



Assessing the mother tongue-based multilingual education policy in the Philippine mathematics education

Katherine Therese S. Tungul*, Minie Rose C. Lapinid

De La Salle University, Philippines

*Corresponding Author: katherine.tungul@dlsu.edu.ph

ABSTRACT

The Philippine Department of Education developed and has been implementing the Mother Tongue-Based Multilingual Education (MTB-MLE) policy in response to encouraging findings from earlier research studies on using the mother tongue in early education. The purpose of this study is to evaluate how the MTB-MLE Policy is being implemented in terms of classroom instruction, teacher and school readiness, and student proficiency in their mother tongue, Kapampangan, and mathematics in the first five years of implementation in the Sasmuan District of Pampanga, Philippines, using an explanatory sequential mixed-methods research design. Teachers rated the implementation of the MTB-MLE policy positively but experienced some difficulties. Data analysis from interviews with teachers, school heads, district supervisors, and class observations revealed some issues, concerns, coping strategies, and best practices. The results of the two achievement exams students took were satisfactory, providing evidence of the value of using their native tongues in the classroom amidst challenges. Implications of the results were drawn for further improvement in the practice of the MTB-MLE policy in Mathematics Education.

Keywords: mother tongue-based multilingual education, language and mathematics, language policy, medium of instruction

Article history

Received:
5 Feb 2024

Revised:
31 March 2024

Accepted:
13 June 2024

Published:
18 September 2024

Citation (APA Style): Tungul, K. T. S., & Lapinid M. R. C. (2024). Assessing the mother tongue-based multilingual education policy in the Philippine mathematics education. *Cakrawala Pendidikan: Jurnal Ilmiah Pendidikan*, 43(3), 607-618. DOI: <https://doi.org/10.21831/cp.v43i3.66558>

INTRODUCTION

Since the teacher and students communicate mathematical concepts through spoken language or written materials, mathematics and language are tightly intertwined in the mathematics learning process (Kaphesi, 2003). This suggests that a student must be a skilled language user to succeed in learning mathematics. The broad language policy in education, on the other hand, causes certain children to struggle and perform poorly when studying mathematics if they cannot meet the language requirements of instruction (Kaphesi, 2003; Barton et al., 2005). Thus, language is characterized by Robertson and Graven (2020) as an enabling or excluding factor in the teaching and learning of mathematics.

The Philippines is a diverse and multilingual country, with over 180 languages spoken throughout its lands. It has faced the challenge of unifying the nation through a single language policy, which led to the declaration of Tagalog as the Filipino language (Wa-Mbaleka, 2014; Monje et al., 2019). Similarly, the best language policy for the educational system has been a topic of ongoing discussion among those who forge educational policies.

The 1987 Policy on Bilingual Education sought to promote national fluency in English and the Philippines (Filipino) by teaching both languages and their use as instructional media at all levels. In addition, various indigenous languages of the Philippines, especially those not Tagalog, have been made official auxiliary languages for instruction in their spoken areas (Department of Education of the Philippines, 1987). As globalization arose in 2000 and beyond, another language policy modified the 1987 policy. Executive Order 210, "Establishing the Policy to Strengthen

English as a Second Language in the Educational System,” stated that English be taught as a second language, starting with the First Grade. Although English was still being used in the classroom, its declining use was blamed for impeding English proficiency growth, which brought back the English-first strategy. Some people object to this policy because of the need to consider marginalized communities (UNESCO, 2003) and the consistently poor performance of Filipino students in large-scale international assessments (Frialde, 2007; Gunigundo, 2010; Navarro et al., 2016).

