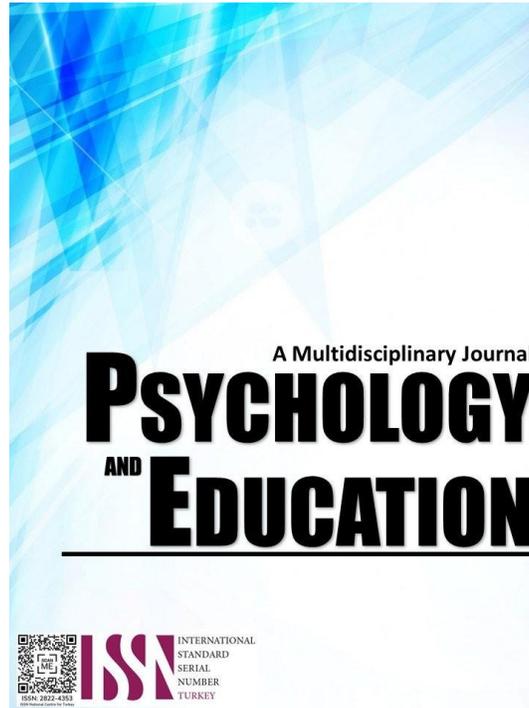


TEACHERS' PERCEPTION IN USING MOTHER TONGUE-BASED INSTRUCTION ON THE METROBANK-MTAP-DEPED MATH CHALLENGE



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Teachers' Perception in Using Mother Tongue-Based Instruction on the Metrobank-MTAP-DepEd Math Challenge

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Abstract

Language mismatch poses challenges for students, particularly those from public schools, as they struggle to comprehend and solve math problems presented in a language different from their primary medium of instruction. Thus, this study investigated the perceptions of Mathematics teachers in Grades 1–3 regarding Mother Tongue-Based (MTB) instruction and its impact on students' performance in the Metrobank-MTAP-DepEd Math Challenge (MMC) in the Tubigon East and West Districts. Using a descriptive correlational design, data were collected from 107 public school teachers via a validated questionnaire and analyzed using weighted means and chi-square tests. Teachers rated their strategies highest ($M = 4.26$, $SD = 0.51$), followed by language competence ($M = 4.05$), sufficiency of teaching materials ($M = 3.77$), and learners' learning level ($M = 3.69$), with an overall perception mean of 3.94 (Agree). However, perceptions of MTB's effect on MMC performance were low ($M = 2.07$, Disagree). Significant relationships were found between perceptions of MTB instruction and years of teaching ($p = 0.002$) and MMC participation ($p = 0.000$), but none with perceptions of its effect on MMC performance. While MTB is viewed as effective for classroom teaching, its benefits do not extend to MMC outcomes due to language mismatch. Recommendations include bilingual review materials and targeted training.

Keywords: *mother tongue-based instruction, Metrobank-MTAP-DepEd Math Challenge, Department of Education, Metrobank, mathematics challenge*

Introduction

Understanding is a fundamental aspect of effective communication, fostering harmonious relationships and promoting collaboration. It enables individuals to express their thoughts, feelings, and perceptions in various situations. Language, as the primary medium of communication, serves as the cornerstone of human interaction and civilization. Through language, people develop understanding, connect with others, and engage in meaningful discourse.

In formal education, language plays a crucial role in facilitating communication and comprehension within the classroom. It promotes active exchanges between teachers and learners, ensuring the effective delivery of lessons and achieving learning objectives. Maximum comprehension is attained when instruction is conducted in a language familiar to students, allowing them to grasp new concepts with ease and confidence.

In the Philippines, English has traditionally been the medium of instruction from primary education through higher education. Over time, Filipinos have developed fluency and expertise in the English language, excelling in both verbal and non-verbal communication. However, despite this proficiency, the country has consistently ranked low in global assessments such as the Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA). These studies suggest that Filipino students experience difficulties in mathematics, science, and reading compared to their peers in other countries. Interestingly, the highest-performing nations in these assessments predominantly use their mother tongue as the primary language of instruction.

