought. It is the same morality that continues to provoke the conscience of social science, resisting the temptation to make its own claims into a moral consensus. It must relearn the art of disagreeing with a willingness to consider the other's presence as a site for thought and creativity, rather than a threat to virtue. Then, its classic promise may be realized, not just in the interpretation of various worlds, but also in their grasp in all wonderful complexity.

B. Methodology

Philosophical and Theoretical Orientation

The method of this paper is grounded in a qualitative-descriptive tradition rooted in interpretive social inquiry. It presupposes that ideology is both material and discursive, a system of meanings embedded in academic institutions, practices, and texts. Drawing on the theoretical foundations of Foucault (1975) and Bourdieu (1998), knowledge is understood not as a neutral description but as a social act created within a specific historical and institutional context. The controlling assumption is that the intellectual leftward inclination of social science cannot be researched out of the context of the systems that support it. The field, according to Bourdieu, creates its own forms of capital, and those forms dictate which ideas are circulated, which are rewarded, and which are disregarded.

With this philosophical stance, the study positions itself to align with epistemological introspection, the belief that research must continually question its premises. It is not aimed at judging the political legitimacy of left-leaning thought, but at arguing about the mechanisms that reproduce it. In this way, the methodology is acting in what Mills (2000) terms the sociological imagination: the ability to interrelate personal, institutional, and historical spheres of thought. An ideological homogeneity is considered here as a sociological artifact, as a pattern of habits that is historically constructed by the past and becomes reproduced through academic structures.

Research Design

Based on interpretive social inquiry, this paper conceptualizes ideology as both material and discursive, a system of meanings grounded in academic institutions, practices, and texts. Drawing on Foucault (1975) and Bourdieu (1998), knowledge is understood as a social practice created under specific historical and institutional circumstances rather than as a manifestation of neutrality. From this perspective, the intellectual orientation of the social sciences is shaped by the very systems that sustain them.

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As Bourdieu argues, every scholarly discipline develops its own kind of knowledge and determines what is accepted as legitimate knowledge and what is on the margins. Consistent with this view, the present study adopts a non-judgmental approach to political positions, guided by epistemological reflexivity, to uncover the mechanisms by which they are reproduced.

In line with Mills's (2000) concept of the sociological imagination, this implies links between personal, institutional, and historical processes, where ideological homogeneity is considered, a habit constantly re-created in academic life.

Data Sources and Corpus

Data for this study are derived from three interrelated sources:

First, a theoretical Review of Sociological Paradigms was conducted to trace the development of the dominant ideological framework within the academic

Second, a textual sample of social science literature was analyzed. This corpus consisted of selected books and scholarly works that explicitly engage with critical frameworks.

Third, the study examined institutional discourses, including policy statements, course syllabi, and scholarly communications related to diversity, justice, and reform.

Taken together, these sources provide a triangulated understanding of how ideological homogeneity emerges in academic discourse. The argument was based on purpose and focused on writings that demonstrated the common pattern of social science aligning with progressive politics. All materials were examined in accordance with ethical and scholarly standards to avoid generalizations about the context.

Analytical Procedure

The analysis followed a four-stage interpretive process: textual identification, interpretive coding, thematic clustering, and conceptual synthesis.

Textual Identification. Selected works identified as representative of academic literature were those that explicitly addressed themes of inequality, emancipation, and criticism.

Interpretive Coding. The selected materials were systematically coded to identify recurring conceptual patterns. Key codes included references to systemic oppression, social justice, and neoliberal critique. Coding was iterative, allowing categories to emerge and evolve during analysis.

Thematic Clustering. Budding codes were clustered into meta-themes that reflect historical and theoretical orientations.

Conceptual Synthesis. The final stage involved identifying patterns and synthesizing them to show how ideological homogeneity occurs in various fields of social science scholarship.

This analytical process reflected in Giddens's (2009) theory of structuration, sees social structures as both facilitating and constraining. In the same way, human agency recreates social norms and scholarly practices to reproduce ideological expectations. The repetition of analysis enables the generation of meaning in an organic, engaging way, drawing on the theoretical perspectives of Marx, Foucault, and Bourdieu.

Validity and Reflexivity

In this study, qualitative rigor is ensured through reflexivity rather than the possible replication of knowledge. The scholar recognizes this position in the academic domain because no analysis can be completely external to its object. The study itself embodies the reflexivity it proposes by placing interpretation within the intellectual flow it criticizes. The integration of theoretical perspectives (Marx, Foucault, Bourdieu) and multiple data sources (texts, discourses, and meta-research) ensures triangulation and fosters interpretative richness rather than prioritizing generalizability.

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Consistent with Foucault's (1975) view of knowledge and power as co-constitutive, each act of analysis is understood as an intervention in meaning-making. Similarly, Bourdieu (1998) cautions against the false objectivity that conceals the social nature of thinking. This paper considers reflexivity as both a methodological practice and an ethical commitment, an imperative to challenge the role of the researcher's subject perspective within the field of ideology under study.

Ethical Considerations

The study's ethical position aligns with intellectual transparency. It does not consider ideological positions to be correct or incorrect; instead, it seeks to examine and understand their role in academic discourse. It is the patterns of dominance and exclusion that create what credible knowledge is. It also emphasizes the importance of criticality in examining one's own assumptions alongside those of others. Intellectual freedom, according to Chomsky (1999), is conditioned by the ability of one to condemn his side as strictly as he opposes it.

Methodological Rationale

The approach used in methodological explanation enables what Habermas (1981) calls communicative rationality, which attempts to understand through dialogue rather than assertion. The power of this method lies in its ability to render visible what is typically invisible or what is often taken for granted: the inner logic of thought at work in academic practice. The study repositions intellectual diversity as a methodological imperative rather than a political motto, and by mapping the conceptual complexities of ideological understanding.

Summary of the Methodological Framework

In a nutshell, the arguments in this research are interpretive, reflexive, and historical. It interprets social science as an intellectual and political initiative. It attempts to reveal how ideological homogeneity is created, reproduced, and justified through qualitative analysis and critical

interpretation. This approach, true to the ethos of Eric Hayot, teaches a thinking grounded in the spirit of style and in epistemic self-awareness and questioning its assumptions, methods, and limits.

C. Results and Discussion

The results lay out what was discovered from the descriptive analysis of the evidence, namely, patterns of ideological convergence in social science academia. At the same time, the discussion engages with the theories of Marx, Foucault, and Bourdieu to highlight the social logic behind the dominance of ideological homogeneity in the social sciences. Taken together, the findings address the study's central question: *how does moral commitment to justice (once the strength of the social sciences) threaten the integrity of epistemological interpretation?*

Key Findings:

Analysis of the data produced three connected findings that reflect the form of ideological homogeneity within the social sciences:

A. The ascendancy of left-leaning paradigms as a standard way of thinking for those in social science academia.

B. The institutional influence of ideological orientations through public discourse and formal policies in social science academia.

C. The internalization of these patterns into both academic identity and practices of critical reflection in social science academia.

Each of these dimensions illustrates how, although historically justified by a commitment to equality, the discipline's ethical orientation, in certain contexts, has become a structure that impedes pluralism and constrains theoretical innovation.

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Superiority of Left-Positional Paradigms

The analysis suggests that left-leaning paradigms are nearly hegemonic across the social sciences. Reading from academic journal articles published over the past decades, as well as conference proceedings and brochures from that period, reveals a recurring focus on critical, post-structural, and intersectional frameworks. These paradigms, initially built for the critique of social domination, have become the normative grounds for this argumentative inquiry.

This development reflects what Fraser (2019) writes that the progressive tradition has played an important role in exposing injustice but has become mired in a concern with its moral authority, turning critique into a repetition. In the same vein, Alexander & Smith (2021) draw attention to the emerging sociology of ideas in academia, where praise is reserved only for dissent when the purview of moral frameworks aligns and is acceptable. This creates a paradox: while knowledge is ideologically divergent, stances are honored in rhetoric, but not in practice.

This pattern supports the core argument of this paper that criticism descends into a lack of reflexivity when it becomes habitual. The same tools that formerly disrupted hierarchies can become tools of compliance. In this sense, the dominance of left-leaning paradigms is seen as both a historical achievement and an epistemological limitation, a self-perpetuating epistemological habit that dictates which questions are answerable only within the field of social science academia.

Consolidation of Ideological Beliefs

The second finding demonstrates how institutional discourse undergoes and legitimizes ideological homogeneity. Analysis indicates that universities, funding agencies, and academic publishers frequently frame academic excellence in terms that align with progressive ideals (e.g., equity, inclusion, and sustainability), which are significant but, when combined, become unquestioned norms.

This phenomenon may contribute to what Collins (2019) pointed that the institutionalization of moral vocabulary creates and sustains "critical orthodoxy," a situation in which a discourse or claim related to justice

becomes a form of legitimacy, rather than questioning itself. This point supports Ahmed's (2021) argument that complaints about the diversity of cultures in universities can lead individuals to replace the structural evolution of knowledge with acts of moral performance. Collectively, these cases exemplify how institutional ethics routinely function as symbolic disciplinary systems that dictate which ideas may linger in academic contexts.

These institutional limitations validate the knowledge gaps this paper argues for, namely that ideological unity can obscure the complexities of social life. While the language of justice is morally necessary, it can also function as an apparatus of normalization and generalization. When universities make virtue synonymous with orthodoxy, critique becomes predictable, and the imagination of knowledge production is reduced.

Integration and Reflexive Practice

The third finding concerns how scholars internalize and explain ideological expectations. Many scholars, even those who express dissatisfaction with orthodoxy, continue to adopt its predicament for either strategic or moral reasons. These findings support the abstract's contention for intellectual reflexivity, questioning not only structures of power but also one's own complicity in them.

This process of reflexivity is called *performative reflexivity*. Performative reflexivity is a form of critical self-awareness of ideological sameness while still being trapped within it. They publicly criticize conformity while, in their own work, arguing about its language and frameworks. This internalization leads to what might be termed moral inertia, in which noticing that you are operating within the dominant ideological construction leads you to feel that engaging ideas outside the paradigm may result in professional marginalization and exclusion.

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Ahmed (2021) emphasizes that higher education cultures are always aligned with institutional tales of virtue, where performance of awareness substitutes for structural change. It supports the paper's argument that, when critique takes on a habituation, inquiry becomes shadow. The need to be morally correct in thinking trumped the opportunity to think otherwise.

The result of this research indicates that ideological homogeneity in the social sciences is not a power conspiracy but a **belief structure**, a recursive alignment among **theory**, **institution**, and **identity**. First, these theoretical traditions give meaning to the vocabulary of justice, then institutions encode this vocabulary in bureaucratic norms, and lastly, scholars internalize that normativity as virtue.

As the paper argues, while this must be coherent, moral and intellectual knowledge has something to do with historical significance, it yields an unintentional consequence — the creation of the epistemic horizon and the diversity of political knowledge. The results, therefore, indicate a need for renewed pluralism in an academic culture that values disagreement, dissent, and other forms of diversity, rather than viewing these differences as a betrayal of academic tradition.

These insights pave the way for the discussion in this paper, which examines the theoretical implications of this ideological structure through the intersecting frameworks of Marx's critique of power, Foucault's discourse analysis, and Bourdieu's sociology of habits.

Discussion

The discussion interprets the patterns and conclusions from the results and incorporates them within a broader theoretical and historical understanding. It elaborates on how ideological homogeneity in social science, while emerging from admirable ideals of equity and justice, has become a quite nuanced mechanism of epistemic restriction. Through the conceptual frameworks of Marx, Foucault, and Bourdieu, and the recent work of Ahmed (2021), this study aims to investigate how power, knowledge, and sociological habits interact to shape the intellectual culture in modern academia, especially in the social sciences. The relationship among

theoretical underpinning, institutional practice, and scholarly agency positions a recursive loop of influence. Structures create ideas, structures dissolve dispositions, and dispositions reproduce ideas.

Ideology, Power, and Knowledge

The first layer of the discussion's interpretation addresses the connection between ideology and power. For Marx, ideology is a tool that hides the material conditions of social existence. It naturalizes inequality by presenting historically contingent relationships as universal truths. In today's social science, the prevalence of left-wing paradigms represents a reversal of Marx's logic. Instead of hiding inequality, discipline places it at the center of social science discourse, but at the same time it runs the risk of creating a new form of discourse. This new discourse argues that power does not come from silence but rather from moral authority.

Foucault (1975) explains that power does not just repress but also produces knowledge and determines the conditions for truth and who can speak it. The paradoxical meanings of "justice" and "equity" evident in institutional discourse constitute a discursive regime and a set of truths regulating academic conduct. As Ahmed (2021) and Berglund (2025) argue, universities have institutionalized these moral vocabularies by treating ethical determinations as bureaucratic categorizations. This results in an "economy of virtue" where acting in accordance with institutional ethics becomes a requirement for professional legitimacy.

Marx's interpretation of "false consciousness" explains not in terms of pure ignorance, but in terms of misrecognition. Social scientists may see their discourse as emancipatory when a reproduction of social power aims to critique as well as destroy. So, ideological unity must be seen as a historically specific form of control rather than a moral hegemony that supplants the economic determinism of a bygone era with systems of symbolic and cultural

authority. As Bourdieu (1998) points out, symbolic power tends to work best when it is least scrutinized and when players are confused by the rules of their own games.