The term "mother tongue" refers to an individual's initial language acquisition, the language with which they primarily identify, the language in which they possess the greatest proficiency, and the language they use most frequently. This linguistic phenomenon is also commonly called the first language, L1, vernacular, mother tongue, or homeland language, as recognized by UNESCO in 2003. There is an increasing global recognition that implementing MTB-MLE can serve as a viable solution to address the issue of poor academic performance among students in Mathematics. Despite the ongoing trend of globalization and interconnectivity, adopting MTB-MLE remains crucial in facilitating children's cognitive and affective growth and their acquisition of more widely spoken languages (Heugh et al., 2012). Over the years, UNESCO has consistently pushed for the MTB-MLE Policy, declaring that bilingual and multilingual education is best complemented and preceded by children learning in their mother tongues. The MTB-MLE also contributes to the country's rich linguistic culture. The "Education for All" initiative by UNESCO has been a worldwide pledge to provide quality education while promoting inclusivity and equality in education as outlined in its sustainable development objectives. Notwithstanding, this requires considering the modern civilization's numerous cultural and linguistic settings. These present a dilemma to policymakers who must, on the one hand, ensure that all members of a nation's population meet normative standards while, on the other hand, defending their right to be distinct from those who are part of certain language and ethnic groupings (UNESCO, 2003).

Implementing the MTB-MLE policy is difficult. The language used for school instruction is heavily influenced by the country's general language policy, which depends on classroom instruction, teacher readiness, school readiness, and the attitudes of the stakeholders who implement the policy. Moreover, Burton (2013) mentioned that the Philippines has primarily conducted Mother Tongue instruction in the community rather than in a national setting due to its diverse culture and language. Given the diversity of Philippine culture and languages, the Department of Education has contracted with divisions and schools to implement MTB-MLE in a manner that is specifically tailored to each of their needs (Monje et al., 2019). Therefore, a more thorough research of how students' native languages affect arithmetic learning and teaching is necessary for mathematical education (Barwell et al., 2021). The present study was conceived and executed within the Sasmuan district of Pampanga against the prevailing context and environment. The primary objective of this investigation is to evaluate the efficacy of the mother-tongue-based multilingual education policy, with a specific focus on its impact on mathematics classroom instruction, teacher and school preparedness, teacher attitudes towards the policy, student proficiency in KaPampangan, and student mathematics performance.

This particular study bears significant importance as results obtained from analyzing the implementation of the MTB-MLE program provide insights into how courses can be delivered more effectively based on language usage. Enhancing classroom instruction and preparation can indicate teachers' cognizance of policy implementation. Lastly, the stakeholders' feedback on best practices for addressing challenging issues and concerns is of significant use to Department of Education officials, curriculum designers, and researchers.

METHOD

An explanatory sequential mixed methods design was employed in the investigation. Quantitative data was collected and analyzed from surveys and achievement tests to achieve the study's goal. Transcripts from the interviews and class observations comprised the qualitative data used to understand the quantitative data better. The execution of the study above necessitated the endorsement of the educational institution administrators and the superintendent of the Pampanga

sector of the Department of Education (DepEd). The respondents were informed of the study's goals and the scope of their participation. Their permission to take part in the study was requested and obtained. The overall collection of data took twenty-eight weeks.

The survey questionnaire about teachers' perceptions of the MTB-MLE policy implementation comprises twenty-nine (29) items, twenty-two (22) of which were adapted from the study of Safary Wa-Mbaleka (2014). A 4-point Likert scale, which offers the options of "strongly agree" (4) through "strongly disagree" (1), is proffered to teachers for their selection. Three certified psychometricians and two specialists in mathematics education validated this questionnaire. A pilot test was conducted on 10% of the primary teacher population. The questionnaire displayed exceptional internal consistency, as indicated by its high Cronbach alpha score of .988 (Salkind, 2007).