In the local setting, the use of English as the medium of instruction poses challenges for learners, particularly in public primary schools. For many students, English is a foreign language, making it difficult for them to express their thoughts and understand new concepts. The Mother Tongue-Based Multilingual Education (MTB-MLE) policy was introduced to address this issue, promoting the use of the learners' first language in early education. This approach enhances academic performance, fosters cultural pride, and supports cognitive development. However, its implementation presents challenges, such as readiness gaps and training needs for teachers and stakeholders (Casinillo, 2022).

Mathematics is a core subject in elementary education, essential for developing logical reasoning and problem-solving skills. However, many students perceive mathematics as one of the most challenging subjects. The complexity of mathematical concepts often discourages learners, particularly when these concepts are taught in English. The K-12 curriculum mandates the use of the mother tongue as the medium of instruction for mathematics in primary education, aiming to enhance comprehension and improve learning experiences. However, concerns have been raised regarding the effectiveness of this approach, especially in translating complex mathematical terms into the local language. Limited availability of resources in the mother tongue further complicates this transition.

Mathematics competitions provide students with a platform to showcase their skills and enhance their mathematical abilities. According to Galleto, these competitions contribute to the multidimensional development of mathematically gifted students, fostering self-directed learning and academic excellence. Baker et al. (2022) highlight that participation in math contests increases students' interest and enjoyment in the subject, ultimately promoting mathematical literacy among the youth.

The Metrobank-MTAP-DepEd Math Challenge (MMC) is one of the most prestigious mathematics competitions in the Philippines. Organized by the Mathematics Teachers Association of the Philippines, this annual competition aims to enhance the mathematical competence of elementary and high school students nationwide. However, a notable issue in the MMC is the discrepancy between the medium of instruction in classrooms and the language used in the competition. While the K-12 curriculum emphasizes mother tongue instruction in early mathematics education, the MMC is conducted in English. This language mismatch poses challenges for students, particularly those from public schools, as they struggle to comprehend and solve math problems presented in a language different from their primary medium of instruction.

This discrepancy prompted the researcher to investigate the perceptions of mathematics teachers in Grades 1 to 3 regarding Mother Tongue-Based Instruction and its impact on students' performance in the MMC. The study specifically focuses on public elementary schools in the Tubigon East and West Districts.

The findings of this study will provide valuable insights into how mother tongue instruction influences mathematics learning and competition performance. It aims to help teachers and school administrators maximize the benefits of mother tongue instruction, ensuring that students develop strong mathematical foundations while being prepared for competitions conducted in English. Ultimately, this study will contribute to the enhancement of local educational strategies, fostering the development of competitive and mathematically proficient students.

Research Questions

The study aimed to investigate the relationship between teachers' perceptions of the effects of Mother Tongue-Based instruction on the Metrobank-MTAP-DepEd Math Challenge Performance, their perceptions of the use of Mother Tongue-Based instruction in teaching Mathematics, and their profiles. Specifically, the study sought to determine the following:

1. What is the profile of the teachers in terms of:
 - 1.1. number of years of experience in teaching Mathematics;
 - 1.2. specialized training attended related to Mother-tongue based instruction and Mathematics; and
 - 1.3. exposure in Metrobank-MTAP-DepEd Math Challenge?
2. What is the level of perceptions of the teachers in the use of Mother Tongue-Based instruction in teaching Mathematics in terms of:
 - 2.1. teacher's competence in language use;
 - 2.2. learners' learning level;
 - 2.3. teacher's strategies used; and
 - 2.4. sufficiency of teaching materials?
3. What is the teachers' level of perception of the effect of mother tongue-based instruction on the Metrobank-MTAP-DepEd Math challenge performance?
4. Is there a significant relationship between the levels of perceptions of the teachers in the use of Mother Tongue-Based instruction in teaching Mathematics, the level of perceptions of the teachers on the effects of Mother Tongue-Based instruction on the Metrobank-MTAP-DepEd Math Challenge Performance, and the profile of the teachers?