Field, Habitual Practices, and Reproduction

The second interpretive layer of this discussion relates to the sociology of knowledge and academic habitual practices. Bourdieu (1998) theorizes the academic field as a constituted space of positions and position-taking defined by the accumulation of economic, cultural, social, and symbolic capital. It is within this field that ideological homogeneity is reproduced by the internal logic of reproduction rather than coercion. Even scholars may seek legitimacy by following the most accepted norms, not because they are compelled or anyone is forcing them, but because they have internalized the value of the ideas and rules that confer intellectual legitimacy within the field of social sciences.

The findings of this study illustrate this dynamic. The prevalence of progressive paradigms in social scientific discourse is not a form of knowledge uniformity but a common habit. Scholars do not reproduce ideological habits consciously; they do so unconsciously, and they interpret the interconnection of these aspects with ethical rationality. Evidence characterizes this as performative reflexivity, the act of seeming self-reflexive, while still residing within the boundaries of institutional virtue. In this context, critique itself becomes a form of symbolic capital, a performance of self-awareness that neither challenges nor threatens the legitimacy of the hegemonic order or power within its boundaries.

This interpretation aligns with Foucault's understanding of knowledge and power as productive, shaping the conditions under which truth is recognized. The university itself, not the university scholar, maintains its authority, not by mandating proof of belief, but by setting the conditions by which beliefs and policies become believable. As a result, ideological conformance is not determined from above but is evidenced through everyday university scholarly practices, such as peer review, referencing, hiring, and conversation. The field reproduces itself through what Bourdieu refers to as doxa, the unspoken belief that normativity is evidenced above

within the frame of respect and authority. Through this doxa, these norms become taken for granted, rendering alternative frameworks less visible or legitimate.

Thus, ideological homogeneity emerges as an effect of intellectual success, imposed through academic influence. Over time, revolutionary ideas become paradigms, paradigms become norms, and norms become invisible. In such conditions, critique risks becoming routinized, leading to a narrowing of inquiry rather than its expansion.

The Ethical Economy of Academia

The third dimension of the discussion is what might be called the ethical economy of academic life, structured around the currencies of virtue, trust, and belonging. Collins (2019) argues that the institutionalization of intersectionality and social justice discourse, while crucial for responding to systemic inequality, produces another hierarchy of ethics capital. In this ethical economy, being on the side of progressive power acts as both an ethical and professional currency. Scholars who display ethical consciousness obtain weak forms of legitimacy and power, whilst those who challenge notions and orthodoxy may experience sudden exclusion within academia.

This moral economy resonates with Fraser's (2019) concept of "progressive neoliberalism," wherein moral idealism becomes intertwined with managerial logic. In universities, the administrative structure assimilates and executes the language of justice and questioning and translates the language of justice into outputs that can be measured, for example, diversity statements, ethical research metrics, and public stature. This ideological coherence may enhance institutional stability, but it limits intellectual evolution.

From a Marxian perspective, this dynamic is like a virtue being commodified. As capitalism slowly commodifies labor, the modern academy commodifies moral engagement into an institutional measure of performance. Therefore, the language of performance becomes a tool for self-

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legitimation. To borrow from Foucault, power is "capillary," circulating throughout the micro-practices of virtue and extending its reach to society.

Reflexivity and the Limits of Critique

If ideological homogeneity continues not through coercion but reflexive complicity, then it is easy to create a sort of reflexivity that moves beyond performance. The findings suggested that some scholars were aware of the narrowing of intellectual space but felt constrained by the moral and professional consequences of dissent. The situation mirrors Mills's (2000) concept of **"trapped imaginations,"** the inability to link one's feelings of discomfort to the possibility of structural change and to the possibility of exclusion.

Thus, critical reflexivity does not reject progressive values, but questions the institutional forms those values have taken. Similarly, some institutions encourage scholars to rethink questions and curiosity as methods of knowledge, actions that expose the contradictions in moral stances often valued as central to institutional life.

Lastly, the idea of resistance could argue that the point of change lies exactly here, within these contradictions. For Foucault, power is never complete because it creates its own rupture points. In the social sciences, these rupture points are evident in an increased interest in methodological pluralism, decolonial epistemologies, and post-critical theory, particularly in the modern era. These things assert that ideological closure may be a valuable statement, but it is not absolute. The challenge is to turn reflexivity from performance to praxis, a way of thinking that is critically aware of its own conditions of possibility.

Reclaiming Pluralism and the Future of Inquiry

The final interpretive thread of this discussion concerns the possible revitalization of the social sciences. As this paper argued, the way forward is not about disregarding justice, but about rethinking justice as a plural power. Justice must also be thought of with epistemic diversity in mind. The findings of this study advocate for what can be referred to as reflexive pluralism: a

willingness to accept multiple, even contradictory, approaches to understanding and accepting different knowledge within the social world.

According to Alexander and Smith (2021), this renewal is encouraged by the **"new sociology of ideas,"** which emphasizes dialogue across traditions of thought rather than a strict adherence to a single moral argument. In this view, pluralism does not mean dispersal or redundancy but a kind of vitality, in which dissent is a source of creativity. This proposition contends that the future of critique may depend on its ability to critique itself, to know when its own categories are used as instruments of stasis rather than transformation.

The discussion has shown that ideological coherence in social sciences can be understood as a form of symbolic power operating across theory, institutional power, and self. While Marx's critique of materialism, Foucault's discourse of power/knowledge, and Bourdieu's conception of habits perfectly explain how ideals of justice transform into systems of legitimacy, the work of Ahmed (2021) and other scholars extends this discussion by demonstrating how moral vocabularies, institutional norms, and reflexive performances combine to create this ideological wholeness.

However, such coherence does not necessarily indicate intellectual degeneration or exclusion. It is a historical moment, a moment of self-recognition from which renewal can arise. The future of the social sciences depends on its ability to revisit pluralism as a style of thought rather than simply as a tolerance for difference: its disciplined heterogeneity will be able to criticize even its own statements.

D. Conclusion

This research argues for the continuity of ideological homogeneity in the social sciences, uncovering how a discipline grounded in the ideals of openness and critique has nevertheless come to occupy a narrow moral and intellectual horizon. Given the theory, institutions, and practices, the social

sciences have internalized a common orientation to justice, equity, and emancipation as necessary values that have become forms of epistemic closure. The evidence presented in this study shows that ideological coherence is not a matter of political preference but of structural reproduction. It emerges out of institutional policy, linguistic conventions, and the reflexive orientations of scholars who, in attempting to criticize power, invariably reproduce its logic.

By examining the moral coherence of the social sciences, both its strengths and limitations, this study demonstrates the continuous relevance of Marx, Foucault, and Bourdieu in understanding contemporary academic culture. What had once been a revolutionary vocabulary of justice in the discipline now represents a symbolic economy of legitimacy, a means of enforcing institutional virtue through a system of reward. Universities, as pointed out earlier, regularly take ethical ideals and turn them into administrative instruments; hence, a mode of bureaucratic performance of moral intention. The same has happened with academic research; critique has become a normal, habitual part of scholarship, and reflexivity, an act of self-preservation.

Thus, the implications of this study go beyond mere ideological critique. This paper revived pluralism, a reconfigured intellectual milieu in which justice converges with methodological pluralism, and dissent is not perceived as antagonism, but as a fundamental condition for comprehension. This pluralism does not abandon the ethical commitments of the social sciences, but rather furthers them by suggesting that truth, like justice, is most meaningful in a state whose power is grounded in pluralism.

To conclude, the challenge is not to abolish the principles that support discipline but rather to revive their creative tension. Social sciences should again practice critical analysis, even of the language of critique, and conceptualize freedom not as agreement but as the ability to think differently. A very plural, self-renewing intellectual tradition could be formed amid that tension between conviction and curiosity, knowledge and humility.

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Bridging Certification Gaps in Electrical Installation and Maintenance: A Competency-Based Improvement Framework for TESDA Assessment Outcomes

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Abstract. *Technical-vocational education and training (TVET) have become increasingly significant in the Philippines as the Department of Education (DepEd) and the Technical Education and Skills Development Authority (TESDA) seek to produce employable graduates through the Senior High School (SHS) Technical-Vocational-Livelihood (TVL) track. Despite sustained national efforts, certification outcomes in programs such as Electrical Installation and Maintenance (EIM) remain inconsistent, resulting in skills certification gaps and attrition between program completion and national assessment. This study addressed these challenges by designing a Competency-Based Improvement Framework (CBIF) to enhance TESDA assessment outcomes in EIM at Tablon National High School, Cagayan de Oro City. Using a sequential explanatory mixed-methods design, the study analyzed three cohorts of EIM learners from 2022 to 2025, examining trends in assessment participation and performance alongside learner-related and institutional factors. Findings revealed pronounced attrition points across cohorts, marked by declining assessment participation and fluctuating passing rates. The framework proposes a practical and transferable model for strengthening SHS TVL implementation and improving TESDA certification outcomes.*

Keywords: *competency-based improvement framework, TESDA assessment outcomes, electrical installation and maintenance (EIM)*

A. Introduction

Technical and vocational education and training (TVET) prepare the Filipino workforce for local and international jobs. In the Philippines, TESDA sees TVET as providing learners with industry-relevant skills for changing sectors such as construction, manufacturing, and energy (TESDA, 2021). With ASEAN economic integration, national certification improves employability, labor mobility, and competitiveness (ADB, 2021). In support of these goals, the Department of Education (DepEd) institutionalized the Technical-Vocational-Livelihood (TVL) track within the Senior High School (SHS) K to 12 curricula. The TVL track aligns school-based training with TESDA Training Regulations, enabling learners to take national competency assessments upon completing their specialization (DepEd, 2019). Beyond immediate employment, the TVL track is intended to support entrepreneurship and further education, thereby expanding postsecondary pathways for learners (Department of Education, 2019; Malipot, 2022).

Despite policy goals, studies show ongoing challenges in TVET participation, implementation, and certification. The Philippine Institute of Development Studies (2024) highlights socio-economic barriers, such as costs, limited information, and weak parental support, that hinder disadvantaged youth's access. It notes uneven institutional responses to industry demands, causing skill mismatches that can impair certification. These structural barriers create early disadvantages that can persist through training and certification.

Moreover, reports from the Second Congressional Commission on Education (EDCOM II, 2024, 2025) highlight ongoing attrition and low graduation rates in TVET, especially in the SHS TVL track and post-secondary programs. Although the final report lacks detailed disaggregated data, it places TVET reform within the National Education and Workforce Development Plan (2026–2035), focusing on pathway coherence, better DepEd–TESDA–CHED coordination, and alignment with labor market needs (EDCOM II, 2026).

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Tablon National High School (NHS) in Cagayan de Oro City was among the public schools that pioneered offering EIM under the TVL track when SHS was rolled out in 2016. The program aligns with TESDA's standards for the Electrical Installation and Maintenance NC II, focusing on wiring, safety, and troubleshooting (DepEd Region X, 2020). Over time, the school has trained and endorsed learners for TESDA assessments to support DepEd's goal of producing workforce-ready graduates. At the school level, the national challenges are reflected in the implementation of EIM training. Hence, in response, this study focuses on the design of a Competency-Based Improvement Framework (CBIF) for the EIM program at Tablon NHS, grounded in local assessment trends and contextual factors influencing TESDA outcomes.

B. Methodology

Research Design

This study used a sequential mixed-methods design, starting with quantitative analysis of five years of TESDA assessment results to identify trends and influencing factors. The qualitative phase explored learners' challenges and experiences. Combining these data informed the development of a Competency-Based Improvement Framework (CBIF), balancing statistical trends and stakeholder insights for an evidence-based framework.

Locale and Participants

The study was conducted at Tablon NHS, Cagayan de Oro City, involving three student cohorts completing the program and taking the TESDA assessment: Batch 1 (2022–2023) with 15 students, Batch 2 (2023–2024) with 10 students, and Batch 3 (2024–2025) with 21 students. From each batch, three participants were purposively selected for FGDs, ensuring they had direct experience with the assessment process and school implementation (Palinkas et al., 2015).

Data Gathering Procedure

Data collection was in three phases. First, TESDA assessment results were gathered, including enrollee numbers, assessment takers, and pass/fail rates per year, which served as the basis for identifying performance trends. Second, learner- and institutional-related factors were collected from school records. Third, thematic insights were generated through FGDs with students, who reflected on challenges, strategies, and experiences related to TESDA assessment. These data sources enabled triangulation and strengthened credibility (Fetters et al., 2013).

Instruments Used

A document analysis guide was used to record TESDA assessment results, enrollment figures per year, demographic, academic, and socio-economic data from learners, as well as indicators of school support and resources. An FGD protocol guided the discussions with selected students. Finally, a framework validation tool was prepared for expert assessors and practitioners to evaluate the clarity, relevance, and feasibility of the proposed CBIF.

Data Analysis Plan

Data analysis involved multiple stages. Quantitative data from TESDA assessments were examined using descriptive statistics, including frequency counts, percentages, an,d pass/fail comparisons across three batches. Qualitative data from FGDs underwent thematic analysis using Braun and Clarke's (2006) six-phase framework, yielding themes categorized into learner-related and institutional dimensions. Results were integrated through triangulation, linking quantitative trends with qualitative insights to develop the CBIF. Expert feedback was analyzed qualitatively to refine the framework in line with the standards and context.

Ethical Considerations

The study followed ethical principles, obtained permission from the school, and secured written consent from participants, ensuring voluntary participation, anonymity, and confidentiality. Codes protected identities during analysis. Sensitive socio-economic data, like 4Ps participation, was reported anonymously. The study also complied with the Philippine Data Privacy Act of 2012 to protect personal information.

