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Effective teaching strategies to address numeracy gaps in struggling learners

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A R T I C L E I N F O

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A B S T R A C T

This study investigated the effective teaching strategies employed by elementary mathematics teachers in addressing numeracy gaps among struggling learners in selected private schools in Laoag City, Ilocos Norte, and Sanchez Mira, Cagayan. Anchored on constructivist and learner-centered learning theories, the research sought to identify the specific numeracy difficulties experienced by learners and the pedagogical practices teachers adopt to address them. Using a descriptive research design, the study involved ten (10) elementary mathematics teachers who participated through an online questionnaire consisting of structured checklists and open-ended questions. Both descriptive statistics and thematic analysis were applied in interpreting the data. Results revealed that learners frequently experience difficulties in fractions, decimals, basic operations, and word problem solving, often arising from weak number sense, poor conceptual understanding, and limited ability to apply mathematical ideas to real-life contexts. Teachers addressed these gaps using visual aids and manipulatives, gamified and technology-based instruction, peer tutoring, remediation, differentiated teaching, and contextualized learning tasks. These adaptive and learner-centered approaches were found to enhance engagement, comprehension, and confidence in mathematics. The study concludes that inclusive, evidence-based, and contextually relevant strategies play a vital role in improving numeracy performance. It recommends sustained professional development for teachers, early diagnostic interventions, strengthened home–school partnerships, and integration of technology-enhanced instruction to promote equitable and lasting numeracy improvement in Philippine education.

Introduction

Numeracy is the primary foundation skill taught to students because it enhances and constructs a level of logical and problem-solving thinking, which children have always needed to be effective in everyday living. In the Philippines, DepEd (2018) underscored that numeracy, together with literacy, is the core of the K to 12 Curriculum, as it provides the learners with the competencies to master higher education

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as well as life-related tasks. Numeracy is something that is more than being able to do simple arithmetic, but is rather the ability to make sense of mathematical information in a range of different contexts. And children who suffer from poor numeracy are deprived in terms of both academic and personal development.

Given the significance of numeracy, they have incessantly shown profound gaps in mathematics achievement among Filipino students. The National Achievement Test (NAT) results of the Department of Education (DepEd, 2019) showed that many of the elementary pupils are not proficient in mathematics. Similarly, Domingo and Ybañez (2020) observed that learning gaps continue to exist in numeracy, primarily because of failure to master basic units, poor retention, and a lack of application mastery. Such gaps, in that case, are not addressed and instead accumulate and represent obstacles to learning and academic advancement.

Several situations have exacerbated the literacy gap in Filipino pupils. The COVID-19 pandemic, which interrupted in-person learning, expanded learning losses in highly consequential ways. Malipot (2021) stated that teachers noted that the struggle in mathematics had increased since they conducted home-based learning because they had lacked the materials needed for their learning and the help of their parents. Moreover, differences in technology access disadvantaged remote learners. These scenarios illustrate how external and systemic challenges have magnified the numeracy divide in Philippine classrooms.

Philippine classroom-based research, however, testifies to the efficacy of teaching approaches that are differentiated and contextualized. According to the study of Aguayhon, Tingson, and Pentang (2023), it was concluded that differentiated instruction helped teachers in modifying lessons in accordance with pupils' capabilities, thus leading to better mathematics performance. Correlatively, Celemin (2024) observed that authentic performance tasks, problem-solving involved in the performance of tasks linked with real-life situations, greatly improved the numeracy skills of Grade 3 students. These results imply that adaptive, engaging, and contextualized approaches are key to closing numeracy gaps among Filipino students.

Truly, there is an urgent need to enhance the numerical proficiency skills of Filipino students in relation to the objectives stated in the K to 12 program and the Sustainable Development Goal on quality education. As Pinto (2023) highlighted, the learning losses from perturbations such as COVID-19 can be long-term if not mitigated. It is within this context that the purpose of this study is to identify the specific numeracy gaps that are most observed among struggling learners and to examine best practices in the development of numerate struggling elementary learners. More specifically, it seeks to examine the critical elements, like distinguishing interventions and implementing strategies such as individualized or differentiated instruction and authentic performance tasks, and to determine their effectiveness with respect to numeracy competencies.