Literature Review

In the world of teaching, developing well-rounded learners begins in the early years of education, requiring appropriate teaching methods and strategies, particularly in the choice of the medium of instruction. Lev Vygotsky's sociocultural theory highlights the significant contributions of society to individual development, emphasizing the interaction between learners and the culture in which they live (Scott & Palincsar, 2013). This theory suggests that learning is essentially a social process, highlighting that knowledge derived from a student's cultural background should form the basis of teaching and learning. The learner's mother tongue plays a crucial role in cognitive development, helping children understand and apply ideas more effectively.

Vygotsky's Sociocultural Theory emphasizes the role of social interaction and cultural context in cognitive development. According to this theory, learners acquire knowledge through communication and interaction with more knowledgeable individuals, such as teachers, peers, and parents. In the context of your study, this theory suggests that pupils' exposure to the Metrobank-MTAP-DepEd Math Challenge and their Mathematics Performance are influenced by their interaction with mentors, their language of instruction, and the support system they receive. The use of Mother Tongue-Based Instruction in teaching Mathematics may affect how pupils internalize mathematical concepts, especially if they struggle with unfamiliar translations of mathematical terms.

Additionally, Jim Cummins' Common Underlying Proficiency Theory posits that skills and knowledge acquired in one language can be transferred to another (Cummins, 2016). This theory is particularly relevant in multilingual education, where learners develop proficiency in their mother tongue before transitioning to additional languages like English or Filipino. The level of difficulty pupils experience in using Mother Tongue-Based Instruction in the Metrobank-MTAP-DepEd Math Challenge can be analyzed through this theory, as it explains how linguistic proficiency in one language (mother tongue) affects their ability to understand mathematical concepts, especially when shifting to English-based assessments in the competition.

In connection, John Sweller's Cognitive Load Theory explains how learners process information and how excessive cognitive load can hinder learning (Sweller, 2011). This theory is relevant when analyzing learners' level of difficulty in using Mother Tongue-Based Instruction in the Metrobank-MTAP-DepEd Math Challenge. If translating mathematical concepts into the mother tongue adds an extra layer of cognitive processing, it may overload students' working memory, making it harder for them to grasp complex ideas and perform well in the competition. The theory suggests that effective instruction should minimize unnecessary cognitive load by using clear and familiar language, which is crucial in Mathematics education.

The appropriateness of the medium of instruction in the early years of education plays a critical role in shaping young learners' skills, particularly in Mathematics. As a subject with broad real-life applications, Mathematics requires a strong foundation to ensure quality learning experiences. The 1987 Philippine Constitution, Article XIV, Section 1, emphasizes the State's commitment to protecting and promoting the right to quality education at all levels. In line with this, Republic Act No. 10533, or the Enhanced Basic Education Act of 2013, strengthens the Philippine Basic Education System by extending the years of schooling and improving the curriculum. DepEd Order No. 74, Series of 2009, mandates the use of the mother tongue as the primary medium of instruction from preschool to at least Grade 3, citing research that students develop cognitive, linguistic, and academic skills more effectively when learning in their first language. Similarly, DepEd Order No. 16, Series of 2012, institutionalized MTB-MLE in all public schools starting in Grade 1, ensuring that students' home languages are used for literacy and instruction.

In Mathematics education, the implementation of MTB-MLE presents both opportunities and challenges. While it promotes better comprehension, translating mathematical terms into local dialects remains a significant hurdle. The Metrobank-MTAP-DepEd Math Challenge, as an annual competition, aims to improve the quality of Mathematics education in the Philippines by encouraging excellence and mastery among students. This study aims to investigate the impact of Mother Tongue-Based Instruction on students' performance in this competition and to provide insights into how language policies affect academic achievement. By addressing these issues, the study aims to contribute to the ongoing efforts to enhance the effectiveness of language policies in education and support students in achieving their full potential.

