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RESEARCH ARTICLE

Enhancing Mathematics Learning through Effective Pedagogical Practices at Tungngod Elementary School

[1] Marjorie B. Catti
Northeastern College, Santiago City
Tungngod Elementary School
Department of Education
Correspondence: marjorie.catti001@deped.gov.ph

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Abstract

This study examined how effective pedagogical practices enhance Mathematics learning among pupils at Tungngod Elementary School. It specifically aimed to identify the teaching strategies employed by Mathematics teachers, examine how these practices support pupils' conceptual understanding, problem-solving skills, and engagement, explore teachers' perceptions of effective Mathematics instruction, and identify challenges encountered in implementing these practices. The study also sought to analyze pupils' learning experiences in response to the pedagogical approaches used. A qualitative descriptive research design was employed to capture in-depth and context-specific insights into classroom practices. Data were collected through semi-structured interviews with Mathematics teachers, classroom observations, and document analysis of lesson plans and instructional materials. Purposive sampling ensured that participants had direct involvement in Mathematics instruction. The collected data were analyzed using thematic analysis, with triangulation of data sources enhancing the credibility of the findings. The results revealed that learner-centered and contextualized pedagogical practices, such as the use of real-life examples, collaborative problem-solving, and differentiated instruction, significantly enhanced pupils' understanding and engagement in Mathematics learning. Teaching strategies that emphasized conceptual understanding and guided reasoning helped pupils develop confidence and problem-solving abilities. Despite these positive outcomes, teachers encountered challenges related to limited instructional resources, time constraints, and diverse learner abilities. Nevertheless, pupils demonstrated positive learning experiences and increased participation when effective pedagogical practices were applied. The study concludes that thoughtful and learner-responsive pedagogy plays a critical role in improving Mathematics learning and highlights the need for sustained instructional support and professional development to strengthen Mathematics education at the elementary level.

Corresponding author:** ***marjorie.catti001@deped.gov.ph

Introduction

Mathematics education plays a crucial role in developing learners' logical reasoning, problem-solving skills, and ability to apply knowledge in real-life situations. At the elementary level, Mathematics serves as a foundational subject that shapes learners' attitudes toward learning and influences their future academic performance. However, Mathematics remains one of the most challenging subjects for many pupils, often resulting in low achievement, anxiety, and disengagement. These challenges highlight the importance of effective pedagogical practices that can support meaningful learning and foster positive learner experiences.

Effective pedagogy in Mathematics involves the deliberate use of instructional strategies that promote conceptual understanding, active engagement, and problem-solving competence. Research has consistently shown that learner-centered approaches, concrete–representational–abstract (CRA) strategies, problem-based learning, and formative assessment practices significantly enhance pupils' mathematical understanding. Teachers play a critical role in selecting and implementing these practices based on learners' needs, classroom context, and available resources.

In the Philippine elementary school context, improving Mathematics instruction remains a priority, particularly in addressing learning gaps and supporting diverse learners. Tungngod Elementary School, like many public schools, faces instructional challenges that require context-sensitive and evidence-based pedagogical responses. This study therefore seeks to examine how effective pedagogical practices enhance Mathematics learning among pupils at Tungngod Elementary School, with the aim of informing instructional improvement and professional development initiatives.

While existing studies provide strong evidence on effective Mathematics pedagogical practices, several gaps remain. Most research focuses on generalized or large-scale contexts, with limited school-based studies examining how pedagogical practices are implemented in specific elementary school settings. Additionally, few studies integrate teachers' pedagogical practices, teachers' perceptions, and pupils' learning experiences within a single investigation.

In the local context, there is a lack of empirical research focusing on how effective pedagogical practices enhance Mathematics learning in small or rural elementary schools such as Tungngod Elementary School. Moreover, limited studies explore the challenges teachers face in implementing effective pedagogy and how these challenges influence pupils' engagement and understanding. Addressing these gaps, the present study provides context-specific evidence on Mathematics pedagogy, contributing to instructional improvement and strengthening Mathematics education at the elementary level.

Background of the Study

Globally, educational reforms emphasize improving the quality of Mathematics teaching through pedagogical innovation and teacher effectiveness. Studies have shown that pupils learn Mathematics best when instruction emphasizes understanding rather than rote memorization (Hiebert & Grouws, 2007). Instructional strategies that actively involve learners in reasoning, discussion, and problem-solving contribute to deeper learning and sustained engagement.