The Mother Tongue (Kapampangan) Achievement Test and the Mathematics Achievement Test are researcher-made. Each test contains 40 multiple-choice questions based on DepEd's K to 12 Curriculum Guide and the topics covered in the key stage Kindergarten to Grade 3 mathematics textbooks. Six specialists evaluated these tests. Items were changed following their advice and suggestions. Using the test-retest approach, sixty-eight Grade 3 students were tested as part of a pilot study to determine each achievement test's reliability. The Mother Tongue Achievement Test and the Mathematics Achievement Test computed Pearson correlation coefficients were $r=.656$ and $r=.754$, showing a moderate to good degree and a great degree of positive linear association between their initial test and retest scores, respectively. The p-values for both tests were .656 and .754 at 0.01 (2-tailed) significance level, implying the achievement tests are reliable. The classroom observation checklist was adapted from Sario et al.'s (2014) study to ensure that observers focused on the behavioral manifestations of students speaking their home tongue in mathematics classrooms.

Grades 1 to 3 mathematics teachers and third-grade students from all public schools in the Sasmuan district of the province of Pampanga participated in the study. The selection of participants included 332 third-grade students, 58 kindergartens through third-grade teachers, nine principals or school heads, and the district's school supervisor. The revised and pilot-tested Mother Tongue and mathematics achievement tests were administered to the remaining 264 Grade 3 students. These were students of the teachers who were surveyed. The students underwent the process of implementing the MTB-MLE program from their initial enrolment in kindergarten. The researcher, a cooperating teacher, and the school head of each educational institution observed two instructors from separate schools twice during their instructional sessions. Interviews were conducted among 35 mathematics teachers, 13 school heads, and the school's district supervisor throughout half of a school year, approximately within 20 weeks.

Descriptive and inferential statistics were employed to scrutinize quantitative data. The present study employed the utilization of DepEd Order No. 8, s.2015, which delineates the "Policy Guidelines on Classroom Assessment for K to 12 Basic Education Program," as a guiding framework to portray the students' aptitude in both their native vernacular and the domain of mathematics. Kindly refer to Table 1 for further details. Students' behavior during classroom observations and teachers' responses on the survey questionnaire are described in terms of the levels of agreement in each item indicator. Please see Table 2.

Table 1. Students' proficiency level descriptors

Descriptor	Grading Scale	Remarks
Outstanding	90 - 100	Passed
Very Satisfactory	85 - 89	Passed
Satisfactory	80 - 84	Passed
Fairly Satisfactory	75 - 79	Passed
Did not meet Expectations	Below 75	Failed

In addition, the classroom observations and individual interviews were meticulously examined to authenticate and corroborate the responses provided by the teachers in the survey questionnaire. The first author started by familiarizing with the data, generated the initial codes,

and collated codes into themes. The themes were then mapped to the questionnaire item responses and integrated correspondingly into this research report. The second author further checked this.

Table 2. Markings of observed values and levels of agreement

Marking	Frequency of Behavior	Level of Agreement
3.1 – 4.0	Always Observed	Strongly Agree
2.1 – 3.0	Sometimes Observed	Agree
1.1 to 2.0	Rarely Observed	Disagree
1.0	Not Observed	Strongly Disagree

FINDINGS AND DISCUSSION

Findings

The following results pertain to educators' perceptions and observations and subdivides them into the MTB-MLE classroom instruction, teacher readiness, school readiness, and teachers' perceptions of the MTB-MLE policy. Students' achievement tests in mathematics and their mother tongue results are also presented. Teachers' and observers' ratings vary by (at most) 0.77 standard deviation units, indicating relatively clustered responses around the mean.

The MTB-MLE classroom instruction

The MTB-MLE classroom instruction results are presented based on the cognitive, affective, and psychomotor aspects of learning. These are further supported by interviews and the researchers' and observers' field notes and narratives. According to Henning (2013), the domain of cognition encompasses acquiring knowledge and expanding one's intellectual faculties. This pertains to the ability to retain and identify pieces of information and comprehend logical sequences and conceptual structures that facilitate the cultivation of cognitive skills and aptitudes.