Methodology

Research Design

To achieve the primary objectives of this study, the researcher employed a descriptive correlational research design. Correlational design is a study design used to examine the relationships between or among two or more variables within a single group, which can occur at multiple levels. It is a type of non-experimental design that examines the relationship between two or more variables (Devi, Lepcha, & Basnet, 2023). In this case, the design was applied to collect data from a sample or the entire population to describe the attitudes, opinions, behaviors, and characteristics of the respondents. A survey was conducted among mathematics teachers in Grades 1 to 3 from all 17 public elementary schools in the Tubigon East District and 14 public elementary schools in the Tubigon West District, encompassing all primary schools that implemented multigrade classes in these districts.

Respondents

The study employed a total population sampling. All 107 teachers handling Grades 1 to 3 in all public primary and elementary schools within the Tubigon East and Tubigon West Districts, which are part of the municipality of Tubigon in the Division of Bohol, were included as respondents. This ensured comprehensive coverage of the target population, providing a complete representation of the perspectives and experiences of teachers in the specified grade levels across the two districts.

Instrument

Through the quantitative component of this study, descriptive statistics were used to understand the data. The researcher used a survey questionnaire to determine the relationship between the teachers' perceptions of the effects of Mother Tongue-Based instruction on the Metrobank-MTAP-DepEd Math Challenge Performance, the teachers' perceptions of the use of Mother Tongue-Based instruction in teaching Mathematics, and the teachers' profiles.

The questionnaire was drafted with guidance from the thesis adviser and statistician. It is composed of two (2) parts. The first part consists of the profiles of the teachers, namely: A. number of years of experience in teaching Mathematics; B. specialized training attended related to Mother-tongue-based instruction and Mathematics; and C. exposure to the Metrobank-MTAP-DepEd Math Challenge. The second part has two (2) categories, namely: the level of perceptions of the teachers in the use of Mother Tongue-Based instruction in teaching Mathematics in terms of (a) teacher's competence in language use; (b) learners' learning level; (c) teacher's strategies used; and (d) sufficiency of teaching materials; and teachers' level of perception of the effect of mother tongue-based instruction on the Metrobank-MTAP-DepEd Math challenge performance. The first category has four (4) parts with 10 questions each, while the second category has 15 questions. It was pilot-tested by 20 (twenty) teachers of the neighboring district and validated using Cronbach's alpha. Moreover, the researcher conducted face-to-face data gathering.

Procedure

In data gathering, the researcher followed the steps. First, the researcher developed questionnaires under the guidance of the thesis



adviser and the statistician. It was pilot-tested and validated. Then, the researcher requested permission from the Schools Division Superintendent of the Bohol Division, as well as the Dean of the College of Advanced Studies of Bohol Island State University, Main Campus, to pursue a study outside school premises. Next, when the request was granted, copies of the said questionnaire were distributed to the respective district supervisors and school heads for permission to conduct the study. Upon clearance, photocopies of the questionnaire were distributed to teachers handling Grades 1-3, to be filled out during class time and returned on the spot. Finally, the data gathered were then processed with statistical analysis.

Data Analysis

The percent formula was used to create a profile of the teachers. Using the weighted mean, a teacher's perception level of mother tongue-based instruction in Mathematics was evaluated in terms of the areas examined, including competence in language, learners' learning levels, teaching strategies, challenges encountered, and the sufficiency of materials for teaching. Teachers' perception level with respect to the impact of mother tongue-based instruction on their wards' performance in the Metrobank-MTAP-DepEd Math Challenge depends on the issues they confront regarding language use. Based on the findings of the Pearson Chi-Square Test of Association, the perceptions of teachers regarding the impact of mother-tongue-based instruction on performance in the Math Challenge, as well as the profiles of both teachers and pupils, were examined.

