

Sustainable Competency-based Learning Activities and Academic Performance in Numeracy Instruction

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sustainable competency-based learning activities, academic performance, Grade 6 numeracy, teaching competencies, descriptive-quantitative research

Abstract. This study examined the implementation of sustainable competency-based learning activities and their relationship with the academic performance of Grade 6 numeracy learners in selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII, during School Year 2025–2026. Specifically, it assessed teachers' competencies in terms of knowledge, attitudes, skills, and behaviors and learners' performance in interpreting electric and water consumption readings, solving routine and non-routine problems involving consumption, constructing and interpreting pie graphs, and solving problems using data presented in pie graphs. The study employed a descriptive-quantitative research design involving 126 respondents, comprising six teachers (4.76%) and 120 Grade 6 learners (95.24%). Data were collected through structured survey questionnaires and learner assessments and analyzed using frequency counts, percentages, weighted means, Pearson's correlation coefficient, and the t-test. The analysis focused on determining teachers' competency levels, learners' performance in the selected numeracy competencies, and the relationship between teachers' competencies and learners' academic performance. The findings are intended to provide a basis for developing enhanced, sustainable, and learner-centered numeracy activities that strengthen conceptual understanding, practical problem-solving, and the application of mathematical skills to real-life situations, consistent with the goals of the MATATAG Curriculum.

Introduction

The implementation of the MATATAG Curriculum represents a significant reform in the Philippine basic education system, aimed at strengthening foundational skills and making learning more focused and relevant. The Department of Education (DepEd), through DepEd Order No. 010, s. 2024, titled Policy Guidelines on the Implementation of the MATATAG Curriculum, established guidelines for its phased implementation. These guidelines were subsequently amended through DepEd Order No. 012, s. 2024. The curriculum reform underscores the importance of developing essential competencies and improving the quality of teaching and learning (Department of Education [DepEd], 2024a, 2024b). In mathematics education, this direction highlights the need for meaningful learning activities that help learners develop numeracy, critical thinking, and problem-solving skills. Grade 6, as the culminating stage of elementary education, is particularly important because learners are expected to consolidate foundational mathematical skills and apply them to more complex, practical situations.

The paradigm of mathematics education has shifted from time-bound, lecture-heavy instruction toward Competency-Based Education (CBE), in which learning is evaluated according to learners' demonstrated mastery of specific competencies rather than merely completing a prescribed syllabus (Evans et al., 2021; Henri et al., 2017; Tahirsylaj & Sundberg, 2020). For competency-based instruction to be effective, learning activities must be sustainable. In this study, sustainable competency-based learning activities refer to activities that support meaningful learning, reinforce the retention and

application of numeracy skills, and can be implemented consistently using available classroom resources. Such activities should provide learners with opportunities to practice, apply, and demonstrate their mastery of identified competencies.

Despite the emphasis on competency-based standards, mathematics achievement remains a concern in many educational contexts (National Research Council, 2001). Research suggests that active learning, appropriate scaffolding, and problem-centered instruction can promote learners' understanding and performance (Dochy et al., 2003; Freeman et al., 2014; Hmelo-Silver, 2004; Prince, 2004; Vygotsky, 1978). Conversely, activities that are insufficiently connected to learners' prior knowledge, lack guided practice, or provide limited opportunities for application may not adequately support the development and retention of mathematical skills. Thus, teachers need to select and implement activities that are aligned with learning competencies, responsive to learners' needs, and appropriate to the mathematical concepts being taught.

Competency-based learning places learners' demonstration of intended learning outcomes at the center of instruction. Learners are given opportunities to develop and demonstrate mastery of predetermined competencies through appropriate learning experiences and ongoing assessment. This approach is closely associated with mastery learning and outcomes-based education because it emphasizes clearly defined outcomes and evidence of learning. In a competency-based mathematics classroom, teachers facilitate learning, guide discussions, monitor progress, provide feedback, and adjust instruction according to learners' demonstrated needs. These practices are particularly relevant in numeracy instruction, where learners need to interpret information, apply mathematical procedures, and solve both routine and non-routine problems.