Finally, the flow of this study is organized as follows: the Introduction presents the background and rationale of the study; the Literature Review discusses related concepts and previous research; the Research Methodology explains the design, participants, instruments, and data-gathering procedures; the

Data Presentation and Analysis shows the summarized results; the Discussion elaborates on the implications of the findings to theories and practice; and the Conclusion provides a brief synthesis of key results, limitations, and recommendations for future studies.

Literature review

This section presents studies on learners' numeracy challenges, effective teaching strategies, and the roles of teachers and learners in improving numeracy skills. It highlights key findings from local and international research on the causes of numeracy gaps and approaches to address them.

Nature and causes of numeracy gaps in learners

Research consistently points to multiple, interrelated factors behind learners' persistent numeracy difficulties. Bernardo (2022) found that low-performing Filipino students in mathematics share certain disadvantages, including limited foundational number sense, minimal exposure to mathematics at home, socio-economic challenges, and weak classroom instructional support. These findings are echoed by the UNICEF, DepEd, and EDCOM (2025) report, which documented that many Filipino children remain below grade-level competencies in literacy and numeracy, partly due to pre-existing gaps and further compounded by COVID-19 disruptions.

Large-scale assessments, such as the National Achievement Test (NAT), have also consistently identified mathematics as a subject of weakness across both elementary and secondary levels. Division reports and performance analyses from 2020 to 2024 attribute the widening of gaps to remote and hybrid learning during the pandemic. Similar issues appear globally, especially in low- and middle-income countries (LMICs), where systematic reviews highlight recurring drivers such as weak early number sense, insufficient instructional fidelity, lack of learning materials and manipulatives, and socio-economic inequities (2018–2024).

International research adds another important dimension, particularly regarding learners with disabilities. Zhang and Holden (2023) demonstrated that children with disabilities often experience greater challenges in numeracy because of inadequate access to adapted instruction and learning accommodations. These findings suggest that inclusive approaches are essential when designing effective numeracy interventions.

Philippine-based action research further supports these observations. Catador and Fernando's (2024) Project PEMDAS, which assessed junior high school students' numeracy skills, found that approximately 86% of learners initially performed poorly. After implementing targeted interventions focusing on basic skills, however, the number of high-performing students increased significantly. Similarly, localized action research projects (Tallud & Caballes, Guevarra, Mozar, Gonzales, 2019–2024) consistently documented foundational skill gaps in counting, number sense, and basic operations. These studies attribute the persistence of gaps to resource limitations, teacher preparedness, and pandemic-related disruptions, while recommending contextualized materials, regular assessments, and remedial sessions as practical responses.

Recent research continues to reveal how learners' foundational understanding of mathematics influences long-term numeracy performance. De Guzman and Santos (2023) analyzed Grade 6 students in Central Luzon and found that difficulties in fractions and decimals were directly associated with limited exposure to hands-on learning in earlier grades and overreliance on rote computation. Similarly, a comparative study by Nardo (2024) in Northern Mindanao emphasized that socio-economic disparities and inconsistent teacher feedback contributed to cumulative learning deficits in mathematics. These findings mirror Bernardo's (2022) conclusions that numeracy challenges are often rooted in systemic inequities rather than individual learner deficiencies. Moreover, UNESCO's Southeast Asia numeracy update (2024) noted that the Philippines continues to experience widening numeracy gaps due to insufficient mastery of number sense during early primary years, underscoring the global relevance of these concerns.

Pedagogical approaches and interventions in numeracy

Addressing numeracy gaps requires evidence-based and context-sensitive strategies. One of the most widely cited models is Teaching at the Right Level (TaRL), pioneered by Pratham and implemented across several LMICs. TaRL emphasizes grouping learners based on actual learning levels rather than grade placement, supported by frequent low-stakes assessments and targeted foundational instruction. Multiple evaluations, including randomized and quasi-experimental studies (2017–2024), confirm that TaRL significantly accelerates both numeracy and literacy outcomes when implemented faithfully.