Ethical Consideration.

The study adhered to ethical considerations by obtaining the necessary authorization from the Schools Division Superintendent, district supervisors, and school heads. The respondents were also oriented towards the procedure to clear any apprehensions, and consent forms were signed before their participation.

Results and Discussion

The following deals with the presentation, analysis, and interpretation of the data based on the results gathered.

Table 1. *Teachers' Profile on the Number of Years of Experience in Teaching Mathematics*

<i>Teaching Experience</i>	<i>Frequency</i>	<i>Percentage</i>
Newly hired/below 1 year	8	7.48%
1-2 years	7	6.54%
3-5 years	16	14.95%
6-10 years	19	17.76%
11-15 years	14	13.08%
16-20 years	21	19.63%
more than 20 years	22	20.56%
Total	107	100.00%

The table reveals that the highest percentage is among teachers with over 20 years of experience, specifically 20.56% or 22 out of 107 teachers. Next in line are teachers with 11 to 15 years of experience, amounting to 19.63% or 21 out of 107 teachers. However, newly hired teachers have a rate as low as 7.48%, while those who have been in the job for 1 to 2 years have a rate of only 6.54%, or 7 out of 107.

Irvine (2019) posits that the relationship between years of teaching experience and teacher effectiveness is a complex one. Although many studies have confirmed that teacher effectiveness peaks for most in the first few years of teaching - typically until their third year of service - overall, effect sizes are weak and are not typical of individual teacher effectiveness. Irvine concludes that it does not seem to make any sense whatsoever to use the number of years of experience as a measure of effectiveness.

Table 2. *Teachers' Profile on Specialized Training Attended Related to MTB-MLE and Mathematics*

<i>Attended trainings</i>	<i>Frequency</i>	<i>Percentage</i>
YES	95	88.79%
NO	12	11.21%
K to 12 Curriculum	76	51.01%
BASA Pilipinas	68	45.64%
Others	5	3.36%

Table 2 presents the fact that most of the teachers were trained in MTB-MLE as well as in Mathematics. According to Laroda (2015), MTB has come alive in Mother Tongue instruction through the quality of training imparted to teachers. All such training should therefore be made available to enrich their knowledge and facilitate fruitful teaching outcomes.

However, there are still 11% or 12 out of 107 respondents who have not undergone any training yet. Most of them are newly hired teachers with less than 2 years of teaching experience. However, this situation should not hinder the teachers from continuing their efforts in educating the pupils.



Table 3. Teachers' Profile on Exposure to Metrobank-MTAP-DepEd Math Challenge

Teaching Experience	Frequency	Percentage
Never joined	27	25.23%
1-2 years	16	14.95%
3-5 years	22	20.56%
6-10 years	22	20.56%
11-15 years	14	13.08%
16-20 years	6	5.61%
more than 20 years	0	0%
Total	107	100.00%

Meanwhile, Table 3 indicates that several teachers claim they never participated in the Metrobank-MTAP-DepEd Math Challenge. Out of 107 respondents, 27, or 25.23%, said that they never joined the contest because some of them are from island schools, are newly hired teachers, or are handling multigrade classes. Teachers from the island schools said that it is too risky for them to travel from the island to the mainland and back with their pupils. Newly hired teachers said they have not yet tried to join the contest. Furthermore, some of the multigrade teachers said that they only have a few pupils.

On the other hand, there are still 80 teachers who said that they joined the contest. Thus, Table 4 reveals the level of competition they have gone so far.

Table 4. Teachers' Level of Metrobank-MTAP-DepEd Math Challenge Competition

Level	Frequency	Percentage
District Level	72	90.00%
Division Level	8	10.00%
Regional Level	0	0%
National Level	0	0%
Total	80	100.00%

In this table, the majority of the 80 teachers have gone to the District Level, with 90% or 72 respondents, while only 10% or eight teachers have gone to the Division Level. It also shows that no one has gone to the regional or national level because only learners in Grades 6 and 10 can participate in the Regional and National Finals, as stated in DepEd Memorandum No. 002, series of 2018.