In the Philippine setting, results from national and international assessments have pointed to persistent challenges in Mathematics achievement at the basic education level. These outcomes underscore the need for strengthened instructional practices that address learners' misconceptions, promote engagement, and support diverse learning styles. Teachers are therefore encouraged to adopt pedagogical approaches that make Mathematics relevant, interactive, and accessible.

At Tungngod Elementary School, understanding how teachers implement pedagogical practices and how pupils respond to these approaches is essential in identifying strategies that effectively support Mathematics learning. By examining classroom practices, teacher perspectives, and pupil experiences, this study aims to provide localized insights that can inform instructional decision-making and school-based improvement efforts.

Related Studies

Numerous studies have examined the relationship between pedagogy and Mathematics learning. Hiebert and Grouws (2007) emphasized that instruction focused on conceptual understanding leads to higher student achievement than procedural teaching alone. Similarly, Boaler (2016) demonstrated that learner-centered and discussion-based Mathematics instruction improves engagement and reduces Mathematics anxiety.

Kilpatrick, Swafford, and Findell (2001) identified five strands of mathematical proficiency conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive dispositionhighlighting the importance of balanced pedagogy. Darling-Hammond et al. (2020) found that effective

teaching practices, including formative assessment and scaffolding, significantly improve learning outcomes in Mathematics.

In elementary classrooms, the use of concrete and visual representations has been shown to enhance understanding. Carbonneau, Marley, and Selig (2013) reported that manipulatives improve conceptual learning when used purposefully. Likewise, Sullivan et al. (2015) found that problem-solving tasks promote deeper engagement and reasoning skills among young learners.

Teacher beliefs also influence pedagogical choices. Philipp (2007) explained that teachers' beliefs about Mathematics shape instructional decisions and classroom practices. Meanwhile, Schoenfeld (2014) emphasized that effective Mathematics teaching requires attention to both content knowledge and pedagogical decision-making.

Locally, studies in Philippine elementary schools have shown that interactive and contextualized Mathematics teaching improves pupil engagement and achievement (Bernardo, 2019). Reyes and Castillo (2021) further noted that challenges such as limited resources and large class sizes affect teachers' ability to implement effective pedagogy consistently.

Research Objectives

This study aims to examine how effective pedagogical practices enhance Mathematics learning among pupils at Tungngod Elementary School. Specifically, it seeks to identify the teaching strategies and instructional approaches employed by Mathematics teachers in delivering key mathematical concepts and skills. The study also aims to examine how these pedagogical practices support pupils' conceptual understanding, problem-solving abilities, and engagement in Mathematics classes. In addition, it explores teachers' perceptions of effective Mathematics instruction and the factors that influence their selection and implementation of teaching strategies. The study further seeks to identify the challenges encountered by teachers in applying effective pedagogical practices in Mathematics teaching and how these challenges affect classroom instruction. Finally, the study aims to analyze pupils' learning experiences and responses to the pedagogical approaches used, with the goal of generating evidence-based insights that may inform instructional improvement, professional development, and school-based initiatives to strengthen Mathematics education at Tungngod Elementary School.

Methodology

This study employed a qualitative descriptive research design to examine how effective pedagogical practices enhanced Mathematics learning among pupils at Tungngod Elementary School. This design was appropriate because the study sought to provide an in-depth and contextualized understanding of teachers' instructional practices, perceptions, and experiences, as well as pupils' responses to Mathematics teaching strategies within the natural classroom setting. The qualitative approach allowed the researcher to capture rich descriptions of pedagogical processes and learning experiences rather than measure outcomes through numerical data.

The participants of the study consisted of selected Mathematics teachers and elementary pupils at Tungngod Elementary School. Purposive sampling was used to ensure that teacher-participants had direct involvement in teaching Mathematics and sufficient classroom experience, while pupil-participants were those regularly exposed to the identified pedagogical practices. This sampling method ensured that participants could provide relevant and meaningful insights aligned with the research objectives.

Data were gathered through semi-structured interviews, classroom observations, and document analysis. Semi-structured interviews were conducted with teachers to explore their pedagogical practices, perceptions of effective Mathematics instruction, and challenges encountered in teaching. Classroom observations were carried out to examine actual instructional strategies, pupil engagement, interaction patterns, and problem-solving activities during Mathematics lessons. Document analysis involved the review of lesson plans, instructional materials, and assessment tools to determine how pedagogical practices were reflected in instructional planning.