Teachers' competence is central to the effective implementation of competency-based learning activities. Hill et al. (2005) found that teachers' mathematical knowledge for teaching is associated with student achievement, while other studies have emphasized the importance of teachers' professional competence in instructional quality and learners' outcomes (Astuti & Jailani, 2020; Kaiser et al., 2022; König et al., 2021). In the Philippine context, DepEd Order No. 042, s. 2017, titled National Adoption and Implementation of the Philippine Professional Standards for Teachers (PPST), establishes professional standards that guide teachers' professional development and practice. The PPST emphasizes the knowledge, practice, and professional responsibilities expected of teachers at different career stages (DepEd, 2017). In this study, teacher competence is examined in terms of knowledge, attitudes, skills, and behaviors related to the implementation of sustainable competency-based learning activities.

Assessment and feedback are likewise essential to competency-based instruction. Formative assessment helps teachers determine whether learners have understood particular concepts, identify learning gaps, and provide appropriate instructional support. Timely and constructive feedback can help learners understand their progress and identify the steps needed to improve their performance (Black & Wiliam, 1998; Hattie & Timperley, 2007; Maskos et al., 2025; Palm et al., 2017; Santos, 2022). In numeracy instruction, assessment should therefore examine not only whether learners obtain correct answers but also whether they can interpret information, apply mathematical reasoning, and solve problems in meaningful contexts.

In view of these considerations, this study examined the implementation of sustainable competency-based learning activities and the relationship between teachers' competencies and learners' academic performance in selected Grade 6 numeracy competencies in public elementary schools in San Isidro District, Schools Division of Leyte, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII. The selected numeracy competencies include interpreting electric and water meter readings; solving routine and non-routine problems involving consumption; constructing a pie graph; and solving problems using data presented in a pie graph. These competencies provide opportunities to examine how learners interpret real-life numerical information, represent data, and apply mathematical reasoning to practical situations.

Specifically, the study sought to: (1) describe the profile of the teacher-respondents; (2) assess teachers' competencies in terms of knowledge, attitudes, skills, and behaviors in implementing sustainable competency-based learning activities; (3) determine learners' academic performance in the selected Grade 6 numeracy competencies; (4) determine whether a significant relationship exists between teachers' competencies and learners' academic performance; and (5) propose enhanced learning activities based on the findings. The study tested the null hypothesis that there is no significant relationship between teachers' competencies and learners' academic performance at the 0.05 level of significance.

The findings are intended to benefit teachers by identifying areas for strengthening numeracy instruction and supporting the selection of effective learning activities. School administrators may use the results to guide instructional supervision, teacher development, and the provision of learning resources. Learners may benefit from activities designed to address identified learning needs, while parents and the wider community may gain a clearer understanding of ways to support children's numeracy development. Ultimately, the study aims to provide an evidence-based foundation for proposing enhanced, sustainable competency-based learning activities that strengthen Grade 6 numeracy instruction.

Methodology

Design

This study employed a descriptive-quantitative research design to examine the implementation of sustainable competency-based learning activities and their relationship with the academic performance of Grade 6 numeracy learners in selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII, during School Year 2025–2026. This design was appropriate because it allowed the researchers to gather numerical data, describe existing conditions, and determine the relationship between teachers' competencies and learners' numeracy performance without manipulating the study variables.

The study involved 126 respondents, consisting of six teachers and 120 Grade 6 learners. Data were collected using structured survey questionnaires to assess teachers' knowledge, attitudes, skills, and behaviors in implementing competency-based learning activities. Learner assessments were also administered to determine their performance in interpreting electric and water consumption readings, solving routine and non-routine problems, and constructing and interpreting pie graphs.