Table 5. Teachers' Level of Perceptions on the Use of Mother Tongue-Based Instruction in Teaching Mathematics

Perception Category	Average	Description
Teacher's Competence in Language Used	4.05	Agree
Learner's Learning Level	3.69	Agree
Teachers' Strategies	4.26	Strongly Agree
Sufficiency of Teaching Materials	3.77	Agree
Overall Rating	3.942	Agree

Legend: 4.21 - 5.00 Strongly Agree, 2.61 - 3.40 Slightly Agree, 1.00 - 1.80 Strongly Disagree, 3.41 - 4.20 Agree, 1.81 - 2.60 Disagree

As presented in Table 5, the teachers gave their strategy the highest grade, scoring 4.26, followed by their competency in language use, which scored 4.05. More importantly, it can be observed that the grades given by the teachers imply that mother tongue-based instruction helps them teach Mathematics effectively and satisfactorily. According to Aliñab and Prudente (2018), teachers can be said to regard meaningful instructional use of the students' mother tongue as important simply because it would make lessons easier to explain. Using the mother tongue has ensured that such instructional use will not only enhance learners' understanding but also give them confidence.

Though the data reveal the effectiveness and usefulness of the Mother-Tongue Instruction in teaching Mathematics, teachers still encounter problems. In cases like these, teachers still need to find operational ways to address these difficulties. As a profession and vocation, these problems should not hinder the primary purpose of being a teacher, which is to teach and educate, especially in the Mathematics subject.

Table 6. Teachers' Level of Perceptions on the Effect of Using Mother Tongue-Based Instruction in Teaching Mathematics to the Metrobank-MTAP-DepEd Math Challenge Performance

Perception	Weighted Mean	Description
1. The language used is English which is easy to understand for the pupils.	1.59	Strongly Disagree
2. The language is used in most of the subjects in school, especially in the Mathematics subject.	1.45	Strongly Disagree
3. The pupils find it difficult to understand the problems because it is not their first language.	3.14	Slightly Agree
4. The organizers allow the quiz masters and coaches to translate the problems in the pupils' mother tongue.	1.48	Strongly Disagree
5. The quiz masters allow the pupils to ask questions if they don't understand the question.	1.27	Strongly Disagree



6.	The pupils find it really difficult to understand the problems to solve because they are using MTB in Mathematics subject.	3.25	Slightly Agree
7.	The organizers welcome the use of Mother Tongue in the competitions and the review lessons/sessions.	1.36	Strongly Disagree
8.	Pupils usually leave the question unanswered which is the cause of having low scores.	3.11	Slightly Agree
9.	The teacher must sacrifice his/her vacant time to conduct a comprehensive review to practice the pupils.	3.20	Slightly Agree
10.	Only the pupils from the private schools have a higher percentage of winning because they are not using Mother Tongue in Math Subject.	2.35	Disagree
11.	Only the pupils from the private schools have a higher percentage of winning because most of them are English speakers, which is their advantage.	2.32	Disagree
12.	In the district level, the questions officially come from the organizers themselves and not from the teachers within the district.	1.45	Strongly Disagree
13.	It is permissible for some schools not to join because the teachers are discouraged in the language used in the contest.	2.50	Disagree
14.	Most of the questions are taken from the lessons and not from the other higher grades references.	1.35	Strongly Disagree
15.	There are guidelines and memoranda that allow the use of Mother Tongue for Grades 1, 2 and 3 contest.	1.24	Strongly Disagree
Average Weighted Mean		2.07	Disagree

Legend: 4.21 - 5.00 Strongly Agree, 2.61 - 3.40 Slightly Agree, 1.00 - 1.80 Strongly Disagree, 3.41 - 4.20 Agree, 1.81 - 2.60 Disagree

Table 6 shows that MTB instruction does not appear to support the success of its learners in the Metrobank-MTAP-DepEd Math Challenge, as teachers disagree with its effectiveness, with an average rating of 2.07 overall.