C. Results and Discussion

Enrolment, Assessment Participation, and Results

The enrollment and TESDA assessment participation trends at Tablon NHS reveal both growth and challenges across cohorts. As shown in Table 1, Batch 1 (2022–2023) enrolled 18 learners, but only 1/3 (33.3%) proceeded to take the TESDA assessment, suggesting that many learners were either unprepared or faced barriers to participation. Batch 2 (2023–2024) showed the lowest participation, with 11 enrollees, but none attempted the assessment. By contrast, Batch 3 (2024–2025) recorded the highest enrollment, with 20 learners, and a relatively higher participation rate of 35%, reflecting modest improvements in student engagement with certification requirements.

Low TESDA assessment participation among Tablon NHS students reveals a challenge in the SHS TVL track: persistent dropout between program completion and certification. This aligns with studies showing that many students complete TVL, but few take assessments, creating a skills certification gap (Abao, Balaba, Cap-atan, Cosmiano, & Mahinay, 2025). This leakage undermines the K to 12 reform's goal of using certification for employability and industry alignment (EDCOMM II, 2026; Department of Education, 2019).

This turnout may reflect socio-economic barriers, such as financial constraints, opportunity costs, and a lack of support, that hinder assessment completion (Philippine Institute for Development Studies, 2024). This explains zero participation in Batch 2, possibly due to resource and motivation deficits. Insufficient institutional support, such as limited access to tools or coaching, also discourages attempts at assessment (Pascua & Molina, 2021). Fluctuating participation reveals gaps in institutional support; Batch 1's strong performance shows potential with robust support.

Table 1
Enrolment, Assessment Participation and Results by Cohort

Cohort	Enrollees	Takers	Passers	Enrollees Who Took Assessment (%)	Takers Who Passed (%)
Batch 1 (2022–2023)	18	6	6	33.33	100
Batch 2 (2023–2024)	11	0	0	0.00	-
Batch 3 (2024–2025)	20	7	3	35.00	42.86
Total	49	13	9	26.53	69.23

The lack of sustained strategies leads to declines, and disparities in facilities and partnerships affect TESDA's assessment readiness, underscoring the need for ongoing investment (Ferrer, 2022). Internationally, TVET systems struggle to align training with national frameworks, leading to uneven outcomes (Asian Development Bank, 2021). To close enrollment-

to-certification gaps, schools like Tablon High must intervene at the learner and institutional levels, providing resources, building confidence, and framing TESDA assessments as attainable for employment (Dizon & Elbinas, 2020). Addressing structural and motivational barriers is vital to boost participation, despite steady or rising enrollment.

The TESDA assessment results for Electrical Installation and Maintenance at Tablon NHS contrast outcomes. Batch 1 (2022–2023) had a 100% pass rate with six certified. Batch 2 (2023–2024) had no participation, likely due to systemic issues. Batch 3 (2024–2025) declined, with 3 of 7 students (42.9%) passing. Across all cohorts, 13 takers—9 passed, 4 failed—achieving a 69.2% rate. Most succeed, but low participation limits impact. Variability across cohorts indicates inconsistent outcomes, affected by preparedness, access, confidence, and institutional readiness.

At a policy level, the overall 69.23% passing rate across all cohorts is promising but still below the ideal standards for employability in an increasingly competitive labor market. Studies have shown that certification outcomes are highly sensitive to learners' socio-economic background, with disadvantaged students often facing barriers in confidence, preparation, and access to supplementary resources (Philippine Institute for Development Studies, 2024).

Certification outcomes reveal ongoing gaps between classroom training and TESDA standards. Studies cite issues such as limited access to equipment, insufficient hands-on practice, and misalignment between instruction and assessment, which harm learner performance (Pascua & Molina, 2021). Institutional issues, including shortages of qualified trainers and weak industry links, worsen these problems (Sanchez, 2019). Learner factors such as study habits, self-efficacy, and readiness also impact certification success (Dizon & Elbinas, 2020). National data show significant dropout between TVL completion and certification, driven by misaligned school-based training and assessment requirements (Abao et al., 2025).

Learner-Related Factors

Referring to Table 2, the learner-related factors of the three cohorts at Tablon NHS reveal consistent demographic and academic patterns, with notable differences in program participation. The average age across cohorts ranged from 18 to 19 years, reflecting the expected age of senior high school graduates. The gender distribution was highly skewed, indicating that the EIM program remains male-dominated. In terms of academic performance, the average TLE grade was relatively high, indicating that learners generally performed well on school-based requirements.

Participation in support programs varied widely. The Joint Delivery Voucher Program (JDVP) saw strong engagement in Batch 1 (11 learners) and especially in Batch 3 (20 learners), but none in Batch 2. This uneven participation mirrors the fluctuations in assessment outcomes noted earlier. Meanwhile, Pantawid Pamilyang Pilipino Program (4Ps) participation was more evenly distributed, with 11 learners identified as beneficiaries across cohorts.

Table 2
Learner-Related Factors of EIM Students by Cohort

Learner Factor	Batch 1 (2022–2023)	Batch 2 (2023–2024)	Batch 3 (2024–2025)
Average Age	18.83	18.54	18.05
Sex (M/F)	16/2	10/1	17/3
Average Final Grade in TLE-EIM	93.17	89.00	91.50
JDVP Participation	11	0	20
4Ps Participation	3	5	3

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Learner-related factors highlight structural and socio-cultural factors that affect TESDA assessment outcomes. Male dominance in EIM reflects deep-rooted gender norms within technical-vocational tracks, with female learners underrepresented in trades such as electrical installation (UNESCO-UNEVOC, 2020). This gender gap aligns with broader Philippine TVET trends that often channel women into caregiving or service roles, thereby limiting their access to higher-paying technical fields (Brillantes & Ramos, 2019).

While learners' academic performance in TLE-EIM was high, uneven participation in certification shows that strong grades do not always mean assessment readiness. Dizon and Elbinas (2020) say that socio-emotional factors, such as confidence and test anxiety, impact certification. Similarly, Agaton and Cueto (2021) note that socio-economic disruptions, such as household duties or limited resources, can prevent learners from certifying. These findings match the gaps between TLE results and TESDA outcomes at Tablon NHS.

Institutional Factors

Table 3 presents the quantitative indicators of institutional support and resources as reported by EIM students at Tablon NHS. The results show that access to real work settings is the most consistently available form of support, placing it in the highly available category. Such opportunities closely mirror actual workplace conditions, thereby enhancing learners' readiness and employability (Hebron-Ariston, 2024). Specifically, students are given chances to engage in hands-on activities, practice their skills using authentic tools and equipment, and observe standard industry procedures in a realistic environment. These experiences not only reinforce classroom learning but also help students develop professional habits, adaptability, and confidence as they transition to the labor market.

In contrast, thirty-two students (65.3%) reported that in-class one-on-one coaching is only moderately available, indicating that while this support is present, it is not consistently or regularly provided to all learners.

Personalized guidance is essential for building confidence, deepening understanding, and refining technical skills in technical-vocational programs, especially for students who may need additional assistance or remediation.

When teachers provide individualized feedback, demonstrate complex procedures step-by-step, and address specific learner difficulties, students are more likely to meet competency standards and perform well in both assessments and real-world tasks. However, the moderate availability of one-on-one coaching suggests potential gaps in instructional support, possibly due to large class sizes, limited teacher time, or competing academic responsibilities. Increasing the frequency and consistency of personalized coaching may help close performance gaps, promote competency mastery, and ensure that all learners are adequately prepared for workplace demands (Dizon & Elbinas, 2020).

Table 3
Institutional Support and Resources as Reported by the Students

Support and Resources	f	%	Interpretation*
In-class simulations	27	55.1%	Moderately Available
In-class one-on-one coaching	32	65.3%	Moderately Available
Access to real work settings	48	98.0%	Highly Available

**Legend:*
Highly Available : ≥ 80% of students reported availability
Moderately Available : 50% – 79% of students reported availability
Limited : 20% – 49% of students reported availability
Very Limited : < 20% of students reported availability

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While 55.1% reported in-class simulations, indicating moderate availability. Over half experienced structured practice using tools or simulated environments. This suggests room for improvement in providing ample practice before TESDA certification. Simulation training is a cost-effective way to address equipment shortages and enhance skills transfer (Rosales, 2022).

Real-world immersion was readily available, and shortages of EIM tools and inefficient scheduling surfaced as recurring issues that reduced practice opportunities and heightened learner anxiety. Providing snacks and meals during assessments was valued as a form of psychosocial support that helped reduce stress. However, the lack of strong narratives about transportation support suggests this remains a gap in institutional support.

Qualitative Report on Learner-Related and Institutional Factors

Table 5's FGD results reveal that students face challenges such as difficult assessment content, many test items, and pressure, reflecting broader issues of test anxiety and readiness in TVL tracks (Dizon & Elbinas, 2020). However, students also demonstrated resilience through peer collaboration and self-study, underscoring the importance of support and motivation in preparing for assessments.

Table 5

Summary of FGDs on Learner-Related and Institutional Factors

Dimension	Learner-Related Factors	Institutional Factors
Challenges Identified	▪ Difficulty understanding many questions in the assessment ▪ Test anxiety and pressure due to the difficulty level ▪ Waiting time during assessment	▪ Lack of materials ▪ Insufficient tools ▪ Physical discomfort during assessment (heat, waiting time)

Enablers / Strengths	▪ Peer support and teamwork ▪ Individual preparation and self-study	▪ Access to tools and equipment during practice (though limited, still beneficial) ▪ Exposure to safety standards
Suggested Improvements	▪ More review opportunities before assessment ▪ More confidence-building activities	▪ Provide adequate materials and functional tools ▪ Improve testing environment (ventilation, comfort) ▪ Organize a fairer system to reduce waiting time

Participants reported shortages of tools and materials, where simulations and coaching were only moderately available. Environmental issues such as heat and wait times hindered performance, exposing logistical gaps. However, positive influences included students valuing safety lessons and access to basic tools, aligning with TESDA's focus on safety and accuracy (TESDA, 2022).

Tablon NHS faces dual challenges of academic and socio-economic vulnerability, with many students from households participating in the Pantawid Pamilyang Pilipino Program (4Ps). Economic pressures often clash with educational needs, compounded by limited tools and review opportunities, leading to test anxiety and low confidence.

Nonetheless, students show resilience through peer support and independent study, highlighting a strong culture of perseverance. Support measures, such as providing snacks during assessments, foster a sense of care and belonging, boosting motivation. Yet, a lack of systematic transportation support remains a gap, especially for students commuting from nearby areas.

Identified Attrition Points

The results presented in the preceding sections reveal that certification outcomes in the Electrical Installation and Maintenance (EIM) program are shaped not by a single deficiency but by a series of attrition points along the certification pathway, as shown in Figure 2.

The first attrition occurs between program enrollment and the TESDA assessment. While enrollment remained stable, many learners did not proceed to the assessment. This shows that enrollment alone does not ensure certification.

The second attrition point arises between TESDA assessment participation and certification success. Passing rates varied across cohorts, reflecting differences in readiness, access to tools, simulation opportunities, and coaching. Learners are motivated, but institutional limitations and uneven instruction hinder mastery.

A third attrition point affects cohorts, as seen in changing certification outcomes year to year. The better performance of earlier groups and the drop in later ones indicate that success depends on cohort-specific factors rather than stable systems. Without standardized prep, consistent resources, and support, improvements in one cohort do not last.

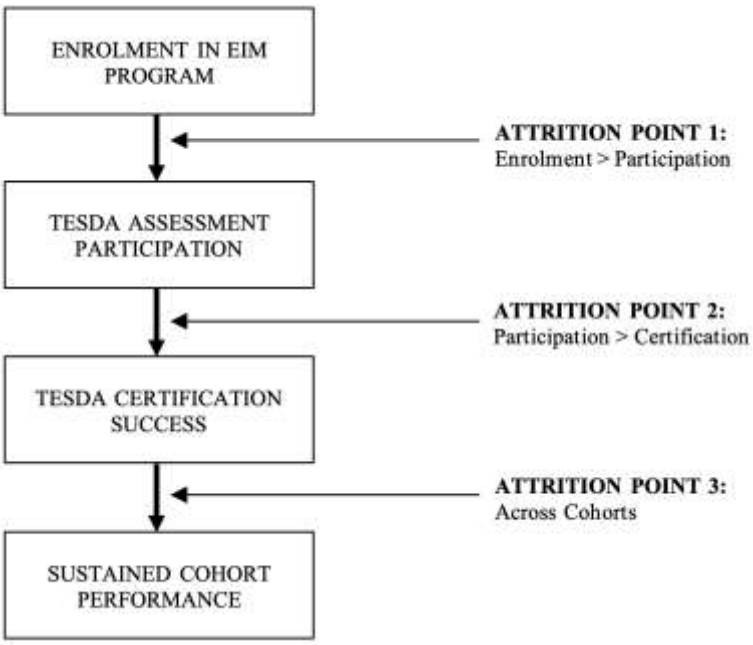
Competency-Based Improvement Framework for EIM

Figure 3 presents the Competency-Based Improvement Framework (CBIF) for Electrical Installation and Maintenance (EIM), which identifies two interrelated domains shaping learning outcomes: institutional factors and learner-related factors.