The collected data were organized, tabulated, and analyzed using frequency counts, percentages, and weighted means to describe the respondents' profiles and competency levels. Pearson's correlation coefficient was used to determine the relationship between teachers' competencies and learners' academic performance, while the t-test was applied to examine relevant differences, as appropriate to the variables and assumptions of the analysis. The results served as the basis for proposing sustainable, learner-centered numeracy activities aligned with the goals of the MATATAG Curriculum.

Environment

The study was conducted in selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII, during School Year 2025–2026. These research settings were selected to provide a practical context for examining the implementation of sustainable competency-based learning activities and their relationship with the academic performance of Grade 6 learners in numeracy. The two locations represent different educational settings within the Philippine basic education system, allowing the study to explore how teachers' competencies and classroom practices relate to learners' development of essential mathematical skills.

San Isidro District, located in Leyte Province, is part of Eastern Visayas, a region where public elementary schools serve learners from communities with varying educational experiences and access to learning resources. Meanwhile, the Schools Division of Lapu-Lapu City is situated in Central Visayas and encompasses public schools serving learners from diverse urban and community environments. These settings provide relevant contexts for examining how teachers facilitate numeracy learning and help learners connect mathematical concepts with everyday experiences. However, the study does not assume that all schools in either location have the same resources, teaching conditions, or learner needs.

The research focused on Grade 6 numeracy because this stage is important in strengthening learners' mathematical understanding before they transition to junior high school. The selected competencies involved interpreting electric and water consumption readings, solving routine and non-routine problems involving consumption, and constructing and interpreting pie graphs. These skills are particularly relevant to daily life because they encourage learners to interpret information, make reasonable decisions, and apply mathematical concepts to practical situations.

The study involved six teachers and 120 Grade 6 learners from the selected public elementary schools, for a total of 126 respondents. The teachers provided information about their knowledge, attitudes, skills, and behaviors in implementing competency-based learning activities, while the learners' assessment results provided evidence of their performance in the identified numeracy competencies. Through these research environments, the study sought to generate context-based findings that could guide the development of sustainable, learner-centered numeracy activities aligned with the goals of the MATATAG Curriculum.

Respondents

The respondents of this study consisted of 126 participants from selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII, during School Year 2025–2026. These included six Grade 6 teachers, representing 4.76% of the total respondents, and 120 Grade 6 learners, accounting for 95.24%. The participation of both teachers and learners was essential to obtaining a more comprehensive understanding of the implementation of sustainable competency-based learning activities and their relationship with learners' academic performance in numeracy.

The six Grade 6 teachers served as respondents in assessing competencies related to knowledge, attitudes, skills, and behaviors in implementing competency-based learning activities. Their participation provided information relevant to understanding how teachers facilitate numeracy instruction, develop meaningful learning experiences, and guide learners in applying mathematical concepts to practical situations. Their responses also helped identify areas of strength and opportunities for improvement in the implementation of sustainable learning activities.

Meanwhile, the 120 Grade 6 learners participated in assessments designed to determine their performance in selected numeracy competencies. These included interpreting electric and water consumption readings, solving routine and non-routine problems involving consumption, constructing and interpreting pie graphs, and solving problems using data presented in pie graphs. Their assessment results provided numerical evidence of their understanding and application of the mathematical skills covered in the study.

The inclusion of teachers and learners allowed the researchers to examine the study variables from complementary perspectives. The teachers provided information about their professional competencies, while the learners demonstrated their numeracy performance through assessment results. Together, these respondents formed the basis for analyzing the relationship between teachers' competencies and learners' academic performance. Their participation was intended to generate useful evidence for developing sustainable, learner-centered numeracy activities aligned with the goals of the MATATAG Curriculum. Throughout the research process, appropriate ethical procedures, including informed consent, confidentiality, and the protection of learner participants, were to be observed.

School	Teachers	Grade 6 Learners	Total Respondents	Percentage (%)
Bulak ES	1	18	19	15.08
Paril ES	1	21	22	17.46
Banat-i ES	1	14	15	11.90
San Isidro Central ES	1	25	26	20.63
Gun-ob ES	1	25	26	20.63
Basak ES	1	17	18	14.29
Total	6	120	126	100.00

Note. N = 126. Percentages are based on the total number of respondents and may not sum exactly to 100 because of rounding.