Systematic reviews of early numeracy interventions (2018–2024) reveal that effective programs often share common features: explicit instruction in number sense and operations, small-group targeted tutoring, contextualized problem-solving tasks, and the use of manipulatives or games to sustain learner engagement. Technology-based approaches, such as mobile learning applications and gamified platforms, have also shown promise in improving short-term numeracy outcomes (2019–2024). However, local pilots in the Philippines—such as NumEra-Z and numeracy-focused mobile games—indicate that issues of device access, connectivity, and teacher readiness must be addressed to ensure scalability and equity.

Empirical evidence reinforces these patterns. In the Philippines, Catador and Fernando's (2024) Project PEMDAS showed how intensive interventions can reduce the prevalence of low numeracy in large groups. At the international level, Lindström-Sandahl et al. (2024) conducted a randomized controlled trial in Sweden and demonstrated that a nine-week intensive numeracy intervention significantly improved number knowledge, arithmetic fluency, and place value understanding among at-risk second-grade learners. Local Philippine projects, including Math-GALING, NumEra-Z, and other community-based pilots (2019–2024), also reported measurable pre- and post-intervention improvements in learners' arithmetic and number sense. However, these initiatives were often limited in scope, highlighting the need for larger-scale studies to confirm generalizability.

Several contemporary studies reinforce the value of integrating interactive and technology-supported instruction in enhancing numeracy learning. Dela Cruz and Lansangan (2024) examined the use of gamified mobile applications in teaching fractions to Grade 5 learners and found notable improvements in engagement and retention compared to traditional drills. In another study, Bayron (2023) reported that

contextualized learning tasks—such as solving community-based problems—significantly increased students' problem-solving accuracy and motivation in mathematics. Likewise, the Asian Development Bank (2023) highlighted that digital learning and peer-collaborative platforms can effectively address foundational gaps when aligned with formative assessment. These studies align with the results of the current research, confirming that adaptive, interactive, and technology-enhanced strategies improve both learner confidence and conceptual understanding in numeracy.

Teacher and learner roles in enhancing numeracy skills

Beyond instructional models, the roles of teachers, learners, and communities are central to the success of numeracy interventions. Literature highlights teachers as critical diagnosticians who can use quick formative assessments to identify specific learner gaps and then implement differentiated instruction to address them (2018–2024). Effective teacher professional development (PD) emerges as another crucial factor. Reviews from 2022 to 2024 emphasize that one-off workshops have limited impact, while ongoing, classroom-linked coaching and practical training in remedial pedagogy result in more meaningful and lasting changes in teaching practices.

Philippine action research supports these findings, showing that teacher-led remedial initiatives—such as after-class tutorials, frequent formative assessments, and teacher-made instructional materials—lead to significant gains in learners' numeracy performance (2019–2024). Causing et al. (2024) further illustrate the benefits of community-based participatory action research (CBPAR), where teachers, learners, and community members co-designed learning materials using locally available resources. Such collaboration enhanced learner engagement and improved performance in number and measurement tasks, underscoring the importance of contextualized and community-supported interventions.

The home environment also plays a vital role in shaping numeracy outcomes. Philippine studies (2020–2024) have shown that parental involvement—such as engaging children in counting activities and number games—contributes positively to early numeracy development. Conversely, the pandemic highlighted inequalities in household support, as children with limited parental assistance fell further behind. Finally, inclusion remains a key consideration, with systematic reviews recommending explicit instruction, adapted materials, and close progress monitoring for learners with disabilities or learning difficulties.

Emerging studies emphasize the transformative role of teachers' professional learning and home–school collaboration in developing numeracy skills. Rivera and Bacani (2024) found that sustained teacher mentoring and professional development programs led to a 20% improvement in numeracy outcomes in pilot schools across Ilocos Norte. This aligns with Causing et al. (2024), who underscored the benefits of community-based learning material development. Furthermore, Castillo (2023) demonstrated that active parental involvement—through guided math activities and household numeracy games—enhanced children's confidence and accuracy in computation tasks. The World Bank (2023) also emphasized that whole-school engagement and teacher empowerment are key drivers of sustainable numeracy gains. Together, these studies reinforce that both teacher capability and learner support systems are crucial to fostering numeracy success and bridging persistent performance gaps.

Statement of the problem

This study explored the effective teaching strategies employed by elementary math teachers in addressing numeracy gaps in struggling learners.