The table further indicates that students find it challenging to comprehend the language used in the competition. Ramlan et al. (201) pointed out that language is fundamentally important as a frame of reference and a relational context in establishing identity. They also note that communication is intended to be the exchange of meaning, and with language differences, effective two-way communication becomes very challenging. When people cannot understand each other's languages, misunderstandings and misinterpretations thrive. In the context of the Math Challenge, this means that participants struggle to envision the problems presented to them, as they apparently do not understand the type of language used in the assessment.

Teachers slightly agree that pupils usually leave questions unanswered, which is a cause of low scores. They also agree that pupils find it challenging to understand the problems because it is not their first language. It is challenging for the pupils because they are using MTB in Mathematics subjects throughout the whole school year in the classroom. However, even though they agree that teachers must sacrifice their free time to conduct a comprehensive review and practice with the pupils, it seems that this is not enough, considering that there are other subjects to focus on during the day and other personal matters to attend to.

Participating in competitions like Metrobank-MTAP-DepEd Math Challenge is an instrumental part of holistic development. Lim (2017) believed that competing is not a waste of time, but an activity that can provide numerous learning opportunities and valuable experiences. However, most teachers feel discouraged from joining competitions like MMC.

Table 7. Relationship Between the Levels of Perceptions of the Teachers on the Use of Mother Tongue-Based instruction in Teaching Mathematics and the Profile of the Teachers

Variable		Pearson Chi-Square	df	p-value	N of Valid Cases	Decision at $\alpha = 0.05$
Years of Teaching Math	Level of Perception	30.372	12	.002	107	Significant; Reject Ho
Attended the Seminars	Level of Perception	.426	2	.808	107	Insignificant; Do not reject Ho
Years in Metrobank-MTAP-DepEd Math Challenge	Level of Perception	33.194	10	.000	107	Significant; Reject Ho
Level of Competition	Level of Perception	1.777	2	.411	107	Insignificant; Do not reject Ho

The relationship between the profile of teachers and their perceptions of MTB instruction in mathematics is shown in Table 7. A chi-square test was conducted on the data to test the relationship.

Also, the related profile in seminars that teachers perceive about MTB instruction in Mathematics does not have a relationship, as the p-value is equal to 0.808. Similarly, the level of competition also lacked a relationship and instead had a very low p-value of 0.000, indicating that the null hypothesis would be rejected.

The years of teaching Mathematics and participating in the Metrobank-MTAP-DepEd Math Challenge are also quite substantial when considered in relation to teachers' perceptions, as indicated by p-values of 0.002 and 0.000, respectively.

An experienced teaching workforce will benefit students and schools by enhancing the individual and collective effectiveness of



teaching, thereby improving student outcomes and developing stability and coherence within instruction and relationship-building—two important aspects of effective schooling. At the same time, they are likely to be more effective in supporting students, especially in Mathematics.

On the other hand, Lim (2017) expressed that competitions open a new world for skills to be tested. It allows you to learn from your fellow competitors. It also helps to discover one's strengths, weaknesses, and learn how to play to one's strengths. Added by Lim, in competition, you need to practice, gain exposure, and gain experience. In teaching Mathematics, if teachers are exposed to the Metrobank-MTAP-DepEd Math Challenge, this can be considered one of the main factors that help them be effective. A comprehensive practice or review before joining a competition/contest helps develop their skills in Mathematics. They can also help the pupils learn.

As stated by Laroda (2018), since the language used in teaching Mathematics is the Mother Tongue, it would be easier for pupils to develop an understanding and the capacity to process skills. Hence, teachers must provide pupils with quality education.