Teachers generally agree with the given statements (mean=2.67) on cognitive aspects of learning. They perceive pupils as learning mathematical concepts when their teachers speak Kapampangan and can analyze word problems when these are written in Kapampangan. The observers' mean ratings are consistently over 3 (always observed). They observed children manifest reasoning skills, interact meaningfully with the materials, their teacher, and peers, learn independently, show the ability to draw conclusions and generalizations, are inquisitive and always ask questions, be reflective and can apply what they learned in the classroom. More than 60% of the classes observed showed promise on the assessments for applying the concepts and skills learned in problem-solving. One of the school heads consistently noted, "The written test scores of the pupils are getting higher since the implementation of MTB-MLE."

The affective domain encompasses emotional responses to situations, including feelings, values, excitement, motives, and attitudes (Wisbey, 2013). The teachers noted that if the course materials are written in Kapampangan, the students appear more participative in the class discussion. Pupils tend to favour learning materials that are written in their native tongue, as they are more easily able to comprehend and establish a connection with the Kapampangan language. In an interview with the students, some of their responses expressed mathematical ideas in MT make them feel smart and confident in mathematics, "Mas buri kung sasagut pag Kapampangan." ["I feel more confident in reciting in Kapampangan."] Unlike the result of the study conducted by Dela Cruz and Lapinid (2014), wherein students had difficulties translating English problems into mathematical equations due to unfamiliar words and the lack of comprehension, pupils in this study felt more comfortable solving word problems in Kapampangan despite problems appearing longer in terms of number of words than their English translations. Most of them answered Kapampangan when asked which language their preferred classroom instruction is medium. Nonetheless, the pupils still valued learning new languages even though they were highly at ease in their MT.

The observers concurred that because pupils were permitted to speak in their MT in class, they felt like they belonged and could freely express themselves. Every item received mean scores

higher than 2 and 3, corresponding to "Agree" and "Sometimes Observed," respectively, by the teachers and the observers.

Class discussions, worksheets, and assessment materials are generally in Kapampangan, albeit not all pupils speak the language. One of the teachers stated, "There are Tagalog (Filipino) and few English speakers. Parents were advised to use Kapampangan at home to develop the understanding and ability to speak in Kapampangan.". The schools are using this as a strategy to address the problem of having students who are non-Kapampangan speakers. According to a teacher, she translates the lesson into Kapampangan, Filipino, and English during the discussion when confronted with this situation. Additionally, it was observed that the teachers requested students translate their final response into Kapampangan every time they answered in Filipino or English.

The psychomotor domain includes using motor abilities, coordination, and physical movement (Wisbey, 2013). The refinement of these competencies necessitates frequent and deliberate exercise, and their evaluation is contingent upon factors such as velocity, precision, scope, sequence, and methodology. The instructional activities conducted in the classroom revealed a discernible acquisition of psychomotor aptitude, with particular emphasis on cultivating problem-solving proficiency. The pupils exhibited a tendency to express cogent and concise descriptions of their approaches to resolving linguistic conundrums.

The school administrators noticed that students are more actively involved in a class that uses their mother tongue. Pupils recite confidently, talk fluently in Kapampangan, communicate well, and display creativity in the classroom. This is also partially attributable to the teacher-led classroom activities that encourage the development of their pupils' psychomotor abilities.

Three-adjective sequences

This subsection is devoted to three adjective sequences, exploring the participants' discernment when they encountered the challenge of using three adjectives before a head noun. It aims to explain the cognitive dynamics and decision-making mechanisms employed as the complexity of adjectival arrangement increases.

The focus of this category extends to four intricate sequences of adjectives, each comprising three prenominal adjectives. These sequences include adjectives of Opinion – Age – Origin (PAO), Opinion – Shape – Colour (PSL), Opinion – Size – Colour (PZL), and Size – Age – Origin (ZAO). As shown in Table 2, PAO is the most accurately processed sequence, scoring 40.47%. On the other hand, ZAO displays the lowest accuracy, scoring 19.04%, which may indicate a cognitive challenge in construing sequences involving adjectives of size, age, and origin.