The framework shows that personal and structural factors in education are interconnected. For example, having institutional tools like labs helps learners practice, boosting their confidence. Likewise, motivated learners with prior prep make supports like coaching more effective. This interaction reflects interdependent systems where outcomes result from these combined factors. The CBIF integrates these into a single model, offering a

simplified, holistic view of the complex system influencing TESDA assessment results.

Figure 2
Attrition Points in the EIM Certification Pathway



Within the Institutional Factors, the provision of tools and equipment is central to competency attainment. Adequate and industry-standard tools enable learners to practice technical skills in conditions that approximate certification tasks, thereby improving mastery and transferability of competencies (Rosales, 2022). Complementing this, simulation and practice labs create structured environments for authentic and repetitive skill application. Evidence suggests that schools with functional practice labs

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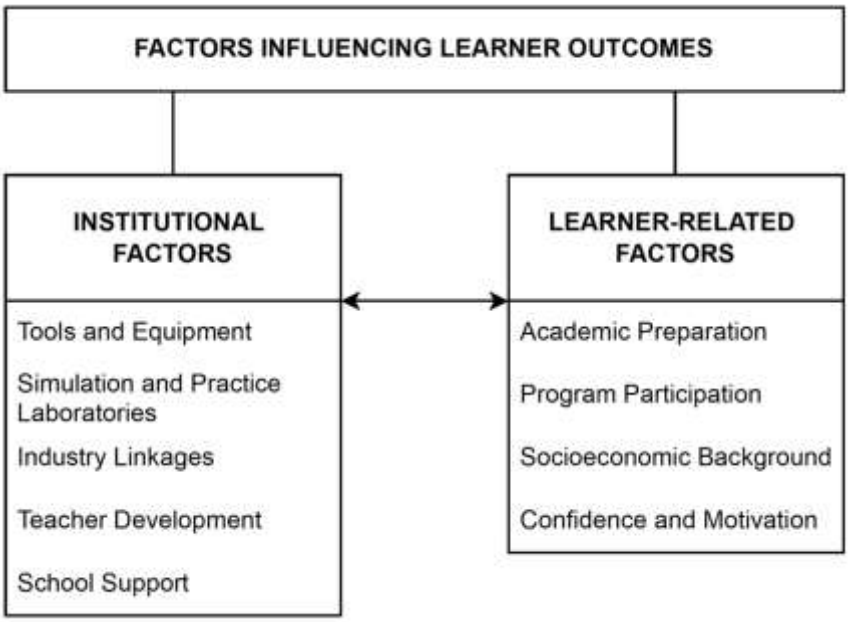
produce learners who are better prepared for national certification due to their familiarity with task-based training (Ferrer, 2022).

Figure 3

Competency-Based Improvement Framework (CBIF) for EIM



Strengthened industry linkages further contextualize classroom instruction by embedding real-world applications of competencies, which aligns with TESDA's emphasis on workplace relevance (TESDA, 2022). Teacher development remains foundational, as instructors with up-to-date training in both pedagogy and technical competencies are better able to align instruction with the TESDA Training Regulations (Sanchez, 2019). Finally, school support—such as transportation, snacks, and extended coaching—addresses logistical barriers that often undermine learner participation and

focus. Support mechanisms ensure that instructional gains translate into improved certification readiness (Pascua & Molina, 2021).

Equally critical are the Learner-Related Factors. Academic preparation in foundational subjects, particularly mathematics and science, underpins learners' ability to engage with complex EIM tasks. Studies affirm that higher achievement in related subjects correlates positively with certification performance (Dizon & Elbinas, 2020). Program participation, such as engagement in the Joint Delivery Voucher Program (JDVP), expands access to enhanced facilities and practical immersion, offering supplementary exposure that reinforces school-based training (Malipot, 2022).

Learners' socio-economic background also influences performance, with disadvantaged learners facing challenges in sustaining participation due to financial constraints. Addressing these barriers through contextualized, low-cost, or community-based projects fosters equity and continuity in learning (Philippine Institute for Development Studies [PIDS], 2024). Lastly, confidence and motivation play a decisive role. Learners who receive structured feedback, peer mentoring, and opportunities for incremental success are more likely to overcome test anxiety and approach assessments with greater resilience (Hebron-Ariston, 2024).

D. Conclusion

This study highlights the identified critical attrition points affecting certification success in the Senior High School TVL track. Learner and institutional factors drive these points. Learners had adequate academic prep but faced socio-economic issues, test anxiety, and limited support.

Along with this, the study developed a Competency-Based Improvement Framework (CBIF) targeting each attrition point, focusing on learner support, curriculum alignment, simulations, coaching, and institutional planning. The CBIF offers a systematic approach to stabilize

certification outcomes, moving beyond isolated interventions to a competency-based system. It guides schools in aligning instruction, resources, and engagement with TESDA standards. It is poised that the framework can benefit other public schools offering SHS TVL programs, helping reduce skills certification gaps and ensuring graduates are workforce-ready.

DepEd and TESDA could collaborate more to streamline curriculum and assessment structures, establish learner-support programs, and create feedback systems that link assessment results to school planning, enhancing TVL programs based on student performance.

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Enhancing Students' Engagement in Technology and Livelihood Education (TLE) through Interactive Digital Play-Based Learning

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Abstract. *This study examined the effectiveness of integrating interactive online games into Technology and Livelihood (TLE) instruction for Grade 8 students under the MATATAG Curriculum. A practical action research design involving 30 learners was used, with data collected through pre- and post-tests, classroom observations, surveys, and interviews. Findings revealed that prior to the intervention, students held a neutral stance toward online games, passive participation, limited resources, and classroom engagement, and mixed emotions toward learning. After integrating online games, students reported increased motivation, stronger positive perceptions, greater participation, and greater collaboration with peers. Quantitative findings showed a significant improvement in students' engagement between pre- and posttests, confirming that interactive online games substantially enhanced both motivation and participation. Qualitative results further supported these findings, highlighting increased interest, excitement, and a stronger desire to perform well in class. The study concludes that interactive online games are effective instructional tools for enhancing student engagement in TLE instruction. It is recommended that future research explore the long-term impacts of online games on academic performance, knowledge retention, and learners' behavior.*

Keywords: *interactive online games, students participation, students motivation*

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A. Introduction

The Department of Education's MATATAG Curriculum focuses on developing basic skills, critical thinking, and 21st-century abilities that prepare students for their future studies and careers. In this context, Technology and Livelihood Education (TLE) is essential for providing students with practical knowledge and skills they can use in everyday situations. However, traditional TLE teaching methods often rely on lectures, note-taking, and textbook-based activities. These approaches may not fully engage today's learners, who are used to technology and prefer more interactive methods. According to Duterte (2024), these interactive technologies emphasize that they transform learning by providing immediate feedback, fostering competition, and allowing personalized pacing, which better captures the interest of digital-native learners than traditional methods.

Based on the survey results on student engagement, learners recorded relatively low mean scores in two critical areas: the affective domain, particularly their liking for learning (M = 2.34), which was rated low, and the behavioral domain, specifically effort and persistence (M = 3.42), which was rated moderate. These findings indicate that many students struggle to maintain genuine interest and enthusiasm in classroom learning activities. As noted by Deng and Yang (2025), inadequate instructional strategies and insufficiently stimulating classroom content can contribute to declining engagement. The low affective score suggests that students are not fully motivated or emotionally invested in the learning process, which may negatively influence their willingness to participate actively in discussions or extend learning beyond classroom requirements. Similarly, the lower score in behavioral effort and persistence reflects a tendency among students to lose focus easily, give up when faced with challenges, or fail to consistently prioritize academic tasks over distractions.

As technology becomes increasingly integral to education, interactive online games have emerged as effective tools for enhancing student engagement and improving learning outcomes. These games can simulate real-life scenarios, provide immediate feedback, and encourage

collaboration, making the learning process more dynamic and enjoyable. In subjects such as TLE, where hands-on experience is essential, game-based learning can increase motivation and help students build confidence in applying their skills to real-world situations. This study aims to evaluate the effectiveness of interactive online games as a teaching strategy for Grade 8 students under the MATATAG Curriculum, focusing on their impact on engagement, academic performance, and perceptions of learning.

B. Methodology

The participants in this study were Grade 8 students enrolled in TLE under the MATATAG Curriculum at a selected public secondary school. One intact class, consisting of 30 students, was included to ensure that all learners consistently experienced the innovation. The research process involved several essential steps. For data collection, the researchers first secured a letter of permission to conduct the study, duly signed by the Division Superintendent and supported by an approved research proposal. This was followed by a formal letter addressed to the School Principal, outlining the purpose and scope of the study and requesting approval to proceed with data gathering. The questionnaires were then administered to participants to assess the pre- and post-initiative phases. After retrieving the completed questionnaires, the researchers conducted a thorough analysis of the data. Ethical considerations were carefully observed throughout the study. Prior to data collection, informed consent was obtained from the participants' parents or guardians, and the learners themselves provided assent to participate.

This study consisted of two questionnaires for the quantitative data, which were administered to another set of 30 participants for reliability testing. The results revealed that the motivation questionnaire obtained a Cronbach's alpha of 0.883, indicating a good level of internal consistency. Similarly, the participation questionnaire achieved a Cronbach's alpha of

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0.864, indicating good internal consistency. These findings indicated that the instruments were highly reliable and suitable for use in this study.

For the qualitative component, the open-ended questionnaire underwent face validation by master teachers, mentors from the city college, and the school head. This process ensured that the questions were properly aligned with the study's objectives and were suitable for eliciting meaningful responses from the participants.

The data were analyzed using descriptive statistics (mean and standard deviation), the Wilcoxon signed-rank test, and thematic analysis. The descriptive analysis, using mean and standard deviation, measured the level of participation among respondents and described the results of the Likert-scale survey questionnaires. The normality test for the pre-initiative motivation phase produced a p-value of 0.5299, which is greater than the 0.05 significance level, indicating that the data were normally distributed. In contrast, the pre-initiative participation phase yielded a p-value of 0.02413, which is less than 0.05, suggesting that the data were not normally distributed. Similarly, the post-initiative motivation phase generated a p-value of 0.0002534, which is below 0.05, indicating a non-normal distribution. However, the post-initiative participation phase produced a p-value of 0.00002098, which is also less than 0.05, confirming that the data for this phase were not normally distributed. Therefore, the study used the nonparametric Wilcoxon signed-rank test to determine whether the pretest and posttest assessments differed significantly. In addition, thematic analysis was employed to examine and interpret learners' responses during the second-cycle focus group discussions (FGD).

C. Results and Discussion

To strengthen students' perceptions of their engagement, interactive online games were employed, and the discussion of the findings and

reflections on the data from that intervention are presented here. The outcome was presented following the problem's formulation.

Table 1

Students' engagement in TLE class during the pre – initiative phase in terms of their motivation

Statements	Mean	SD	Interpretation
1. I feel excited to attend my TLE class.	3.77	1.17	High
2. I pay attention to lessons because they are interesting to me.	3.57	1.25	High
3. I am eager to learn new concepts in TLE.	3.43	1.10	High
4. I put effort into completing my TLE tasks even if they are challenging.	3.43	1.28	High
5. I find the topics in TLE relevant to my future goals.	2.80	1.10	Moderate
6. I feel motivated to study TLE even outside of classroom hours.	2.77	1.14	Moderate
7. I am willing to exert extra effort to improve my performance in TLE.	3.27	1.17	Moderate
8. I enjoy learning activities in TLE lessons.	3.57	1.01	High
9. I set personal goals to do well in my TLE class.	3.23	0.82	Moderate
10. I look forward to applying what I learn in TLE to real-life situations.	2.90	0.99	Moderate
Overall	3.27	1.10	Moderate

Note. 4.21–5.00 = Strongly Agree (Very High); 3.41–4.20 = Agree (High); 2.61–3.40 = Slightly Agree (Moderate); 1.81–2.60 = Disagree (Low); 1.00–1.80 = Strongly Disagree (Very Low).

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Table 1 presents students' motivation levels in TLE classes during the pre–initiative phase. The results reveal a mean of 3.27 and a standard deviation of 1.10, which is interpreted as "Moderate." This indicates that students' overall engagement level before the intervention was moderately engaged, suggesting that learners only slightly agreed with statements related to their motivation in TLE. This further implies that, prior to the integration of online games, students demonstrated average participation and interest, but not a consistently high level of engagement in the class.

The moderate level of engagement suggests that students were somewhat involved but not fully immersed in their learning experiences. They may have shown occasional interest and effort, yet lacked sustained motivation across different learning tasks. Li et al. (2024) observed that students often exhibit uncertainty or a neutral stance regarding factors influencing their motivation, which aligns with the moderate engagement reflected in the findings. Furthermore, the relatively high standard deviation of 1.10 indicates variability in responses, suggesting that while some students were actively engaged, others were less engaged. Jääskä et al. (2022) similarly noted that students' engagement varies depending on their learning preferences and perceived relevance of activities.

Among the indicators, Statements 1, 2, 3, 4, and 8 obtained mean scores ranging from 3.43 to 3.77, all of which were verbally interpreted as "High." This reflects that students were highly engaged in aspects related to interest and enjoyment, such as feeling excited to attend class, paying attention to lessons, and enjoying learning activities. In particular, Statement 1, "I feel excited to attend my TLE class," had the highest mean of 3.77, indicating that students generally showed high levels of enthusiasm and interest. This suggests that learners were inclined to attend TLE classes even before the intervention. Duterte (2024) supports this finding, stating that students tend to exhibit positive attitudes when learning environments are stimulating and interactive.