Data analysis was conducted using thematic analysis. Interview transcripts, observation notes, and documents were systematically coded, categorized, and analyzed to identify recurring patterns and themes related to pedagogy, learner engagement, and instructional challenges. Triangulation of data sources strengthened the credibility and trustworthiness of the findings. Ethical considerations were strictly observed throughout the study, including securing informed consent, maintaining confidentiality, and ensuring that all data were used solely for academic and research purposes.

Results/Findings

Based on the thematic analysis of data gathered through semi-structured interviews, classroom observations, and document analysis, several themes emerged that address the research objectives of the study on enhancing Mathematics learning through effective pedagogical practices at Tungngod Elementary School.

Theme 1: Learner-Centered and Contextualized Pedagogical Practices in Mathematics Instruction

In response to the objective of identifying pedagogical practices employed by Mathematics teachers, findings revealed that teachers consistently used learner-centered and contextualized strategies to facilitate understanding of mathematical concepts. Classroom observations showed the use of real-life examples, group problem-solving activities, and differentiated tasks tailored to pupils' abilities.

One teacher stated,
"Mas naiintindihan ng mga bata ang Math kapag inuugnay ko ito sa mga sitwasyon sa bahay o sa komunidad."
Another participant shared,
"Gumagamit ako ng pang-araw-araw na halimbawa tulad ng pera at sukat para mas madali nilang maunawaan."
A third teacher remarked,
"Hinahati ko ang mga gawain depende sa kakayahan ng mga bata para lahat ay makasabay."

These responses indicate that teachers exercised instructional flexibility, a practice observed during classroom visits where lessons were adapted to pupils' contexts. This finding suggests that learner-centered pedagogy enhanced accessibility and comprehension, aligning with the study's objective of examining strategies that support Mathematics learning.

Theme 2: Pedagogical Practices Supporting Conceptual Understanding and Problem-Solving Skills

Addressing the objective on how pedagogy supports learning outcomes, the study found that effective teaching strategies emphasized conceptual understanding and problem-solving rather than rote computation. Observations revealed the use of guided questioning, visual aids, and step-by-step demonstrations.

One teacher explained,
"Hindi lang sagot ang mahalaga; pinapaliwanag ko kung paano nila nakuha ang sagot."
Another teacher stated,
"Pinapagawa ko sa kanila ang problema sa grupo para matuto silang mag-isip at magtulungan."
A pupil participant expressed,
"Mas madali ang Math kapag may paliwanag at may drawing o halimbawa."

These responses suggest that pedagogical practices encouraged reasoning and active engagement. The triangulation of interview and observation data confirmed that such strategies helped pupils develop deeper understanding and confidence in solving mathematical problems.

Theme 3: Teachers' Perceptions of Effective Mathematics Pedagogy

In line with the objective of exploring teachers' perceptions, findings revealed that teachers viewed effective Mathematics instruction as interactive, structured, and supportive. Teachers emphasized the importance of patience, clarity and varied strategies.

One teacher shared,
"Ang epektibong pagtuturo ng Math ay yung hindi minamadali ang mga bata."
Another participant noted,
"Kailangan iba-iba ang paraan ng pagtuturo dahil hindi pare-pareho ang mga bata."
A third teacher added,
"Kapag masaya ang klase, mas natututo ang mga bata."

These responses indicate that teachers' instructional decisions were influenced by their understanding of learners' needs. This perception guided their pedagogical choices, as reflected in lesson plans and observed classroom practices.

Theme 4: Challenges in Implementing Effective Pedagogical Practices

Responding to the objective of identifying challenges, teachers reported constraints that affected the implementation of effective pedagogy. Interviews and document analysis revealed issues related to limited instructional materials, time constraints and varied learner abilities.

One teacher stated,
"Mahirap minsan dahil kulang ang gamit para sa Math activities."
Another remarked,
"Hindi sapat ang oras para matulungan lahat ng bata."
A third teacher explained,
"May mga batang hirap talaga sa Math kaya kailangan ng dagdag na oras."

These challenges were evident during observations where teachers had to manage large classes with limited resources. The findings suggest that while teachers demonstrated effective practices, structural constraints affected the consistency of implementation.