Specifically, the study answered the following research questions:

1. What specific numeracy gaps are most observed among struggling learners in Elementary?

2. What teaching strategies are currently used by teachers to address numeracy gaps in struggling learners?

Research methodology

This chapter presents the research design, sources of data, which includes the locale of the study, population, and sampling, data gathering instrument, and data analysis, including its ethical standards.

Research design

This study employed a descriptive research design, which is appropriate for describing existing conditions, practices, and challenges without manipulating variables. The main objective of this design was to identify the numeracy gaps commonly observed among struggling learners and to determine the strategies used by elementary mathematics teachers to address these gaps. By utilizing a descriptive approach, the study was able to gather both quantitative and qualitative data that provided a clear and comprehensive picture of the issue under investigation.

Locale of the study

The study was conducted in private schools located in Laoag City, Ilocos Norte, and Sanchez Mira, Cagayan. These schools were purposely selected because they are representative of private school settings in the region and are accessible to the researcher. The inclusion of schools from both areas ensured variation in school contexts, thereby enriching the findings of the study.

Population and sampling

The population of the study consisted of ten elementary mathematics teachers from the selected private schools. Since the number of participants was relatively small, the researcher employed total population sampling. This sampling technique allowed the study to include all available respondents, ensuring that the data collected represented the perspectives of the entire population of mathematics teachers from the chosen schools.

Data gathering instrument

The main data gathering instrument was an online questionnaire designed through Google Forms. The questionnaire consisted of two parts: a checklist and open-ended questions. The checklist was designed to capture specific and quantifiable data on teaching strategies and interventions frequently used by teachers, while the open-ended questions provided the opportunity for teachers to share detailed insights,

experiences, and reflections regarding the numeracy gaps they observed and the practices they employed to address them.

Data gathering procedure

The researcher administered the data collection process online by distributing the Google Forms link to all respondents through their school communication channels and email addresses. Respondents were given sufficient time to complete the questionnaire at their convenience. To ensure a high response rate, follow-up reminders were sent to participants who had not yet completed the survey. Once all responses were collected, the researcher organized and prepared the data for analysis.

Data analysis tool

The data collected were analyzed using both quantitative and qualitative methods. Descriptive statistics such as frequency counts, percentages, and mean scores were applied to the checklist responses to summarize and interpret the teaching strategies employed by teachers. For the responses to open-ended questions, thematic analysis was conducted to identify recurring ideas, patterns, and themes that reflected teachers' experiences and insights in addressing numeracy gaps among struggling learners.

Ethical considerations

This study followed strict ethical standards to ensure the integrity of the research process and the protection of participants. Informed consent was secured by informing the respondents about the objectives of the study, the procedures involved, and their right to withdraw at any stage without any consequence. Confidentiality and anonymity were strictly maintained, as no personal information or school identifiers were disclosed in the reporting of results. Participation was voluntary, and the data gathered were used solely for academic purposes. Furthermore, all related literature and references utilized in the study were properly cited and acknowledged to uphold academic honesty and avoid plagiarism.

Data presentation and analysis

This part presents findings from the structured interviews conducted with teachers teaching Mathematics in the private schools of Laoag City and Sanchez Mira, organized according to key themes identified during the interviews. Below is a summary of the themes and their corresponding categories, the frequency of responses associated with each category, and the interpretation of the data gathered.

Problem 1: What specific numeracy gaps are most observed among struggling learners in Elementary?

Table 1: Specific numeracy gaps that are most observed among struggling learners in Elementary

Themes	Categories	Frequency
Theme 1: Areas of difficulty in mathematics	Basic operations	4
	Place value and number sense	4
	Word problem solving	7
	Fractions and decimals	8

	Measurement	4
	Geometry	3
Theme 2: Developmental stages of numeracy gaps	Grades 1-2	3
	Grades 3-4	4
	Grades 5-6	5
Theme 3: Common errors and misconceptions	Difficulty in problem-solving	5
	Confusion with fractions, decimals, and percentages	5
	Errors in basic operations and place value	3
	Difficulty in applying concepts and solving multi-step problems	4
	Misunderstanding in geometry and measurement	3

Source: *Data were gathered from questionnaire responses with ten mathematics teachers in Divine Word College of Laoag and Ben Lippen Christian Learning School, 2025.*

Theme 1: Areas of difficulty in mathematics

The responses of teachers revealed that the most challenging areas in mathematics for struggling learners are fractions and decimals, word problem solving, and basic operations. Eight participants identified fractions and decimals as the most difficult to teach, while seven mentioned that learners find problem-solving particularly hard.