On the other hand, Statements 5, 6, 7, 9, and 10 obtained mean scores ranging from 2.77 to 3.27, interpreted as "Moderate." This indicates that students demonstrated only moderate engagement in areas related to deeper

motivation, such as applying learning to real-life situations, studying beyond class hours, and setting personal academic goals. Notably, Statement 6, "I feel motivated to study TLE even outside of classroom hours," had one of the lowest mean scores (2.77), reflecting that students were less engaged in independent learning behaviors. This suggests that while students may participate in class, their engagement does not extend much beyond the classroom.

Overall, the findings imply that although students exhibited high engagement in immediate classroom experiences, their overall engagement remained moderate, particularly in terms of sustained motivation, persistence, and self-directed learning. This indicates a gap between students' interest and their deeper commitment to learning tasks. As noted by Cuizon and Feudo (2022), students often struggle to maintain effort and persistence when tasks become more demanding, especially without strong motivational support.

Hence, the moderate level of engagement observed in the pre–initiative phase highlights the need for instructional strategies that can enhance not only students' interest but also their sustained motivation and active involvement. This supports the implementation of innovative approaches, such as integrating online games, to further improve students' engagement in TLE classes.

Table 2 presents students' engagement levels in TLE classes during the pre–initiative phase, measured by participation. The results reveal a mean of 3.23 and a standard deviation of 1.02, which is interpreted as "Moderate." This indicates that students were moderately engaged in terms of participation prior to the intervention. It suggests that learners only slightly agreed with statements about their active involvement in classroom activities, indicating an average level of participation but not a consistently high degree of engagement.

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Table 2

Students' engagement in TLE class during the pre – initiative phase in terms of their participation

Statements	Mean	SD	Interpretation
1. I actively join in classroom discussions during TLE lessons.	3.67	0.90	High
2. I volunteer to answer questions in TLE class.	2.80	0.89	Moderate
3. I cooperate with my classmates during group activities in TLE.	3.73	1.01	High
4. I contribute ideas and suggestions when given the opportunity in TLE.	3.13	0.97	Moderate
5. I ask questions when I do not understand TLE lessons.	2.90	1.12	Moderate
6. I participate in hands-on activities and demonstrations in TLE.	3.10	1.03	Moderate
7. I consistently submit TLE requirements on time.	2.79	1.05	Moderate
8. I engage in peer learning by helping classmates understand TLE topics.	3.10	1.03	Moderate
9. I actively participate in performance tasks and practical activities in TLE.	3.60	1.07	High
10. I show interest in class reflections or sharing sessions after TLE lessons.	3.47	1.11	High
Overall	3.23	1.02	Moderate

Note. 4.21–5.00 = Strongly Agree (Very High); 3.41–4.20 = Agree (High); 2.61–3.40 = Slightly Agree (Moderate); 1.81–2.60 = Disagree (Low); 1.00–1.80 = Strongly Disagree (Very Low).

The moderate level of engagement implies that while students were able to participate in certain activities, their involvement was not sustained across all aspects of classroom interaction. They may have engaged when required, but did not consistently demonstrate initiative or active contribution. Guiao et al. (2025) emphasized that a moderate level of engagement does not necessarily hinder learning, but it indicates room for improvement in fostering more active participation. Additionally, the standard deviation of 1.02 indicates variability in responses, suggesting that

while some students were actively involved, others hesitated or participated minimally. Domingo (2025) supports this by noting that differences in teaching approaches and learner preferences can influence students' levels of engagement.

Looking at the individual indicators, Statements 1, 3, 9, and 10 obtained mean scores ranging from 3.47 to 3.73, all of which were verbally interpreted as "High." This indicates that students were highly engaged in collaborative and interactive aspects of participation, such as joining discussions, cooperating with classmates, completing performance tasks, and engaging in reflection activities. In particular, Statement 3, "I cooperate with my classmates during group activities in TLE," recorded the highest mean of 3.73, indicating a high level of engagement in teamwork and collaboration. This suggests that students were more comfortable participating in group settings where shared responsibility and peer support were present. Cagatan et al. (2024) highlighted that collaborative learning enhances student engagement and promotes better academic outcomes.

On the other hand, Statements 2, 4, 5, 6, 7, and 8 obtained mean scores ranging from 2.79 to 3.13, interpreted as "Moderate." This indicates that students demonstrated only moderate engagement in areas requiring individual initiative, such as volunteering to answer questions, asking for clarification, contributing ideas, and consistently submitting requirements on time. Notably, Statement 7, "I consistently submit TLE requirements on time," obtained the lowest mean of 2.79, suggesting that students showed less engagement in responsibility and task management. Similarly, Statement 2, "I volunteer to answer questions in TLE class," also reflected moderate engagement, suggesting that students were somewhat hesitant to actively participate in discussions.

These findings imply that, while students were actively engaged in group-based, structured activities, their individual participation remained moderate, particularly in tasks that required confidence, initiative, and

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accountability. Cruz (2024) explained that students' willingness to participate is often influenced by factors such as self-confidence, fear of making mistakes, and perceived difficulty of the subject. Although collaborative activities encouraged participation, they did not fully translate into increased individual assertiveness.

Overall, the results indicate that students' participation during the pre–initiative phase was moderate, with stronger involvement in cooperative activities than in independent or self-initiated activities. This highlights the need for instructional strategies that not only promote collaboration but also enhance students' confidence, responsibility, and willingness to actively participate on an individual level. The findings support integrating more engaging and interactive approaches, such as online games, to further improve students' participation in TLE classes.

Table 3.

Students' perception of their active participation during the pre – initiative

Sample Responses	Code	Theme
- *"I'm usually a quiet and introverted type of person. I don't really participate unless if my name is called."* - *"I only participate if the teacher calls me."* - *"I participate in my TLE class by raising my hand whenever there's an oral recitation and contributing when there's a group project."* - *"I participate in my T.L.E class by listening if what our teacher discusses and always doing the tasks that is given to me."*	Ways of Participation	Passive and Demotivated

- "In grade 8, T.L.E is hard for me especially that I am a slow learner…" *- "The challenge I face in our class is lack of materials…"* *- "Loss of interest in the subject."*	Challenges Affecting Participation in TLE	Lack of materials and loss of interest
- "I feel nervous when the teacher papasok sa klase dahil hindi ako maka learn." *- "I get distracted easily because I always play on my cellphone…"* *- "I feel good about T.L.E because I learned so much."*	Students' Feelings Toward TLE Participation	Mixed Emotions

Table 3 presents insights into students' perceptions in TLE classes, the challenges they face towards classroom engagement. Three dominant themes emerged: Passive and Demotivated Participation, Lack of Materials, and Mixed Emotions Toward Learning.

Passive and Demotivated Participation. Several students said they participate in class only when required, such as when the teacher calls on them or when group work demands it. Base to the S4 (Student 4) response *"I'm usually a quiet and an introverted type of person. I don't really participate unless if my name is called."* and S1 (Student 1) *"I only participate if the teacher calls me."*. This indicates that their participation is more a response to external prompts rather than self-initiated engagement. Pamor et al. (2024) observed that some students tend to be quiet and introverted, participating primarily in response to external cues rather than through self-initiated involvement.

Lack of Materials and Loss of Interest. Lack of resources such as instructional materials and learning tools were identified as a prime barrier. As to the response of S4 (Student 4) *"The challenge I face in our class is lack of materials…"*. Students also said a decline in interest in the subject, which may

further discourage active participation. S1 (Student 1) *"Loss of interest in the subject."*. These responses indicate low student engagement. Manlangit (2025) emphasized the importance of adequate resources and teacher support in addressing these challenges and enhancing student motivation in TLE.

Mixed Emotions Towards Learning. Students revealed varying emotional experiences in TLE classes. As the response of S5 (Student 5) *"I feel nervous when the teacher papasok sa klase dahil hindi ako maka learn."* Some admitted to feeling nervous and distracted. Others, however, expressed positive emotions. Stating that they felt good about learning in TLE and acknowledged the value of the knowledge they gained. Base to the response of S7 (Student 7) *"I feel good about T.L.E because I learned so much."* According to Manatad et. al (2020) that students' emotional experiences impacted their motivation, participation, and overall engagement in TLE classes.

Table 4
Students' engagement in TLE class during the post – initiative phase in terms of their motivation

Statements	Mean	SD	Remarks
1. I feel excited to attend my TLE class.	4.13	0.73	High
2. I pay attention to lessons because they are interesting to me.	3.97	0.89	High
3. I am eager to learn new concepts in TLE.	3.73	0.83	High
4. I put effort into completing my TLE tasks even if they are challenging.	4.20	0.71	High
5. I find the topics in TLE relevant to my future goals.	3.60	0.89	High
6. I feel motivated to study TLE even outside of classroom hours.	3.40	0.77	Moderate
7. I am willing to exert extra effort to improve my performance in TLE.	4.17	0.87	High
8. I enjoy learning activities in TLE lessons.	4.23	0.94	Very High
9. I set personal goals to do well in my TLE class.	3.73	0.91	High

10. I look forward to applying what I learn in TLE to real-life situations.	3.57	0.82	High
Overall	3.87	0.84	High

Note. 4.21–5.00 = Strongly Agree (Very High); 3.41–4.20 = Agree (High); 2.61–3.40 = Slightly Agree (Moderate); 1.81–2.60 = Disagree (Low); 1.00–1.80 = Strongly Disagree (Very Low).

Table 4 presents students' engagement levels in TLE classes during the post–initiative phase, focusing on motivation. The results reveal a mean of 3.87 and a standard deviation of 0.84, which is interpreted as "High." This indicates that students were highly engaged in terms of motivation after the intervention. It suggests that learners generally agreed with the statements, reflecting a strong level of interest, enthusiasm, and active involvement in their TLE learning experiences following the integration of online games.The high level of engagement implies that the intervention was effective in enhancing students' motivation, as learners became more attentive, interested, and willing to participate in learning activities. Compared to the pre–initiative phase, the increase in engagement level demonstrates that students developed a more positive attitude toward TLE. Cosmiano et al. (2024) emphasized that gamification strategies significantly improve learners' motivation by making lessons more interactive and meaningful. Furthermore, the relatively lower standard deviation of 0.84 indicates that students' responses were more consistent, suggesting a shared positive perception of the learning experience. Pagente et al. (2024) noted that a lower variation in responses reflects alignment in students' engagement, indicating that most learners benefited from the intervention.

Examining the individual indicators, most statements (1, 2, 3, 4, 5, 7, 9, and 10) obtained mean scores ranging from 3.57 to 4.20, all verbally interpreted as "High." This reflects that students were highly engaged across various dimensions of motivation, including interest in attending class, paying attention, exerting effort, and applying learning to real-life situations. Notably, Statement 4, "I put effort into completing my TLE tasks even if they are challenging," obtained a mean of 4.20, indicating that students demonstrated a high level of persistence and commitment in accomplishing tasks. This suggests that the intervention not only increased interest but also strengthened students' willingness to overcome challenges.

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Moreover, Statement 8, "I enjoy learning activities in TLE lessons," recorded the highest mean of 4.23, interpreted as "Very High." This indicates that students were very highly engaged in terms of enjoyment, highlighting that the integration of online games made learning more interactive, fun, and meaningful. Escueta (2024) supported this finding, emphasizing that game-based learning enhances students' enjoyment and encourages active participation. This very high level of engagement suggests that enjoyment played a key role in sustaining students' motivation throughout the lessons.

On the other hand, Statement 6, "I feel motivated to study TLE even outside of classroom hours," obtained the lowest mean of 3.40, interpreted as "Moderate." This indicates that students were only moderately engaged in terms of extending their learning beyond the classroom. Although the intervention successfully increased in-class motivation, it had a lesser impact on students' willingness to engage in independent learning. This suggests that while students were highly motivated during structured classroom activities, additional strategies may still be needed to encourage self-directed learning outside school hours.

Overall, the findings reveal that students' motivation during the post–initiative phase was highly engaged, with a notable improvement compared to the pre–initiative phase. Students demonstrated stronger interest, enjoyment, effort, and commitment to learning TLE. However, the moderate engagement in out-of-class learning indicates an area for further enhancement. These results highlight the effectiveness of integrating online games as an instructional strategy to improve students' motivation, while also suggesting the need to strengthen strategies that promote continuous learning beyond the classroom.

Table 5

Students' engagement in TLE class during the post – initiative phase in terms of their participation

Statements	Mean	SD	Intepretation
1. I actively join in classroom discussions during TLE lessons.	4.12	0.97	High
2. I volunteer to answer questions in TLE class.	3.55	0.83	High
3. I cooperate with my classmates during group activities in TLE.	3.93	0.87	High

4. I contribute ideas and suggestions when given the opportunity in TLE.	3.67	0.71	High
5. I ask questions when I do not understand TLE lessons.	3.73	0.98	High
6. I participate in hands-on activities and demonstrations in TLE.	3.80	0.85	High
7. I consistently submit TLE requirements on time.	3.57	0.97	High
8. I engage in peer learning by helping classmates understand TLE topics.	3.63	0.85	High
9. I actively participate in performance tasks and practical activities in TLE.	4.27	0.87	Very High
10. I show interest in class reflections or sharing sessions after TLE lessons.	3.77	0.90	High
Overall	3.81	0.88	High

Note. *4.21–5.00 = Strongly Agree (Very High); 3.41–4.20 = Agree (High); 2.61–3.40 = Slightly Agree (Moderate); 1.81–2.60 = Disagree (Low); 1.00–1.80 = Strongly Disagree (Very Low).*

Table 5 presents the students' engagement level in TLE classes during the post–initiative phase in terms of participation. The results reveal a general mean of 3.81 with a standard deviation of 0.88, which is verbally interpreted as "High." This indicates that students were highly engaged in terms of participation after the intervention. It suggests that learners generally agreed with the statements, reflecting a strong level of active involvement, collaboration, and interaction in TLE classroom activities following the integration of online games.

