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Bridging Language and Learning: Lived Experiences of Mathematics Teachers in Mother Tongue-Based and English Instruction

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Abstract

This qualitative phenomenological study explores the lived experiences of Grade 1–3 mathematics teachers in multilingual classrooms in the Philippines. It highlights challenges encountered and strategies employed in implementing mother-tongue-based multilingual education (MTB-MLE) alongside English instruction. Thematic analysis revealed key issues such as language barriers, code-switching practices, and limited instructional resources. Teachers reported using differentiated instruction, cultural relevance, and collaborative strategies to address the complexity of multilingual instruction. The findings offer insight into effective pedagogical practices for mathematics education in linguistically diverse settings.

Keywords: bilingual pedagogy, code-switching, differentiated instruction, mathematics, mother-tongue-based instruction, multilingual education

INTRODUCTION

Mathematics instruction in multilingual classrooms poses unique challenges for educators, particularly in regions with linguistic diversity like the Philippines. The Department of Education's MTB-MLE policy mandates the use of the mother tongue as the medium of instruction from Kindergarten to Grade 3 to enhance comprehension and learning outcomes (DepEd, 2017). However, educators must reconcile this directive with the global emphasis on English proficiency and standardized mathematical language (Barwell, 2020; Cummins, 2021).

This study investigates the lived experiences of elementary mathematics teachers using both mother tongue and English, exploring the tensions, adaptations, and outcomes associated with multilingual instruction.

METHODOLOGY

Using a phenomenological approach informed by Moustakas (1994), the study captures the subjective experiences of 16 Grade 1–3 mathematics teachers from public elementary schools in Matag-ob, Leyte. Data were collected through semi-structured interviews and analyzed using heuristic inquiry to identify emerging themes. Ethical standards, including informed consent and participant anonymity, were upheld throughout the research.

RESULTS AND DISCUSSION

There were various themes that emerged after analyzing the interview transcripts.





Theme 1: Language Barriers in Mathematics Instruction

A primary challenge reported by participants was the difficulty in translating mathematical concepts into the mother tongue, due to limited or nonexistent equivalents. Teachers noted that certain terms, such as *denominator* or *polygon*, do not have direct translations, leading to confusion among students (Participant BR).

This aligns with the findings of Jalil et al. (2023), who emphasize that language barriers hinder students' ability to comprehend abstract mathematical concepts. Moreover, the need to develop a standardized mathematical vocabulary in local languages is urgent (Alexander, 2000).

Theme 2: Code-Switching as a Cognitive Bridge

Code-switching emerged as a common pedagogical strategy. Teachers reported that alternating between the mother tongue and English helped bridge conceptual gaps, allowing students to relate new knowledge to familiar language structures.

Participants described using mother tongue to introduce concepts, followed by reinforcement in English (Habintwali et al., 2024; Malindi et al., 2023). While effective, this practice sometimes resulted in inconsistencies and student confusion when terminology switched unexpectedly (Tupas, 2015).

Theme 3: Instructional Resource Limitations

Teachers highlighted a lack of teaching materials in the mother tongue, which forced them to either translate English resources manually or rely heavily on oral explanations (Mampane, 2024). This lack of materials strained preparation time and reduced instructional quality, confirming concerns raised by Benson (2004) and Reyes (2017) regarding the inadequacy of localized resources in multilingual education.

Theme 4: Student Comprehension and Transition Challenges

Students exhibited difficulty transitioning between languages, especially in assessments and abstract reasoning. Many struggled when math terms in English were introduced without adequate scaffolding in the mother tongue (Reeve, 2020). Teachers noted that success often depended on the students' linguistic background and exposure at home (Participant J).

Theme 5: Strategic Use of Visual Aids and Hands-On Learning

To overcome linguistic barriers, teachers employed bilingual flashcards, diagrams, and manipulatives. These tools helped students visualize mathematical operations and connect them to everyday contexts. Similar to findings by García, Johnson, and Seltzer (2021), visual aids were especially useful for reinforcing both language and content knowledge.

Theme 6: Culturally Relevant Instruction

Participants shared that integrating local examples and cultural references helped contextualize mathematical problems, increasing engagement and comprehension (Gay, 2018; Villegas & Irvine, 2020). For instance, teachers used local food items or games to explain fractions and arithmetic operations.

Theme 7: Differentiated Instruction for Multilingual Classrooms

Teachers reported using differentiated instruction to address varying levels of linguistic and cognitive development. Strategies included learning stations, group work, and technology-enhanced learning to accommodate diverse learners (Santangelo & Tomlinson, 2018). This approach was seen as essential in multilingual classrooms with uneven language exposure.

Theme 8: Collaborative Practices and Teacher Support

Teachers emphasized the importance of collaboration with peers for resource-sharing and professional development. Despite limited institutional support, participants initiated peer mentoring and co-planning



to enhance instruction (Mthembu et al., 2024).

Support from parents and community members was also identified as critical. Gathering feedback helped teachers adjust methods to better meet students' linguistic and cultural needs (Epstein, 2019).

Theme 9: Assessing Effectiveness of Instructional Language

Teachers assessed instructional effectiveness using a range of criteria:

- Student learning outcomes. Performance on tasks, participation, and assessments (García, 2021).
- Engagement and motivation. Observations of enthusiasm, attention, and willingness to participate (Wang & Holcombe, 2021).
- Self-reflection. Ongoing evaluation of teaching practices and responsiveness to classroom dynamics.
- **Parent and community feedback.** Insights from families helped confirm the relevance and impact of instructional strategies.

CONCLUSION

This study reveals that multilingual mathematics instruction requires careful balancing of linguistic, cultural, and pedagogical factors. Teachers must be creative and adaptive, often working around systemic limitations such as resource scarcity and insufficient training. Their strategic use of code-switching, culturally relevant content, and differentiated instruction offers a model for effective bilingual pedagogy.

RECOMMENDATIONS

Professional Development. Establish regular training in bilingual mathematics instruction, emphasizing translanguaging, code-switching, and culturally responsive pedagogy.

- **Resource Development.** Invest in creating and disseminating bilingual and mother tongue teaching materials for mathematics.
- **Curriculum Design.** Incorporate flexibility to allow strategic language transitions and contextual learning.
- **Policy Support.** Institutionalize collaborative practices and mentorship to sustain teaching quality in multilingual settings.
- **Future Research.** Explore longitudinal effects of MTB-MLE on student achievement in mathematics, especially beyond primary education.

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