"If they can see word problems, they have already thought that it's hard without even analyzing the problem." (P2)

"They do not know how to apply concepts about the lesson." (P5)

"Learners struggle with multi-step problems and often forget to convert units properly." (P7)

Participant 1 also emphasized that many pupils have difficulty with place value and number sense, while Participant 3 observed that even basic operations such as addition and subtraction remain challenging in lower grades.

These responses indicate that learners' mathematical struggles are mainly conceptual rather than procedural. Learners often fail to connect abstract mathematical symbols to real-world meaning, which results in weak problem-solving performance. This supports Bernardo (2022), who asserted that poor foundational number sense and limited conceptual understanding lead to persistent mathematics difficulties. Similarly, Domingo and Ybañez (2020) found that many Filipino students fail to make sense of mathematical relationships, leading to recurring performance gaps. The findings of this study confirm that the most significant numeracy issues lie in comprehension and application rather than computation alone.

Theme 2: Developmental stages of numeracy gaps

Teachers consistently noted that numeracy difficulties begin to appear in the early grades and intensify as learners advance. Most respondents observed that gaps start forming in Grades 1 to 2 and become more pronounced by Grades 5 to 6.

"Adding and subtracting numbers with regrouping is still hard for many of my pupils even in Grade 2." (P3)

"I include a review of basic concepts before starting a new lesson in my Grade 6 class." (P5)

"Some learners in Grade 5 are having difficulty in adding and subtracting fractions without common denominators." (P6)

These comments suggest that gaps formed in the foundational stages of numeracy persist across grade levels when early interventions are not applied. As learners progress, unmastered concepts accumulate and cause further difficulties in higher mathematical tasks. This observation supports the UNICEF, DepEd, and EDCOM (2025) report, which stressed that early diagnostic instruction and intervention in Grades 1 to 3 are essential to prevent long-term numeracy gaps. Similarly, De Guzman and Santos (2023) confirmed that inadequate mastery in the early grades correlates with poor comprehension in higher-order concepts such as fractions and decimals. The teachers' recognition of these developmental stages highlights the importance of early and sustained instructional support, consistent with Nardo's (2024) claim that cumulative learning deficits are often a result of instructional inequities and delayed remediation.

Theme 3: Common errors and misconceptions

The teachers identified recurring errors and misconceptions that hinder learners' mathematical understanding. These include confusion in comparing fractions, misunderstanding place value, incorrect use of operations in problem solving, and difficulty relating fractions and decimals.

"Students believe that a larger denominator means a larger fraction. They also have difficulty applying geometric formulas correctly and understanding perimeter versus area." (P8)

"Students often fail to identify what operation to use in a problem. They also confuse units in measurement and do not fully understand part-whole relationships in fractions." (P9)

"Students often reverse numbers, misalign digits in operations, and fail to understand the importance of place value." (P10)

"Many also think decimals and fractions are unrelated." (P7)

These misconceptions reveal how limited conceptual understanding impedes learners' ability to apply mathematical reasoning effectively. Catador and Fernando's (2024) Project PEMDAS demonstrated that

remediation focused on conceptual understanding significantly improves learners' performance. Likewise, Celemin (2024) concluded that authentic performance tasks—those connected to real-life applications—help correct conceptual errors. The findings of this study reinforce the view that many misconceptions arise from rote learning and a lack of contextualization. As Bernardo (2022) and De Guzman and Santos (2023) emphasized, instruction that prioritizes meaning-making and visual modeling fosters deeper understanding than procedural drills alone.

Problem 2: What teaching strategies are currently used by teachers to address numeracy gaps in struggling learners?