Most pupils were observed to recite the counting numbers in English, Filipino, and Kapampangan. However, since counting numbers in English is shorter, easier to pronounce, and easier to spell than in the Filipino and Kapampangan languages, the pupils tend to count in English. Consequently, the teacher asked students to restate these again in Kapampangan. This is validated when three to four pupils mentioned in the interview, "Mas saguli ing mamilang one, two, three, kesa king metung, adwa, ampong atlu." ["It is easier to count with one, two, and three instead of metung, adwa, ampong atlu."]

Table 3. Translation of the basic arithmetic operations into Kapampangan

Basic Arithmetic Operations	Kapampangan Terms (Verbs) Used in Classroom Instruction	Translation
Add	Piyaben	Put together
Subtract	Maglako	Remove
Multiply	Ulitan	Repeat
Divide	I grupu	Group

Nevertheless, with a mean of 3.15 out of 4, teachers could better express themselves when teaching mathematics in Kapampangan than in other languages. Although most teachers answered

“Agree” in this statement, some school heads said during the individual interview, “Not all the teachers showed expertise in using Kapampangan as the medium of instruction.”

Inconsistencies in the implementation were observed in classes as some teachers were unsure how to implement the MTB-MLE Policy in mathematics classes. For example, some teachers wrote their assessments in full Kapampangan texts while others wrote these in mixed Kapampangan and English texts. Still, at times, they gave instructions using the English language only. A teacher opines that the Bilingual Education Policy surpasses the MTB-MLE Policy, stating, “I think that Bilingual Education is superior. I find some mathematics Kapampangan terms hard to pronounce. We can keep the medium of instruction as Kapampangan. However, we should keep the math terms in English.” Some of these terms are difficult to translate to Kapampangan, like “regrouping or borrowing and rounding off.” Another teacher expressed employing code-switching as a tactic. To explain the meaning of mathematical phrases that could not be translated into Kapampangan, they frequently jump between languages. Notwithstanding, using symbols and figures in mathematics and code-switching facilitated communication between the teacher and the pupils. This was also found to be the solution of most schools observed. If there had been enough non-Kapampangan speakers, the school principal suggested grouping them together in a separate class and teaching them in either Filipino or English.

School readiness

The evaluation of school readiness is about the crucial support systems in place, such as the availability of MTB-MLE materials, the quality of training provided, the level of faculty competence, and the comprehensiveness of the curriculum. The aspect of teacher training is the least rated (mean=2.91) among many of their peers, indicating a need for improvement in this area. All other aspects of school readiness, such as having enough MTB-MLE materials and its fit for use and the school’s MTB-MLE curriculum, are perceived as adequate, with mean ratings of over 3.

Learning materials include but are not limited to various pedagogical materials, including textbooks, instructional manuals, supplementary workbooks, and syllabi. These materials are indispensable as they facilitate student learning, significantly enhancing academic performance. The mean of teachers' responses regarding providing adequate instructional resource materials is 3.06. Unfortunately, there were no learning guides and textbooks for kindergarten and Grade 1 during the study. On the other hand, the Grade 2 and 3 levels completed their books only four years after the policy's implementation. The materials were said to be distributed equally among the schools. Nonetheless, the learning materials provided to the district were not enough to accommodate the whole population. Consequently, teachers created their teaching materials to meet their pupils' needs without teaching materials from the DepEd.

The teachers in this study purport to possess the ability to instruct mathematics according to the MTB-MLE guidelines, as indicated by their mean ratings of higher than 3. Nevertheless, the classroom observations divulge lapses in adhering to the MTB-MLE policy concerning determining which actions to take and which to avoid. The ability of teachers to disseminate mathematical knowledge in their mother tongue is hindered to some extent by inadequate training.