The high level of engagement implies that the intervention effectively enhanced students' participation, as learners became more confident, responsive, and involved in various classroom tasks. Compared to the pre–initiative phase, the increase in participation demonstrates that students developed greater willingness to engage in discussions, group work, and

performance-based activities. Borbon (2023) emphasized that the use of technology-based tools promotes active participation by making learning experiences more dynamic and student-centered. Furthermore, the relatively low standard deviation of 0.88 indicates consistency in responses, suggesting that most students shared a common positive perception of their participation. Regudon et al. (2022) supported this, noting that gamification fosters a collaborative classroom environment and encourages uniform engagement among learners.

Examining the individual indicators, most statements (1, 2, 3, 4, 5, 6, 7, 8, and 10) obtained mean scores ranging from 3.55 to 4.12, all verbally interpreted as "High." This reflects that students were highly engaged in various forms of participation, including joining discussions, contributing ideas, asking questions, participating in hands-on activities, and collaborating with peers. Statement 1, "I actively join in classroom discussions during TLE lessons," with a mean of 4.12, indicates that students demonstrated a high level of engagement in verbal participation and interaction during class.

Remarkably, Statement 9, "I actively participate in performance tasks and practical activities in TLE," recorded the highest mean of 4.27, interpreted as "Very High." This indicates that students were very highly engaged in experiential and performance-based learning activities. It suggests that the integration of online games significantly enhanced students' willingness to participate in hands-on tasks, making learning more interactive and meaningful. This aligns with the nature of TLE as a practical subject, where active participation in tasks is essential for skill development.

However, Statement 2, "I volunteer to answer questions in TLE class," obtained the lowest mean of 3.55, although still interpreted as "High." This indicates that students were highly engaged but comparatively less assertive when it comes to volunteering responses during discussions. While participation improved overall, some students may still experience hesitation due to factors such as lack of confidence or fear of making mistakes. This

suggests that although the intervention enhanced general participation, encouraging individual assertiveness remains an area for further improvement.

Generally, the findings reveal that students' participation during the post–initiative phase was highly engaged, with strong involvement in both collaborative and individual classroom activities. The presence of a very high level of engagement in performance tasks further highlights the effectiveness of interactive and game-based strategies in promoting active learning. These results indicate that integrating online games not only increased students' participation but also fostered a more dynamic, collaborative, and engaging learning environment in TLE classes.

Table 6
Significant difference in the level of students' engagement in terms of motivation during the pre and post phases of intervention

Motivation	Mean	SD	W – Computed	p– value	Intepretation
Pre – Intervention	3.27	0.65	38	0.00016	Significant
Post - Intervention	3.87	0.53			

Note: The critical value for W at N = 28 (p<0.05) is 116.

Table 6 shows that the post–intervention mean of 3.87 is much higher than the pre–intervention mean of 3.27 for motivation. This indicates that the integration of interactive online games effectively enhanced students' motivation toward learning. Wang et al. (2022) found that digital game-based interventions produce moderate positive effects on student learning outcomes and are associated with improved affective motivation across various settings. These findings suggest that the use of game-based strategies not only captured learners' interest but also encouraged them to actively

engage with the lessons. Meanwhile, the standard deviation for the pre-initiative phase (0.65) is slightly higher than that of the post-initiative phase (0.53). This pattern aligns with findings from other quasi-experimental and randomized studies on gamified or game-based learning, which report higher average motivation following gamified interventions (Elzeky et al., 2022). This suggests that students' perceptions of the intervention became more consistent after its implementation, reflecting a shared positive experience and a relatively uniform agreement that interactive online games had a motivating effect on their learning.

The p-value of 0.00016 is less than the significance level of 0.05, indicating a significant difference in students' engagement in terms of motivation between the pre- and post-intervention phases. This suggests that the findings provide strong evidence that the implementation of interactive online games had a meaningful effect on learners' motivational levels. Casia et al. (2024) reported similar improvements in motivation following gamified interventions, demonstrating the significant impact of interactive game-based strategies on students' motivation and engagement. These results suggest that integrating such digital tools into the teaching of TLE not only captured students' interest but also fostered greater enthusiasm and willingness to participate in class activities.

Table 7

Significant difference in the level of students' engagement in terms of participation during the pre and post-phases of intervention

Motivation	Mean	SD	W – Computed	P – Value	Description
Pre – Intervention	3.23	0.59	68.5	0.00128	Significant
Post - Intervention	3.80	0.62			

Note: The critical value for W at N = 29 (p<0.05) is 126.

Table 7 shows a significant difference in students' engagement in terms of participation between the pre- and post-phases of the intervention. The results show that the post-intervention phase obtained the highest mean of 3.80, compared to 3.23 in the pre-intervention phase. This demonstrates that the use of interactive online games positively influenced and increased students' participation in TLE classes. The findings suggest that integrating such activities encouraged learners to be more actively involved, cooperative, and responsive during classroom discussions and tasks. Nadeem et al. (2023) highlighted that interactive online games are an effective way to promote student involvement and collaboration during TLE discussions and tasks. Meanwhile, the standard deviation in the post-intervention phase was slightly higher at 0.62 than in the pre-intervention phase at 0.59, indicating that students' perceptions of their participation remained relatively consistent. This reflects that most learners shared a common positive view of the intervention, confirming its effectiveness in enhancing classroom engagement. Kalobo (2025) emphasized that consistency in student perceptions supports the interpretation that most learners share common positive views of the intervention's impact on classroom engagement.

Furthermore, the p-value of 0.00128 is less than the significance level of 0.05, indicating a significant difference in students' engagement in terms of participation between the pre- and post-intervention phases. This result provides strong evidence that integrating interactive online games into TLE classes substantially increased student participation. It suggests that the intervention effectively encouraged learners to take a more active role in classroom activities. Barba (2021) reported that gamified learning enhances student participation and engagement, showing significant improvements in both engagement and academic performance, demonstrating that interactive online games effectively promote active learner involvement.

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Table 8
Interactive online games influence students' intrinsic motivation to learn TLE concepts

Sample Responses	Code	Theme
- *"This game influence me to study because these games makes me happy and I interest to study hard."* - *"Interactive Online games can significantly boost my interest and excitement in learning TLE…"*	Effects of Interactive Online Games on TLE Learning	Boost Interest and Excitement
- *"I got motivate to study because we want to be the top 1 Group and it's so fun…"* - *"Online games encourage me to learn TLE even outside, because online games is fun and exciting."*	Encouragement from Online Games	Fun and engaging type of learning
- *"It is like we win study hard so we can beat all the players in the game and its like the game is important to us because it is teamwork…"* - *"I feel excited when it starts to competing on score and it encourage me more to study."*	Eagerness Through Online Games	Motivated to be on top

Table 8 highlights three major themes that emerged from the students' responses regarding the use of interactive online games in TLE classes: Boost Interest and Excitement, Fun and Engaging Type of Learning, and Motivated to Be on Top.

Boost Interest and Excitement. Students emphasized that online games made the learning process enjoyable and stimulating. As the evident

response of S2 (Student 2) *"This game influences me to study because these games make me happy and I am interested in studying hard."* This indicates that the element of fun and entertainment inherent in games plays a vital role in sparking learners' curiosity and sustaining their interest. According to Mahmud et al. (2023), interactive digital games increase students' engagement and motivation through immersive digital environments and instant feedback. This engagement mediates the positive relationship between digital gaming and motivation to learn, aligning with the claim that enjoyment and entertainment are vital to sustaining learners' interest.

Fun and Engaging Type of Learning. The interactive online games made students studying more enjoyable by providing a fun and interactive platform. S5 (Student 5) response says that *"Interactive Online games can significantly boost my interest and excitement in learning TLE…"* This shows how online games can transform traditional classroom learning into a more dynamic and engaging experience. According to Sun et al. (2023), online educational games increase motivation and engagement by providing a fun, interactive way of learning tailored to different learning styles.

Motivated to Be on Top. Students' eagerness to compete and excel it shows that the competitive aspect of interactive online games served as a strong motivational drive. Base to the response of S8 (Student 8) *"It is like we win by studying hard so we can beat all the players in the game, and it's like the game is important to us because it is teamwork…"* This competitiveness highlights the motivational power of recognition and achievement embedded in game–based learning. According to Biona et al. (2024), competition in interactive online games promotes greater engagement and a stronger desire to be on top.

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Table 9
Interactive online games affect students' active participation in TLE classroom discussion and group activities.

Sample Responses	Code	Theme
- *"Interactive online games can boost my confidence and engagement and encourage active participation in TLE class discussions…"* - *"It's fun that's why I love TLE so much because we can play and I will study to get more higher score and be top one in TLE subject."*	Active Participation Through Online Games	Boost Confidence, Motivation, and Engagement
- *"I'm helping my groupmates to study because I want to winners my group."* - *"Interactive online games makes me more engaged and willing to work with classmates in group tasks."*	Encouragement from Engagement in Group Tasks Through Interactive Games	Motivated to be on top and willingness to collaborate

Table 9 highlights how interactive online games influence students' active participation in TLE classroom discussions and collaborative group tasks. Two central themes emerged: Boost Confidence, Motivation, and Engagement and Motivated to Be on Top and Willingness to Collaborate.

Boost Confidence, Motivation, and Engagement. Students emphasized that online games enhanced their confidence to participate in class discussions. As the response of S6 (Student 6) *"Interactive online games can boost my confidence and engagement and encourage active participation in TLE class discussions…"*. This finding suggests that the fun and competitive nature of the games encouraged them to be more engaged and motivated in TLE lessons. According to Duterte (2024) that use of badges and immediate

feedback created a sense of accomplishment that further boosted students' motivation and confidence in learning.

Motivated to Be on Top and Willingness to Collaborate. Online games motivated students not only to aim for top performance but also to collaborate effectively with their groupmates. Base to the response of S1 (Student 1) *"I'm helping my groupmates to study because I want to winners my group."* Students highlighted the importance of teamwork, noting that helping their groupmates contributed to shared success. According to Li et al. (2024) that students become more willing to collaborate and compete positively simultaneously, which enhances their overall learning experience and motivation.

D. Conclusion

The study's findings suggest that students' initial uncertainty and low engagement in TLE classes were largely influenced by traditional instructional approaches that failed to fully capture their interest and motivation. The presence of passive participation, limited resources, and mixed emotional responses toward learning indicates that learners were not sufficiently stimulated to engage actively in classroom activities. However, the significant improvements observed after the implementation of interactive online games imply that game-based learning addresses these gaps by creating a more stimulating and participatory learning environment. The increase in both motivation and participation, supported by statistically significant differences between pre- and post-intervention phases, indicates that learners respond positively to interactive, technology-enhanced strategies. Moreover, the emergence of themes such as heightened interest, enjoyment, and a desire to excel reflects the development of intrinsic motivation, suggesting that students are not only participating more but are also becoming more invested in their learning. Overall, the findings imply that integrating interactive online games can effectively transform learners'

attitudes and behaviors, leading to improved engagement and a more meaningful learning experience in TLE.

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Knowledge, Attitudes, and Practices of Grade 6 Pupils on Sustainable Plant Care: Implications for Eco-Friendly School Gardening Programs

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Abstract. *Sustainable plant care is a vital component of environmental education that promotes ecological responsibility among learners. This study examined the knowledge, attitudes, and practices (KAP) of 148 Grade 6 pupils using a descriptive–correlational design. Data were gathered through a validated 30-item knowledge test and Likert-scale measures for attitudes and practices, and analyzed using descriptive statistics, Spearman's rho, and regression analysis. Results revealed a moderately high level of knowledge (M = 19.45, SD = 5.93), favorable attitudes (M = 4.12, SD = 0.585), and generally practiced sustainable behaviors (M = 3.94, SD = 0.567), although gaps were noted in technical areas. Significant positive relationships were found among knowledge, attitudes, and practices, with attitudes showing the strongest association with practices (ρ = .455, p < .001). Regression results confirmed that attitudes significantly predict practices (β = 0.217, p = .008), but with low explanatory power (R^2 = .046). The findings suggest that while knowledge supports awareness, attitudes play a more critical role in shaping sustainable behavior, highlighting the importance of experiential and community-based interventions to strengthen eco-friendly practices among learners.*

Keywords: *environmental education; pro-environmental behavior; sustainable plant care; school gardening;*

A. Introduction

Sustainable plant care is an essential practice that ensures plant health, preserves soil, and conserves water and biodiversity. It encompasses eco-friendly gardening methods such as composting, mulching, organic fertilization, recycling, and pollinator protection, all of which contribute to environmental sustainability. Recent studies highlight that sustainable plant care practices not only benefit ecosystems but also enhance food security and climate resilience (Diel & Labay, 2025). In schools, sustainable plant care is promoted through classroom integration and gardening activities that teach children to become responsible stewards of the environment. This becomes especially relevant in Grade 6, where pupils are expected to apply foundational knowledge and skills in agriculture under the Edukasyong Pantahanan at Pangkabuhayan (EPP) curriculum (DepEd, 2024).