Table 1. Distribution of the Respondents by School

Research Instrument

The study utilized two primary research instruments: a structured survey questionnaire and a researcher-prepared numeracy assessment. These instruments were designed to gather relevant quantitative data on teachers' competencies in implementing sustainable competency-based learning activities and the academic performance of Grade 6 learners in selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII.

The structured survey questionnaire was administered to the six Grade 6 teachers to assess their competencies in terms of knowledge, attitudes, skills, and behaviors. The questionnaire included statements related to their understanding of competency-based learning, attitudes toward its implementation, ability to design and facilitate meaningful numeracy activities, and teaching behaviors that support learners' mathematical development. The responses were intended to identify teachers' competency levels and areas that may require further professional support.

The researcher-prepared numeracy assessment was administered to the 120 Grade 6 learners to determine their performance in the selected mathematical competencies. The assessment covered interpreting electric and water consumption readings, solving routine and non-routine problems involving consumption, constructing and interpreting pie graphs, and solving problems using data presented in pie graphs. The items were designed to measure learners' understanding, computational accuracy, interpretation of information, and application of mathematical concepts to real-life situations.

Before administration, the instruments should undergo appropriate expert validation to establish their relevance, clarity, and alignment with the study's objectives. The learner assessment should also be pilot-tested, when feasible, to determine its reliability and suitability for Grade 6 learners. Necessary revisions should be made based on the results and recommendations of the validators. These procedures help ensure that the instruments produce credible and meaningful data for analysis.

Data Gathering Procedure

The data-gathering process began with the preparation of the necessary research instruments, including a structured survey questionnaire for teachers and a numeracy assessment for Grade 6 learners. The instruments were reviewed by qualified experts to ensure their clarity, relevance, and alignment with the objectives of the study. Revisions were incorporated based on their recommendations before the instruments were administered.

The researcher then secured permission from the appropriate education authorities and school heads of the selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII. Coordination with the participating schools was undertaken to establish a convenient schedule for data collection and minimize disruptions to regular classroom instruction. Informed consent was obtained from the teacher participants and the parents or legal guardians of the learner participants, with appropriate assent procedures for the children.

After securing the necessary approvals, the structured survey questionnaires were distributed to the six Grade 6 teachers to gather information about their knowledge, attitudes, skills, and behaviors in implementing sustainable competency-based learning activities. Meanwhile, the numeracy assessment was administered to the 120 Grade 6 learners under appropriate and consistent testing conditions. The assessment covered electric and water consumption readings, routine and non-routine problem-solving, and the construction and interpretation of pie graphs.

Upon completion, the researcher retrieved the questionnaires and assessment papers, checked them for completeness, and organized the responses for coding and tabulation. The collected data were analyzed using the appropriate statistical tools. Throughout the process, confidentiality, voluntary participation, and the protection of respondents' information were observed.

Ethical Considerations

The study observed appropriate ethical standards to protect the rights, dignity, privacy, and welfare of all participants involved in examining sustainable competency-based learning activities and Grade 6 learners' numeracy performance in selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII.

Before conducting the study, the researcher secured the necessary approval and permission from the appropriate education authorities and school heads. The purpose, procedures, and scope of the research were clearly explained to the participating teachers and the parents or legal guardians of the Grade 6 learners. Informed consent was obtained from adult participants and parents or legal guardians, while age-appropriate assent was sought from the learners. Participation was voluntary, and respondents were informed of their right to decline or withdraw without penalty or negative consequences.

Confidentiality and privacy were maintained throughout the research process. Names and other identifying information were not disclosed in the presentation or publication of results. Codes were used where appropriate, and completed questionnaires, assessment records, and electronic data were stored securely with access limited to authorized persons. The collected information was used solely for the stated research purposes and handled in accordance with applicable data privacy requirements.