Observations in the classroom have revealed variations in how teachers apply the policy. Some of them ask their pupils to count in Kapampangan. Others require their pupils to count in both English and Kapampangan. As was previously indicated, the teachers' assessments also differ. The school heads and principals have also observed several issues with teachers, such as term translation and proficiency in Kapampangan. One of the principals was cited as saying, “Teachers are asked to be resourceful.” However, it was unclear to practitioners what they could and could not do since instructors lacked the training and seminars to administer the MTB-MLE Policy adequately using established protocols. As a result, applying the policy led to various interpretations and was carried out differently by some schools. Lastly, school heads received complaints from parents that learners had difficulty learning English lessons when promoted to higher Grade levels. The MTB-MLE policy's objectives were presented to them during the parents' orientation, albeit this consultative meeting did not get complete attendance.

Pupils' achievement in mother tongue and mathematics

Table 4 shows the mean scores (out of 40 points in each test) of 264 pupils who took the Mathematics achievement test and the Mother Tongue achievement test. Following the mandate of DepEd Order No. 8, 2015, both grades were transmuted into 75%, deemed fairly satisfactory (Department of Education of the Philippines, 2015). These scores show a fairly satisfactory proficiency level. The calculated correlation coefficient, $r=.749.$, indicates a strong positive linear relationship between these two achievement tests and is significant at the 0.01 level (2-tailed). This implies that a student who performs well on the mother tongue achievement test also performs well on the mathematics achievement test.

Table 4. Pupils' achievement scores in the Mother Tongue and Mathematics

Math Scores			Mother Tongue Scores			Pearson Correlation
M	SD	N	M	SD	N	r
22.91	6.693	264	23.03	6.080	264	.749**

Discussion

Primary-level teachers responsible for instructing students in all course subjects, including mathematics, are considered native language teachers for pupils. According to the MTB-MLE policy's mandate, the mother tongue serves as both a subject area and language of instruction and learning (Department of Education of the Philippines, 2009). Non-native speakers are asked to speak Kapampangan at home and whenever pupils are asked to translate or add the numbers in Kapampangan when they respond in Filipino or English. This begs the question of whether a student's mother tongue, in this case, Kapampangan for the majority of the students, serves as a means or an end, or both, in the learning of mathematics and whether it is advantageous or necessary for non-native speaker students to learn the Kapampangan mathematical numbers even if they prefer to count in English, which is the medium of instruction in their future years. The scenario presents a challenge for pupils in a trilingual context within the classroom, whose primary language is English, whose secondary language is Filipino, and whose official language of instruction is Kapampangan. The requirement to acquire proficiency in the local dialect presents an added encumbrance to the essential mathematical aptitude that students must master. It is posited that a comprehensive evaluation of linguistic expertise is conducted in the context of bilingual instruction to determine the appropriate level of instruction for pupils in classes taught in that vernacular, thereby optimizing the educational experience (Launio, 2015). It may be advisable to leave the task of learning the Kapampangan language to the volition of the student and their parent or guardian rather than making it a mandatory requirement for those who do not possess fluency in the language (Jourdain & Sharma, 2016; Craig & Morgan, 2015). Using the majority of students' MT is not necessarily the best technique for dealing with language concerns in mathematics classes, according to Barwell et al. (2021), who also recommended striking a balance between the obstacles that students may have and their potential strengths warranting unconventional and innovative strategies in dealing with classes of multiple first-language speakers. There is a need to explore the limits and opportunities of using multiple MTs in specific mathematics classrooms and contexts so that each learner's first language can be acknowledged (Meyer et al., 2021).