Table 2: Teaching strategies that are currently used by teachers to address numeracy gaps in struggling learners

Themes	Categories	Frequency
Theme 1: Instructional approaches and interventions	Remediation or Re-teaching	5
	Peer tutoring or Group work	4
	Use of Visual aids and Manipulatives	7
	Integrating games or activities in math lessons	7
	Technology-based tools	7
	Real-life application of math concepts	6
Theme 2: Differentiated instruction for diverse learners	Use of varied teaching strategies	3
	Differentiated activities	4
	Review and reinforcement	2
	Flexible pacing and support	3
	Peer tutoring and grouping	3
	Use of diagnostic tools and visual aids	3
Theme 3: Skill development through assessment and feedback	Use of real-life and visual learning experiences	3
	Gamified and engaging activities	3
	Collaborative and project-based learning	3
	Regular practice and guided drills	3
	Ongoing formative assessment	4
	Timely and Constructive Feedback	5
	Reflective tools	2

Source: *Data were gathered from questionnaire responses with ten mathematics teachers in Divine Word College of Laoag and BenLippen Christian Learning School, 2025.*

Theme 1: Instructional approaches and interventions

To address numeracy gaps, teachers reported using a combination of interactive, visual, and contextualized strategies. Many employed visual aids, manipulatives, games, and technology-based tools to make lessons more engaging and to simplify abstract concepts.

"I use different strategies in teaching pupils." (P1)

"Using gamification-type activities lets the learners be motivated and have fun at the same time in learning." (P4)

"I give extra time and practice for learners who need it. I also encourage peer tutoring where the fast learners support others." (P6)

"I use continuous formative assessments to identify gaps early and use immediate feedback to guide corrections." (P7)

These strategies highlight teachers' flexibility and focus on learner-centered instruction. The use of visual aids and manipulatives corresponds with the Teaching at the Right Level (TaRL) model by Pratham, which promotes grouping learners based on actual learning levels. The teachers' integration of games and technology also mirrors findings by Dela Cruz and Lansangan (2024), who noted that gamified instruction increases engagement and retention. Additionally, Aguhayon, Tingson, and Pentang (2023) emphasized that differentiated and interactive teaching strategies are essential in improving numeracy outcomes. The findings affirm that learner engagement and contextualization are vital in addressing numeracy difficulties.

Theme 2: Differentiated instruction for diverse learners

Participants strongly agreed that differentiation is essential in catering to diverse learning abilities. Teachers modified lesson pacing, activity complexity, and group composition to meet individual learners' needs.

"I prefer easy and hard levels of activities depending on the level of numeracy skills of my pupils." (P4)

"I use flexible grouping and give enrichment activities to those who master lessons early. Struggling learners receive targeted mini-lessons." (P8)

"I use tiered activities—simple tasks for struggling learners and extension tasks for advanced students." (P9)

"I provide scaffolded worksheets and peer support. Visual learners use flashcards and concrete examples." (P10)

These responses demonstrate that teachers intentionally adapt instruction to accommodate learners' readiness, interests, and learning profiles. Aguayhon et al. (2023) supported this approach, noting that differentiated instruction improves academic performance by ensuring that all students engage meaningfully with content at their appropriate level. This practice aligns with the learner-centered pedagogy promoted by DepEd (2022) and the Sustainable Development Goal on quality education. Rivera and Bacani (2024) also found that teacher mentoring and ongoing professional development strengthen teachers' ability to differentiate effectively. The consistent use of flexible grouping and adaptive materials in this study suggests that teachers value inclusion and equity in mathematics instruction.

Theme 3: Skill development through assessment and feedback

The study also revealed that assessment and feedback are integral components of effective numeracy instruction. Teachers use formative assessments, such as short quizzes, whiteboard checks, and math journals, to monitor learner progress and adjust instruction accordingly.

"I make collaborative learning and mini whiteboard responses." (P2)

"I use continuous formative assessments to identify gaps early and use immediate feedback to guide corrections." (P7)

"I use performance tasks and guided practice. Feedback is immediate to correct misconceptions before they become habits." (P9)

"I use math journals for reflection and short quizzes to assess understanding. Feedback is both verbal and written to motivate improvements." (P10)

These statements reveal that teachers view assessment not as a summative endpoint but as a continuous learning process. This aligns with Causing, De Vera, and Ponce (2024), who emphasized that formative feedback helps build learners' self-confidence and promotes self-reflection. Similarly, Lindström-Sandahl et al. (2024) found that frequent low-stakes assessments significantly improve arithmetic fluency and conceptual understanding among struggling learners. UNESCO (2024) likewise highlighted formative assessment as a tool for improving learning quality and learner autonomy. The consistent use of feedback and reflective assessment in this study demonstrates teachers' commitment to continuous improvement and responsive teaching practices.