Theme 5: Pupils' Learning Experiences and Engagement in Mathematics Classes

Addressing the objective on pupils' responses, findings showed that pupils were more engaged and participative when interactive and contextualized strategies were used. Classroom observations revealed increased participation during group work and hands-on activities.

One pupil shared,
"Mas gusto ko ang Math kapag may group activity."
Another pupil stated,
"Mas naiintindihan ko kapag may halimbawa."
A third pupil expressed,
"Masaya ang Math kapag tinutulungan kami ng teacher."

These responses suggest that effective pedagogical practices fostered positive learning experiences. The triangulation of pupil responses and classroom observations confirmed that engagement and motivation increased when instruction was learner-centered.
Hence, the findings demonstrate that effective pedagogical practices at Tungngod Elementary School enhanced Mathematics learning by promoting conceptual understanding, problem-solving skills, and learner engagement. While teachers showed strong commitment to learner-centered instruction, challenges such as limited resources and time constraints influenced the extent of implementation. The study affirms that pedagogy plays a critical role in improving Mathematics learning and highlights the need for sustained instructional support to strengthen teaching practices.

Discussions

The findings of this study indicate that effective pedagogical practices play a significant role in enhancing Mathematics learning among pupils at Tungngod Elementary School. Teachers' use of learner-centered and contextualized instructional strategies, such as connecting mathematical concepts to real-life situations, differentiated tasks, and collaborative activities, enabled pupils to better understand abstract concepts. These practices fostered active participation and made learning more meaningful, supporting the idea that Mathematics instruction is most effective when pupils are actively engaged in the learning process. Classroom observations confirmed that pupils demonstrated greater attentiveness and willingness to participate when lessons were relevant to their daily experiences.
The study also revealed that pedagogical practices emphasizing conceptual understanding and problem-solving contributed positively to pupils' mathematical competence. Teachers encouraged learners to explain their reasoning, work collaboratively, and use visual representations to solve problems. This approach helped pupils develop deeper understanding rather than relying on rote computation. Pupils' responses showed increased confidence in solving mathematical problems when instruction focused on explanation and guided practice. These findings highlight the importance of teaching approaches that promote reasoning, communication, and higher-order thinking in Mathematics learning.
Despite the positive impact of effective pedagogy, the study identified challenges that affected the consistent

implementation of these practices. Limited instructional materials, time constraints, and varying learner abilities were reported as barriers to maximizing pedagogical effectiveness. Nonetheless, pupils' positive learning experiences and increased engagement suggest that even within existing constraints, thoughtful and learner-centered teaching strategies can significantly improve Mathematics learning. The findings underscore the need for continued instructional support, resource provision, and professional development to help teachers sustain and strengthen effective pedagogical practices in Mathematics

Conclusions

This study concludes that effective pedagogical practices significantly enhance Mathematics learning among pupils at Tungngod Elementary School. The results demonstrated that learner-centered and contextualized instructional strategies enabled pupils to better understand mathematical concepts, actively participate in classroom activities, and develop confidence in problem-solving. Teaching approaches that emphasized conceptual understanding, guided practice, and collaborative learning were particularly effective in promoting deeper comprehension rather than rote memorization. Despite challenges such as limited instructional materials, time constraints, and diverse learner abilities, teachers were able to implement meaningful pedagogical practices that positively influenced pupils' engagement and learning experiences. Conclusively, the findings affirm that effective pedagogy plays a crucial role in improving Mathematics learning and that instructional practices grounded in pupils' needs and contexts can lead to more meaningful and sustained learning outcomes.

Implications of the Study

The findings of this study imply that strengthening learner-centered and contextualized pedagogical practices can further improve Mathematics learning in elementary schools. Teachers may benefit from continued professional development focused on innovative instructional strategies that promote conceptual understanding and problem-solving skills. School administrators should consider providing adequate instructional resources and allocating sufficient time for lesson preparation and collaborative planning to support effective pedagogy. The positive impact of interactive and student-focused strategies on pupil engagement also suggests the need to institutionalize such approaches in Mathematics instruction. Furthermore, addressing challenges related to diverse learner abilities highlights the importance of differentiated instruction and additional learner support. Lastly, the study implies that future research may explore the long-term effects of effective pedagogical practices on Mathematics achievement and examine their applicability across different school contexts to strengthen Mathematics education more broadly.

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Conflicts of Interests

The author declares no conflict of interest.

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