As societies diversify due to migration, mobile technology, social media, and globalization in trade and employment, learners and teachers must unavoidably negotiate a difficult linguistic environment (Barwell et al., 2021). It is not surprising that the Sasmuan district offers bilingual or trilingual classrooms given the variety of languages spoken in the classroom. The teacher is compelled to adeptly adapt and translate instructional materials in regional, national, and English languages. Educators utilize symbols, pictures, and code-switching techniques to address the challenge of finding Kapampangan equivalents for mathematical terminology. This approach facilitates understanding for students who do not have the language as their first language and fosters a connection with them. This has been supported by research conducted across the nation (e.g., Navarro et al., 2016; Gempeso & Mendez, 2021). Ahmad and Kamaruzaman (2009) contend

that the practice of code-switching confers benefits upon students in their acquisition of a second language. Code-switching emerges as a potentially efficacious transitional strategy, particularly for native speakers, in engendering early language exposure, given that English eventually becomes the predominant medium of instruction from Grade 4 onward. Our study found results that reveal translanguaging strategies where certain fluid language practice teachers in the classroom used as adoptive strategies which include utilization of some visuals such as figures and diagrams, using layman everyday language and code-switching, which are dynamic ways using their full linguistic repertoire for efforts to communicate their ideas effectively (De Los Reyes & Bagona, 2022).

Understanding linguistic differences can aid in preventing misunderstandings and enhancing the learning environment for both teachers and students (Edmonds-Wathen et al., 2021). In our study, we found students could generate ideas and construct their knowledge in a learner-centered setting since they are expected to be more proactive in defending their responses in a familiar language. Unfortunately, due to a scarcity of mathematics textbooks in Kapampangan, students are denied their right to linguistic resources for the subject, forcing them to acquire it using only English-language textbooks available (Robertson & Graven, 2020). This concern may be addressed by creating mathematics reference books and textbooks in the Kapampangan language, which entails collaborative work between mathematics teachers and linguists.

Research has demonstrated that teachers with the necessary skills to execute the MTB-MLE policy can enhance pupil accomplishment by cultivating academic brilliance (Wisbey, 2013). Teachers in this study were confident of their knowledge in using the MTB-MLE albeit classroom observations revealed different implementation of the policy. Although DepEd has given schools and divisions local implementation control over the policy as it is impractical for them to support all district languages due to the Philippines' rich culture and linguistic landscape, delegating the program's operational activities has been hampered due to delays in the creation of teaching materials and teacher preparation rooting from the insufficient funding and problems with the procurement process for earmarked monies (Monje et al., 2019). The implementation had become troublesome since the teachers were forced to improvise due to the seeming lack of support (Monje et al., 2019).

Notably, parents' preference for the English language and their conviction that mastering it can lead to economic rewards outweigh any advantages of learning the mother tongue. This explains their lack of support for their children's mother tongue development (Parba, 2018). This is consistent with the results of the study of Adriano et al. (2021). This underscores the need to strengthen community and parental involvement in a school's MTB-MLE policy implementation (Walter & Dekker, 2011) and enhancement of their language attitudes in linguistically diverse contexts that considers language proficiency, cultural identity, and community perceptions as potential factors in the successful implementation of the MTB-MLE program (Mulwa, 2014; Ponce & Lucas, 2021).

Most results from this study confirm studies conducted in other regions of the Philippines in terms of improved numeracy skills as reflected in their mathematics performance and increased engagement - e.g., the Lubuagan MLE Program by Walter & Dekker (2011), Ricablanca (2014) and Navarro et al. (2016). The Sasmuan region of Pampanga is implementing the MTB-MLE policy in its educational system. Although not perfect, the results of the two achievement tests in mathematics and Kapampangan have demonstrated their efficacy despite the difficulties. The findings of this study lend credence to the notion that children may comprehend and learn mathematics when taught to them in their mother tongues.