Knowledge, as an independent variable, shapes how sustainable plant care is understood and applied. Pupils with greater knowledge are more likely to adopt effective gardening practices, such as proper watering schedules, soil conservation techniques, and pest management strategies. A study on school gardens in Europe demonstrated that when learners were knowledgeable about environmental principles, they practiced them more consistently in both school and home gardens (Papadopoulou et al., 2020). Similarly, in the Philippine context, insufficient knowledge about eco-friendly gardening has been identified as a barrier to the long-term sustainability of school-based gardening programs (Cuaba, 2024). Thus, assessing knowledge provides insight into whether Grade 6 pupils can apply classroom lessons to practical and sustainable plant care.

Attitudes, another independent variable, reflect pupils' values, perceptions, and feelings toward sustainable plant care. Positive attitudes foster appreciation of plants' roles in human life and strengthen learners' willingness to engage in environmentally sound practices. According to Mellona and Peria (2025), school gardens significantly improve attitudes

toward nature by fostering a sense of ownership and pride in maintaining green spaces. In the Philippines, pupils who demonstrate favorable attitudes toward gardening are also those who show greater responsibility in recycling waste, participating in tree planting, and conserving water resources (Diel & Labay, 2025). Measuring attitudes, therefore, is crucial in determining the motivational aspect of learners' engagement in sustainable plant care.

Practices serve as the observable application of both knowledge and attitudes toward sustainable plant care. These include daily or routine behaviors such as using organic fertilizers, segregating biodegradable waste, and avoiding harmful pesticides. A case study on the implementation of the *Gulayan sa Paaralan* Program revealed that schools where pupils actively practiced eco-friendly methods achieved higher vegetable yields and greater program sustainability (Cuaba, 2024). Similarly, international studies confirm that gardening practices among children improve when lessons are reinforced with actual hands-on activities in school gardens (Papadopoulou et al., 2020). Evaluating practices thus provides evidence of how classroom learning translates into real-life environmental behaviors.

Sustainable plant care in the school setting requires structured support through curricular integration. In the Philippine K–12 framework, the DepEd EPP curriculum for Grade 6 emphasizes agriculture as a foundational strand. Learners are introduced to competencies such as soil and water management, composting, propagation, and pest control using organic methods (DepEd, 2024). However, a review of program implementation noted that without consistent monitoring of pupils' actual KAP levels, teachers may not fully recognize the effectiveness of instruction or learners' readiness to sustain eco-friendly gardening projects (Cuaba, 2024). This gap highlights the importance of a systematic approach to measuring outcomes of agricultural education in schools.

Recent studies also show that school gardening programs strengthen the connection between environmental education and community well-being. Diel and Labay (2025) emphasized that pupils who participated in gardening projects not only learned technical skills but also brought their practices into their households, thereby influencing food consumption

patterns and home waste management. Likewise, international evidence supports the idea that school gardens foster lifelong sustainable habits and strengthen awareness of environmental issues among young learners (Papadopoulou et al., 2020). These findings reinforce the value of embedding sustainable plant care practices in the elementary curriculum.

This study, therefore, aimed to determine the levels of knowledge, attitudes, and practices of Grade 6 pupils regarding sustainable plant care. The findings served as valuable input for the planning and implementation of eco-friendly school gardening initiatives that are meaningful, sustainable, and aligned with curricular goals of both environmental stewardship and educational development.

B. Methodology

This study employed a descriptive–correlational research design to determine the levels of knowledge, attitudes, and practices (KAP) of 148 randomly selected Grade 6 pupils regarding sustainable plant care. The descriptive aspect focused on obtaining quantitative data on pupils' knowledge through a 30-item multiple-choice test, as well as their attitudes and practices using two 10-item Likert-type scales. The correlational aspect sought to determine possible relationships among the three constructs—knowledge, attitudes, and practices—to provide evidence of how understanding and values translate into actual behaviors. Prior to data collection, the instruments were subjected to content validation by three experts to ensure clarity, relevance, and alignment with the study objectives. To further establish the quality of the measures, reliability testing was conducted, yielding high coefficients for the knowledge test ($\alpha = 0.980$), attitudes scale ($\alpha = 0.879$), and practices scale ($\alpha = 0.960$), indicating excellent internal consistency.

The design was chosen because it allows for a systematic description of pupils' KAP while examining the relationships among variables in a

natural classroom setting without manipulation. This approach is appropriate for baseline assessments that aim to inform program development. In particular, the data generated served as input for enhancing eco-friendly school gardening initiatives in line with DepEd's Edukasyong Pantahanan at Pangkabuhayan (EPP) curriculum and the principles of Education for Sustainable Development (ESD).

C. Results and Discussion

Knowledge level of Grade 6 pupils on sustainable plant care

The assessment of Grade 6 learners' knowledge of sustainable plant care is vital for determining how well public-school pupils understand the principles and practices needed to protect the environment and promote responsible agriculture. Since these learners are at a formative stage, the extent of their knowledge reflects not only classroom instruction but also the influence of school-based initiatives like *Gulayan sa Paaralan*, environmental campaigns, and experiential learning. Evaluating the distribution of their scores across established intervals provides a more meaningful interpretation of their overall knowledge level and highlights areas of strength and concern that may require targeted educational interventions.

Table 1 presents the distribution of knowledge levels of Grade 6 pupils on sustainable plant care, with an overall mean score of 19.45 (SD = 5.93), interpreted as moderate knowledge. This indicates that learners possess a developing understanding of key concepts such as proper plant maintenance, soil care, watering practices, and environmental stewardship. A substantial proportion of pupils fall within the high (30.4%) and advanced (27.0%) knowledge levels, suggesting that many are already capable of not only recalling information but also applying basic principles of sustainable plant care. In the context of Bloom's Taxonomy, these learners demonstrate competencies that extend beyond remembering and understanding toward application, which is essential in fostering environmentally responsible behaviors (Anderson & Krathwohl, 2001; UNESCO, 2023).

Table 1
Distribution of Knowledge Levels in Sustainable Plant Care among Grade 6 Pupils (n = 148)

Score Interval	Frequency (f)	Percent (%)	Interpretation
0 – 5	1	0.7	Very Low Knowledge
6 – 10	15	10.1	Low Knowledge
11 – 15	20	13.5	Basic Knowledge
16 – 20	27	18.2	Moderate Knowledge
21 – 25	45	30.4	High Knowledge
26 – 30	40	27.0	Advanced Knowledge
Overall	**M = 19.45**	**SD = 5.93**	Moderate Knowledge

Despite these positive results, a notable percentage of pupils remain at the moderate (18.2%) and basic (13.5%) levels, while some fall into the **low (10.1%) and very low (0.7%) categories**. This indicates that a portion of learners is still limited to foundational knowledge and has not fully developed the ability to apply sustainable plant care practices in real-life contexts. In terms of sustainability education, this gap suggests that learners may understand concepts such as planting techniques and environmental protection but may struggle to consistently translate these into practice, such as proper waste segregation in gardening or efficient water use (OECD, 2021). Such disparities highlight the need for differentiated instruction and targeted interventions to support learners at varying levels of understanding.

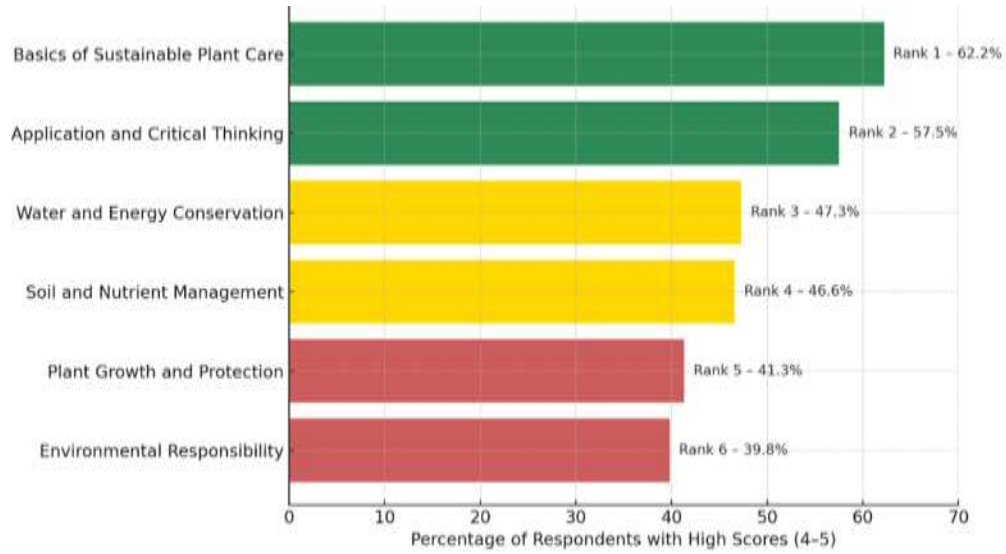
The observed distribution of knowledge levels may be influenced by learners' exposure to school-based programs such as Gulayan sa Paaralan, hands-on gardening activities, and environmental awareness campaigns. Research indicates that experiential learning approaches, particularly those involving direct interaction with plants and ecosystems, significantly enhance students' understanding of sustainability concepts and promote deeper engagement (Tilbury, 2020; UNESCO, 2023). Learners who actively participate in gardening activities are more likely to internalize sustainable practices, such as composting, organic planting, and resource conservation,

which explains the higher proportion of pupils in the high and advanced categories.

Hence, the findings imply that while sustainable plant care education is moderately effective, there is a need to strengthen instructional approaches to ensure more consistent and higher levels of learning among all pupils. Integrating **inquiry-based, experiential, and context-driven strategies** can help learners develop higher-order thinking skills, including the analysis and evaluation of sustainable practices. Emphasizing real-world application—such as maintaining school gardens, engaging in community greening initiatives, and practicing environmentally responsible behaviors can further enhance pupils' knowledge and foster long-term sustainability awareness. These efforts are crucial for developing environmentally literate individuals capable of contributing to sustainable development at both the school and community levels.

Figure 1

Ranked Knowledge levels in sustainable plant care (by component)



The ranking of knowledge levels across components, as shown in Figure 1, reveals that Grade 6 learners performed best in the Basics of Plant Care and

Application & Critical Thinking components. More than half of the pupils scored in the high range in these domains, suggesting that they have developed foundational competencies, such as proper watering, sunlight exposure, and plant care, as well as the ability to apply this knowledge in reasoning and problem-solving. These findings highlight the effectiveness of school-based initiatives like Gulayan sa Paaralan and contextualized science lessons, which align with UNESCO's (2021) call for experiential and inquiry-based learning to build ecological literacy at the basic education level. The results also affirm Sharma et al.'s (2022) conclusion that hands-on, localized instruction strengthens both knowledge acquisition and higher-order thinking skills in sustainability education.

In contrast, mid-level performance was observed in Water & Energy Conservation and Soil & Nutrient Management, while weaker outcomes were recorded in Plant Growth & Protection and Environmental Responsibility. These results suggest that while learners are aware of basic conservation practices and soil-related concepts, their understanding of more technical processes such as nutrient cycling, composting, and integrated pest management remains limited. Aune et al. (2021) emphasize that such technical domains often require repeated guided practice and structured demonstrations for younger learners to internalize scientific principles. Similarly, Ahmed et al. (2023) note that awareness of conservation does not automatically translate into consistent practice, which explains the gap between knowledge and behavior in these areas. The low ranking of Environmental Responsibility indicates that while pupils recognize the importance of stewardship, they have yet to fully translate awareness into daily sustainable habits, echoing global concerns about the "knowledge–action gap" in environmental education.

The overall pattern suggests that while Grade 6 learners have moderate knowledge of sustainable plant care, variability across components calls for targeted interventions. Strengthening instruction in soil fertility, plant

protection, and environmental responsibility through project-based activities, school garden experiments, and community linkages could bridge the observed gaps. Integrating reflective tasks and performance-based assessments, such as journals and practical demonstrations, may also help move learners from partial awareness toward consistent, responsible practice. These strategies align with international recommendations that sustainability education should not only transfer knowledge but also cultivate long-term values and habits (UNESCO, 2021; Sharma et al., 2022). Ultimately, the ranked distribution underscores the need for schools to sustain strengths while addressing weaker domains to develop holistic environmental literacy among public school learners.

Attitudes of Grade 6 pupils toward sustainable plant care in terms of environmental awareness, willingness to participate in gardening, and values of responsibility and stewardship

Table 2 presents the attitude of Grade 6 learners toward sustainable plant care, showing generally favorable to highly favorable responses across all items. The highest mean scores were recorded for recognizing the importance of caring for plants to protect the environment (A1, M = 4.53, SD = 0.684) and for expressing joy in seeing plants cared for in the community (A6, M = 4.45, SD = 1.012), both of which were interpreted as highly favorable. Other items, such as willingness to participate in gardening projects (A8, M = 4.07) and valuing native plant species (A7, M = 4.24), reflect a favorable orientation toward sustainable practices. Even the relatively lower means, such as preferring natural pest control (A5, M = 3.81) and protecting pollinators (A9, M = 3.76), still fall under the favorable range, indicating positive but less consistent attitudes in these technical areas. Overall, the composite mean of 4.12 (SD = 0.585) suggests that Grade 6 learners hold a favorable attitude toward sustainable plant care, aligning with current literature that highlights the role of environmental education in shaping pro-sustainability values and behaviors at the elementary level.