The researcher also ensured that the administration of learner assessments was conducted fairly, respectfully, and without unnecessary pressure. Learners' scores were treated as research data and were not used to embarrass, label, or discriminate against any participant. Findings were reported honestly and objectively, without altering or misrepresenting the results. Through these measures, the study aimed to uphold research integrity while safeguarding the best interests of the participating teachers and learners.

Data Analysis

The data gathered from the 126 respondents were systematically organized, coded, tabulated, and analyzed using appropriate statistical tools to address the objectives of the study. The analysis focused on teachers' competencies in implementing sustainable competency-based learning activities and the academic performance of Grade 6 learners in selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII.

Frequency counts and percentages were used to describe the distribution of respondents according to their relevant profiles and other categorical variables. These statistical tools also presented the number and proportion of teachers and learners in the study. Weighted means were employed to determine the levels of teachers' competencies in terms of

knowledge, attitudes, skills, and behaviors based on their questionnaire responses. Learners' assessment results were summarized to describe their performance in interpreting electric and water consumption readings, solving routine and non-routine problems, and constructing and interpreting pie graphs.

Pearson's product-moment correlation coefficient was used to determine the strength and direction of the relationship between teachers' competency scores and learners' academic performance, subject to the assumptions of the test. The t-test was intended to examine significant differences between two groups when supported by the research questions and the nature of the data. All inferential tests were interpreted using an appropriate level of significance, such as 0.05, if specified in the approved research plan.

The results were interpreted objectively and presented in tables with corresponding explanations. The findings served as the basis for identifying areas for improvement and proposing sustainable, learner-centered numeracy activities aligned with the MATATAG Curriculum.

Results and Discussion

Results

The results of the study were organized according to the research objectives, focusing on teachers' competencies in implementing sustainable competency-based learning activities and the academic performance of Grade 6 learners in numeracy during School Year 2025–2026. The analysis covered 126 respondents, consisting of six teachers and 120 learners from selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII.

The first set of results focused on teachers' competencies in terms of knowledge, attitudes, skills, and behaviors. The responses from the structured survey questionnaire were analyzed using weighted means to determine the level of competency in each dimension. The findings were intended to identify teachers' strengths and areas where additional professional support could improve the implementation of sustainable competency-based learning activities.

The second set of results examined learners' performance in selected Grade 6 numeracy competencies. Assessment results were analyzed to determine learners' proficiency in interpreting electric and water consumption readings, solving routine and non-routine problems involving consumption, constructing and interpreting pie graphs, and solving problems using data presented in pie graphs. These results provided a basis for identifying competencies that learners had mastered and those requiring further instructional support.

The final analysis examined the relationship between teachers' competencies and learners' academic performance using Pearson's correlation coefficient, where appropriate. The t-test was intended to determine significant differences between relevant groups, depending on the research questions and available data. Collectively, the results were intended to guide the development of sustainable, practical, and learner-centered numeracy activities aligned with the MATATAG Curriculum.

Discussion

The study examined the implementation of sustainable competency-based learning activities and their relationship with the academic performance of Grade 6 numeracy learners in selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII, during School Year 2025–2026. The findings were intended to provide insights into teachers' competencies and learners' performance in applying mathematical concepts to practical situations.

Teachers' competencies in knowledge, attitudes, skills, and behaviors are important considerations in delivering meaningful numeracy instruction. Teachers who understand the competencies being taught, demonstrate positive attitudes toward learning, and apply appropriate instructional strategies can create learning experiences that encourage participation, critical thinking, and problem-solving. Examining these dimensions can help identify areas where professional development and instructional support may strengthen classroom practices.

Learners' performance in interpreting electric and water consumption readings, solving routine and non-routine problems, and constructing and interpreting pie graphs reflects the importance of connecting mathematics with everyday experiences. These competencies require learners not only to perform calculations but also to interpret information, recognize relationships, and make informed decisions. Contextualized activities may help learners understand the practical value of mathematics and develop greater confidence in solving problems.