The MTB-MLE policy has one of its objectives: to lay a solid educational foundation in the first language. Observations of classroom instruction have indicated that mother tongue education has had a favorable impact. However, implementing the policy continues to be difficult for teachers and administrators. Like the study by Barruga (2024) in examining the Masbatenyo public elementary school teachers' implementation of the MTB-MLE through a case study, the key challenges identified were scarcity of readily printed materials, teachers' struggles in translating technical terms into local dialects, and the complexity of the policy itself. The same

challenges in the lack of teaching resources in the mother tongue were found in the studies of Tenorio (2022), Barruga (2024), Gempeso and Mendez (2021), and Navarro et al. (2016). In our study, teachers were confused about what to do and what not to do by the policy due to a lack of suitable support in the form of training, seminars, and reference materials. This is demonstrated by the difficulty teachers have while trying to translate certain mathematical terminology into Kapampangan and in accommodating students with diverse mother tongues. Despite this, most teachers continue to support the policy and develop creative ways to get by. Similar studies (Ricablanca, 2014; Navarro et al., 2016; Gempeso & Mendez, 2021; Tenorio, 2022; Saavedra, 2020) have emphasized the importance of support in terms of textbooks, instructional materials, teacher training and preparing teachers to teach mathematics in compliance with the MTB-MLE policy. Equipping teachers to teach primary grades in mathematics in the mother tongue entails revisiting the teacher education curriculum to include courses on handling multilingual and multicultural classrooms (Gempeso & Mendez, 2021). Verdida and Penera (2021) suggest that pre-deployment training modules should be used to prepare teachers for MTB-MLE classrooms as a potential solution to address issues related to language proficiency and instructional strategies.

Our study showed how crucial the role teachers play and the support they need to implement the MTB-MLE Policy. Although the survey found that most of the district's schools are not yet resource-ready to implement the policy, teachers act as a conduit for removing the obstacles. The strategies they apply to their daily teachings, such as code-switching and improvised learning materials, have aided students in performing satisfactorily in mathematics.

While it is true that there are deficiencies, needs, and problems that must be highlighted for more directive plans and treatments to improve the policy and its practice (Prendergast, 2016; Barwell et al., 2021), we concur with Monje et al. (2019) that there is wisdom in implementing the MTB-MLE policy since it is well grounded in terms of the pedagogical foundation of language use in education. Nevertheless, there is a need for clear policies and to engage stakeholders in dialogues for successful policy implementation and possibly policy revisions or amendments to address ambiguities and inconsistencies in the implementation (Stone, 2012; Barruga, 2024; Navarro et al., 2016). Gempeso and Mendez (2021) and Barruga (2024) recommend strategies to ensure alignment between policy and practice. Nonetheless, they did not provide an extensive list of specific actionable recommendations. As such, researchers and policymakers are encouraged to document successful and unsuccessful MTB-MLE practices to develop strategies to enhance MTB-MLE teaching practice and solve its implementation difficulties (Malone, 2016).

CONCLUSION

This study evaluated the efficacy of using the Kapampangan language as the medium of instruction in Grade 3 mathematics classes following the MTB-MLE mandate. Results revealed satisfactory mathematics performance and mother-tongue proficiency. Challenges include limited teacher training, instructional materials, and resources. Nonetheless, teachers can devise ways to cope with these difficulties. This research is not without flaws or restrictions. The results might not accurately represent the experiences of all teachers locally and globally, given the research site. However, findings suggest the following inclinations that merit more study and consideration in the policy's improvement and implementation. 1) To further strengthen teachers' skills in utilizing the mother language as a teaching medium in cooperation with linguists and ensure that teacher training and seminars are complete and easily available; 2) To eliminate ambiguity and inconsistencies in the policy's application, introduce clear protocols for executing the MTB-MLE Policy in the subject of mathematics; 3) Ensure that educational resources are distributed fairly among schools; 4) Develop, design, and implement programs that consider the needs of students whose first language is English. Because Kapampangan is not their mother tongue, they should not be denied the same opportunity to acquire quality education; 5) To enhance the successful implementation of the MTB-MLE policy, it is imperative to augment parental involvement in nurturing parent-school relationships, thereby amplifying support; 6) Conduct research on the mother tongue-based multilingual education policy's potential degrees of efficacy about the

learner's social standing and other personal and social aspects, such as their competency in the English language; 7) Develop and/or improve the current mathematics teacher education curriculum to include multicultural and multilingual teaching and learning.

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