Table 2
Attitude toward Sustainable Plant Care among Grade 6 Learners (n= 148)

Item	Statement	Mean	SD	Interpretation
A1	I believe caring for plants in sustainable ways is important for protecting the environment.	4.53	0.684	Highly Favorable
A2	I enjoy helping in gardens using compost or organic fertilizers.	4.09	1.049	Favorable
A3	I think saving water when watering plants is a good habit.	4.08	1.066	Favorable
A4	I feel responsible for reducing waste when gardening.	3.93	0.983	Favorable
A5	I prefer using natural pest control instead of chemicals.	3.81	1.220	Favorable
A6	I feel happy when I see plants and trees being cared for in the community.	4.45	1.012	Highly Favorable
A7	I believe planting native plants and trees helps the environment.	4.24	0.980	Highly Favorable
A8	I am willing to join school or home projects like composting.	4.07	0.912	Favorable
A9	I believe protecting bees and other pollinators is important.	3.76	1.103	Favorable
A10	I believe practicing sustainable plant care benefits families and communities in the future.	4.22	0.989	Highly Favorable
	Overall	**4.12**	**0.585**	**Favorable**

Note: *4.21-5.00 Strongly Agree (Highly favorable), 3.41–4.20 Agree (Favorable), 3 = Slightly Agree (Moderate), 1.81–2.60 Disagree (Unfavorable); 1.00–1.80 Strongly Disagree (Highly Unfavorable).*

Environmental Awareness

The results show that Grade 6 pupils demonstrated a generally favorable attitude toward environmental awareness, with high mean scores across items related to caring for plants (A1, M = 4.53), planting native trees (A7, M = 4.24), and recognizing the benefits of sustainable practices for families and communities (A10, M = 4.22). These findings suggest that learners are aware of the ecological importance of sustainable plant care and recognize its broader societal impact. UNESCO (2021) emphasizes that early environmental education fosters ecological literacy and helps cultivate sustainable mindsets among schoolchildren. Similarly, Sharma et al. (2022) highlight that localized and practical science lessons are effective in developing awareness of sustainability issues at the primary level. The data indicate that pupils are not only aware of environmental challenges but also view plant care as a concrete way of contributing to solutions, reflecting the success of integrated environmental lessons in public schools.

Willingness to Participate in Gardening

Learners also expressed a strong willingness to engage in gardening practices, particularly composting and organic fertilizers. Items A2 (M = 4.09) and A8 (M = 4.07) both fall within the favorable range, indicating that pupils are open to participating in school- and home-based sustainability projects. This aligns with Ahmed et al. (2023), who argue that willingness to participate in environmental activities is a key predictor of behavior adoption, especially when learners are exposed to practical, hands-on opportunities. The findings suggest that pupils are motivated to extend their classroom knowledge to real-life contexts, reinforcing the value of initiatives such as *Gulayan sa Paaralan* as venues for experiential learning. However, sustaining this willingness requires continuous support, teacher encouragement, and recognition of students' efforts to ensure long-term engagement.

Values of Responsibility and Stewardship

In terms of values, Grade 6 pupils also reflected a favorable orientation toward responsibility and stewardship. Pupils agreed that they feel responsible for reducing waste when gardening (A4, M = 3.93) and take joy in seeing plants cared for in their communities (A6, M = 4.45, highly favorable). These results highlight that learners are beginning to internalize a sense of stewardship and responsibility for the environment. According to Aune et al. (2021), instilling responsibility in young learners requires a combination of knowledge, practical experience, and role modeling from teachers and community leaders. The high score in A6 suggests that pupils are emotionally engaged with sustainability efforts, a critical factor in developing lifelong stewardship values. This echoes UNESCO's (2021) observation that environmental education must not only transmit knowledge but also foster affective and ethical dimensions of learning. The implication is that reinforcing responsibility and stewardship through classroom routines, school-wide campaigns, and community projects can help anchor these values more deeply in learners' daily lives.

Practices of Grade 6 pupils on sustainable plant care in terms of daily gardening habits, recycling and waste management, and participation in school or community gardening projects

The practices of Grade 6 pupils in sustainable plant care were examined across three dimensions: daily gardening habits, recycling and waste management, and participation in school- or community-based gardening projects. These dimensions provide insights into how often learners apply sustainable practices in their daily routines, how well they manage waste through recycling and segregation, and how actively they engage in collaborative activities that promote environmental stewardship. By analyzing these areas, the study highlights not only the learners'

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knowledge but also the extent to which they translate awareness into actual behavior.

Table 3

Practices on Sustainable Plant Care among Grade 6 Learners (n = 148)

Item	Statement	Mean	SD	Interpretation
P1	I save water when watering plants	4.14	1.063	Practiced
P2	I use compost or organic fertilizer for plants.	3.97	0.954	Practiced
P3	I recycle old bottles, cans, or plastics to make plant containers.	4.19	0.992	Practiced
P4	I plant vegetables or trees at home or in school.	3.68	1.173	Practiced
P5	I put mulch (leaves or grass clippings) on the soil to keep it moist.	3.40	1.282	Sometimes Practiced
P6	I use natural ways to control pests (garlic, neem, companion planting).	3.78	1.250	Practiced
P7	I join school or community projects like tree planting.	3.76	1.297	Practiced
P8	I separate biodegradable and non-biodegradable waste for gardening.	4.13	1.090	Practiced
P9	I avoid harming bees and other helpful insects.	3.81	1.421	Practiced
P10	I keep the garden neat and clean.	4.55	1.035	Highly Practiced
	Overall	**3.94**	**0.567**	**Practiced**

Note. ***4.21–5.00 = Highly Practiced, 3.41–4.20 = Practiced, 2.61–3.40 = Sometimes Practiced, 1.81–2.60 = Seldom Practiced,*** *and* ***1.00–1.80 = Never Practiced.***

Daily Gardening Habits

The survey results show that daily gardening habits are moderately strong among Grade 6 learners, with the highest practice reported in maintaining a neat and clean garden (P10, M = 4.55, *Highly Practiced*). Saving water when watering plants (P1, M = 4.14) and planting vegetables or trees

(P4, M = 3.68) were also frequently practiced, although mulching was only *Sometimes Practiced* (P5, M = 3.40). These patterns suggest that learners are more engaged with visible, routine tasks than with technical practices that require specific knowledge or resources. Aune et al. (2021) emphasize that sustainable agricultural skills, such as mulching and pest management, require hands-on training and repeated exposure to become habitual. Schools can strengthen these areas through guided demonstrations and practical classroom integration.

Recycling and Waste Management

Practices involving recycling and waste management scored favorably, with recycling containers (P3, M = 4.19) and waste segregation (P8, M = 4.13) rated as *Practiced*. These results indicate that learners are internalizing waste-reduction habits promoted in schools and communities. UNESCO (2021) reveals that engaging pupils in recycling and segregation projects fosters ecological literacy at an early age. Similarly, Sharma et al. (2022) noted that integrating school-based recycling programs reinforces sustainable behavior through repetition and modeling. These findings imply that environmental education in public schools is helping to normalize waste-management practices, but further reinforcement is necessary to ensure these become consistent lifelong habits.

Participation in School or Community Gardening Projects

The data also highlight learners' participation in wider sustainability efforts, such as joining tree-planting activities (P7, M = 3.76) and avoiding harm to pollinators (P9, M = 3.81). While rated as *Practiced*, these are not yet at the highly practiced level, suggesting that opportunities for direct involvement may be limited or sporadic. Ahmed et al. (2023) argue that sustainable practices are more consistently adopted when learners are given meaningful roles and see the impact of their actions in their community.

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Thus, expanding partnerships between schools, local government units, and community organizations can provide more structured opportunities for learners to engage in collaborative gardening and conservation projects. These activities would not only improve practical skills but also cultivate responsibility and long-term stewardship values.

Relationship among the pupils' levels of knowledge, attitudes, and practices on sustainable plant care

Table 4 presents the results of the correlation analysis, which reveal significant positive associations among the knowledge, attitudes, and practices of Grade 6 learners regarding sustainable plant care. Knowledge was moderately correlated with attitudes (ρ = .429, p < .001), suggesting that pupils with higher knowledge scores also tended to report more favorable attitudes toward sustainability. This finding aligns with UNESCO's (2021) framework on Education for Sustainable Development (ESD), which highlights that environmental literacy builds the foundation for the development of pro-environmental values and behaviors. It indicates that as learners gain greater understanding of sustainable plant care, they become more likely to internalize its importance and reflect it in their dispositions.

A significant but **weaker correlation** was found between knowledge and practices (ρ = .210, p = .010), showing that while knowledge contributes to behavior, it does not fully guarantee consistent application of sustainable practices. This gap between awareness and action is often cited in environmental education research (Ahmed et al., 2023). For example, learners may know the value of mulching or using organic fertilizers but may not practice them regularly due to limited resources, lack of guidance, or inconsistent reinforcement in school and at home. This emphasizes the need for more hands-on, structured, and community-supported learning activities to bridge the "knowledge–practice gap."

Table 4
Correlations Among Knowledge, Attitudes, and Practices on Sustainable Plant Care

Variables	ρ (Spearman's rho)	p-value	Interpretation
Knowledge & Attitudes	0.429	< .001	Moderate positive correlation (significant)
Knowledge & Practices	0.210	0.010	Weak positive correlation (significant)
Attitudes & Practices	0.455	< .001	Moderate positive correlation (significant)

Note. $p < .05$

Additionally, a **moderate positive relationship** was observed between attitudes and practices ($\rho = .455$, $p < .001$), the strongest association in the matrix. This suggests that pupils with more favorable attitudes toward sustainable plant care were also more likely to engage in sustainable practices, such as recycling, water conservation, and tree planting. Sharma (2022) noted that cultivating positive environmental attitudes during childhood is a strong predictor of sustainable lifestyle choices in later years. The implication for public schools is clear: fostering positive attitudes—through experiential learning, recognition systems, and community involvement—can be a powerful lever to enhance the translation of knowledge into practice, thereby cultivating responsible and environmentally engaged young citizens.

Table 5 presents the regression analysis examining the predictive effect of pupils' attitudes on sustainable plant care practices. The results show that attitudes significantly predict practices, indicating that pupils with more

favorable attitudes toward sustainable plant care are more likely to engage in such practices. This finding supports the Theory of Planned Behavior, which explains that attitudes influence behavioral intentions and actual behavior (Ajzen, 1991; Bosnjak et al., 2020).

Table 5
Predictive effect of pupils' attitudes on the practices of sustainable plant care

Predictor	B	β	t	p	Decision	Interpretation
Constant	3.2095	----	11.62	<.001	----	----
Attitudes	0.0176	0.217	2.68	0.008	Reject Ho	Significant

Model Summary
R^2=046; Adjusted R^2=040; F-value=7.18; p-value=0.001; Interpretation= Significant

Specifically, attitudes had a statistically significant positive effect on sustainable plant care practices (B = 0.0176, β = 0.217, t = 2.68, p = .008). Since the p-value is less than .05, the null hypothesis is rejected. This means that an increase in positive attitudes corresponds to an increase in sustainable practices. However, the effect size (β = 0.217) indicates only a small to moderate influence, suggesting that attitudes contribute to behavior but are not the only factor shaping pupils' actions. Similar findings have been reported in recent studies, where attitudes significantly influence pro-environmental behaviors but with limited strength (Hagger et al., 2022; Steg & Vlek, 2021).

The overall model is statistically significant (F = 7.18, p = .001), confirming that attitudes can predict sustainable plant care practices. However, the coefficient of determination (R^2 = .046) shows that only 4.6% of the variance in practices is explained by attitudes. The adjusted R^2 (.040) further indicates that the model's explanatory power is relatively low. This

suggests that while attitudes are important, most of the variation in pupils' practices (95.4%) is influenced by other factors.

These findings highlight that behavior is complex and shaped by multiple influences. Aside from attitudes, factors such as knowledge, environmental exposure, school-based programs, and family or community support play significant roles in shaping sustainable practices. This aligns with recent literature, which emphasizes that pro-environmental behavior is not driven solely by attitudes but also by contextual and social factors (UNESCO, 2023; Otto & Pensini, 2017).

The results indicate that attitudes are a significant predictor of sustainable plant care practices, but their influence is limited. This implies that efforts to promote sustainable behavior among pupils should not focus solely on improving attitudes, but also on strengthening knowledge, providing practical experiences, and creating supportive environments that encourage sustainable actions.

D. Conclusion

The findings indicate that Grade 6 pupils generally demonstrate moderately high knowledge, favorable attitudes, and practiced behaviors toward sustainable plant care. However, variability across knowledge components points to the need for targeted interventions in technical areas such as soil fertility, pest management, and environmental responsibility. While knowledge contributes to pupils' awareness, it is their positive attitudes that most strongly predict the translation of learning into consistent, sustainable practices. This highlights the critical role of affective dimensions—values, motivation, and stewardship in promoting eco-friendly behaviors among young learners.

Eco-friendly school gardening initiatives, therefore, must go beyond imparting technical knowledge to nurturing positive attitudes and providing

structured opportunities for practice. Integrating project-based learning, community engagement, and recognition systems can help sustain pupils' motivation while reinforcing responsible environmental habits. Strengthening curricular alignment with Education for Sustainable Development and DepEd's EPP competencies will ensure that school gardens function as effective platforms for environmental literacy and sustainability education. Hence, this study concludes that enhancing knowledge, shaping attitudes, and creating supportive practice environments are mutually reinforcing strategies for cultivating responsible, environmentally engaged citizens at the elementary level.

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