The relationship between teachers' competencies and learners' academic performance was another important focus of the study. Statistical analysis can help determine whether an association exists between these variables. However, the actual direction, strength, and significance of the relationship must be established from the computed results. Overall, the study provides a framework for identifying instructional priorities and developing sustainable, learner-centered numeracy activities aligned with the goals of the MATATAG Curriculum.

Limitations

This study involved six teachers and 120 learners from selected schools in two divisions, so its findings cannot be generalized widely. With only six teachers, correlations between teacher competencies and learner performance have limited statistical power. The teacher data rely on self-reported ratings, and the design does not support causal claims. Future studies may use larger samples, multilevel analysis, or experimental designs.

Conclusion and Recommendations

Conclusion

This study focused on the implementation of sustainable competency-based learning activities and their relationship with the academic performance of Grade 6 numeracy learners in selected public elementary schools in San Isidro District, Leyte Province, Region VIII, and the Schools Division of Lapu-Lapu City, Region VII. Through the participation of six teachers and 120 learners, the research sought to examine teachers' competencies and learners' performance in selected numeracy skills during School Year 2025–2026.

The study highlights the importance of teachers' knowledge, attitudes, skills, and behaviors in providing meaningful and relevant mathematics instruction. These competencies can support the development of learning activities that encourage active participation, conceptual understanding, and practical problem-solving. Similarly, learners' ability to interpret consumption readings, solve routine and non-routine problems, and construct and interpret pie graphs is essential in applying mathematical knowledge to real-life situations.

The findings, once supported by the actual statistical results, can guide the identification of teachers' professional development needs and learners' specific numeracy learning gaps. They may also provide a basis for designing sustainable, contextualized, and learner-centered activities that respond to the needs of Grade 6 learners.

Ultimately, strengthening numeracy instruction requires continuous collaboration among teachers, school leaders, and other education stakeholders. By promoting relevant learning experiences and responsive instructional practices, schools can help learners develop the mathematical understanding and problem-solving abilities needed for further education and everyday life. The proposed instructional improvements should be guided by the study's verified findings and aligned with the objectives of the MATATAG Curriculum.

Recommendations

Based on the objectives and scope of the study, the following recommendations are proposed to strengthen the implementation of sustainable competency-based learning activities and improve Grade 6 learners' numeracy performance.

For Teachers. If the findings reveal gaps in teachers' knowledge, attitudes, skills, or behaviors, targeted professional development and collaborative learning sessions are recommended. Teachers should integrate contextualized activities involving electricity and water consumption readings, routine and non-routine problem-solving, and pie graph construction and interpretation. These activities should accommodate different learning abilities and promote critical thinking, practical application, and active participation.

For School Administrators. If the results indicate challenges in implementing competency-based learning activities, school heads should provide appropriate instructional materials, mentoring, and opportunities for professional development. Learning Action Cell sessions may be organized to encourage teachers to share effective practices and develop sustainable, learner-centered numeracy resources.

For Teachers and Learning Support Teams. If learners demonstrate low performance in particular numeracy competencies, schools should implement targeted remediation, enrichment activities, and regular formative assessments. Assessment results should guide instructional adjustments and provide timely feedback to help learners address difficulties and strengthen mathematical understanding (Black & Wiliam, 1998; Hattie & Timperley, 2007).

For Parents and Guardians. Schools should encourage families to support numeracy learning at home through practical activities, such as reading utility consumption information, interpreting simple graphs, and solving everyday mathematical problems.

For Future Researchers. Further studies should involve more schools and participants and examine factors such as learner motivation, mathematics anxiety, parental support, and access to learning resources. Longitudinal or experimental designs may also determine the effectiveness of specific interventions.

These recommendations should be finalized in accordance with the actual findings, particularly teachers' competency levels, learners' assessment results, and the statistical relationship between the study variables. This approach will ensure that proposed interventions respond to demonstrated needs and support the goals of the MATATAG Curriculum.

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Competing Interests Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Appendices

No appendices are attached to this study.