Discussion

The findings of this study emphasize that numeracy difficulties among struggling learners are deeply rooted in weak conceptual understanding, limited mastery of foundational skills, and accumulated learning gaps that begin in the early grades. These results affirm Bernardo's (2022) assertion that mathematical struggles are primarily conceptual rather than procedural. Learners' inability to connect mathematical symbols to real-life meaning leads to recurring errors in fractions, decimals, and word problem solving. This reinforces the constructivist perspective that learning occurs more effectively when students build meaning from active engagement and contextual experiences.

From a theoretical standpoint, the study supports Vygotsky's Zone of Proximal Development (ZPD) and Piaget's Constructivist Learning Theory, both of which emphasize scaffolding and experiential learning as pathways to understanding abstract concepts. Teachers' use of manipulatives, gamified lessons, and technology-based tools aligns with these theories by providing sensory and interactive opportunities for learners to construct knowledge. Similarly, the integration of Teaching at the Right Level (TaRL) principles—through differentiated tasks and flexible pacing—demonstrates how adaptive instruction can bridge learning gaps by meeting learners where they are developmentally.

In terms of practical implications, the study highlights the critical role of differentiated instruction and formative assessment in supporting diverse learners. Teachers employed tiered activities, peer tutoring, and continuous feedback mechanisms, which proved effective in sustaining learner engagement and improving comprehension. These approaches confirm the findings of Aguhayon, Tingson, and Pentang (2023) and Rivera and Bacani (2024), who noted that differentiation and ongoing mentoring enhance instructional responsiveness and learner confidence. Moreover, the findings have implications for teacher professional development, suggesting that ongoing, practice-based training is essential for teachers to effectively diagnose and address numeracy difficulties.

The use of contextualized and gamified learning activities also demonstrates the practicality of integrating technology and real-world applications in mathematics instruction. As supported by Dela Cruz and Lansangan (2024) and Bayron (2023), such innovations not only increase motivation but also make abstract mathematical concepts more relatable and meaningful. Teachers' efforts to link lessons to real-life contexts reflect a shift toward authentic and inclusive pedagogy, where learners see mathematics as a tool for reasoning and problem-solving beyond the classroom.

Finally, this study contributes to existing theories of numeracy development by reaffirming that effective numeracy teaching is multidimensional—it requires addressing cognitive, emotional, and contextual factors simultaneously. The evidence presented here offers a framework for responsive mathematics instruction that integrates constructivist principles, learner-centered strategies, and continuous formative feedback. Practically, schools should institutionalize early interventions, diagnostic assessments, and sustained teacher mentoring to ensure that numeracy gaps are detected and addressed before they widen. This integration of theory and practice advances the field of mathematics education by emphasizing that equitable and engaging instruction can transform learners' mathematical confidence and proficiency.

Conclusion

This study identified the most common numeracy gaps among struggling learners—fractions, decimals, and word problem solving—and examined the strategies teachers use to address them. The results show that numeracy difficulties begin in the early grades due to insufficient conceptual mastery and persist without early intervention. Teachers addressed these gaps through visual aids, manipulatives, gamified and technology-based instruction, peer tutoring, and differentiated learning tasks, all of which fostered engagement and deeper understanding.

In essence, effective numeracy instruction requires adaptive, learner-centered, and context-based approaches supported by continuous feedback. The study concludes that differentiated and formative strategies are most effective in improving numeracy performance and learner confidence.

However, the study was limited to a small group of private school teachers in two locations, which may affect generalizability. Future research should include public schools, larger populations, and experimental designs to validate the long-term impact of specific interventions. Further studies may also explore parental involvement and technology integration as factors influencing numeracy development.

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***Ethical statement*:** The study followed ethical guidelines, and participants' privacy was protected.

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