Table 8 presents the relationship between teachers' perceptions of using Mother Tongue-Based (MTB) instruction in Mathematics and students' profiles, specifically regarding the effects of MTB instruction on performance in the Metrobank-MTAP-DepEd Math Challenge. A chi-square test was employed to assess the relationship between these variables.

Table 8. Relationship Between the Level of Perceptions of the Teachers on the effects of Mother Tongue-Based instruction in Teaching Mathematics to the Metrobank-MTAP-DepEd Math Challenge performance and the Profile of the Teachers

Variable	Pearson Chi-Square	df	p-value	N of Valid Cases	Decision at $\alpha = 0.05$
Level of Perceptions	Years in Teaching	16.529	.168	80	Insignificant; Do not reject Ho
	Seminars Attended	1.459	.692	80	Insignificant; Do not reject Ho
	Years in coaching	2.103	.551	80	Insignificant; Do not reject Ho
	Level in Competition	10.399	.581	80	Insignificant; Do not reject Ho

The results indicate no significant relationship between teachers' perceptions of MTB's effects on Math Challenge performance and the teachers' profiles in several areas: years of teaching ($p = 0.168$), seminars attended ($p = 0.692$), years involved in coaching the Math Challenge ($p = 0.551$), and levels of competition attended ($p = 0.581$). These findings suggest that the teachers' profiles do not influence the performance in the Math Challenge.

Conclusions

While teachers generally perceive MTB-MLE as an effective classroom strategy—enhancing comprehension, encouraging learner participation, and facilitating more precise concept delivery—its benefits do not appear to extend to performance in English competitions. This gap reflects a misalignment between the language of instruction in early education and the language demands of external academic contests.

The results suggest that years of teaching experience and exposure to the Math Challenge significantly shape teachers' confidence and strategies in applying MTB-MLE. However, the absence of a significant relationship between teachers' profiles and perceptions of MTB-MLE's impact on competition performance indicates that language mismatch, rather than teacher capability, may be the primary barrier. This aligns with Cummins' Common Underlying Proficiency Theory, which posits that while cognitive skills can transfer across languages, proficiency gaps in the competition's language can hinder performance.

The study contributes to the growing body of literature that recognizes MTB-MLE as a valuable pedagogical tool, while also highlighting its limitations in preparing learners for high-stakes assessments conducted in English. It reinforces Sweller's Cognitive Load Theory by showing that the need to translate problems during competitions mentally imposes an additional cognitive burden, potentially reducing accuracy and speed in problem-solving.

These insights call for a more adaptive language policy that bridges the gap between classroom instruction and competition requirements. Practical measures could include gradual integration of English mathematical terms alongside mother tongue instruction in early grades, targeted review programs that prepare students for English-based assessments, and teacher training modules that focus on bilingual mathematics pedagogy.

The study's limitations, chiefly its focus on a specific geographic area and reliance on self-reported teacher perceptions, suggest the need for broader, multi-district research that includes direct measurement of student performance data. Future studies may also explore the effects of hybrid instruction models or scaffolded language transition strategies in mathematics learning.

Ultimately, while MTB-MLE fosters a strong foundational understanding in Mathematics, its full potential will be realized only when aligned with the linguistic realities of both classroom learning and external academic benchmarks. A balanced, transitional approach may better equip Filipino learners to excel not only in understanding mathematical concepts but also in demonstrating their skills in diverse, competitive settings.

Additionally, based on the study's conclusions, the researcher offers the following recommendations to utilize the findings effectively:

Metrobank-MTAP-DepEd Math Challenge organizers must give more attention and consideration to the implementation of the K to 12 curriculum, which utilizes Mother-tongue Instruction as a medium of instruction. Review materials, such as books, may be developed and provided to teachers, with translations from Visayan to English. They may also give service credits to teachers who utilize Saturdays for conducting reviews. If possible, the questions may be drafted by the organizers themselves, and not by the teachers within the district. Lastly, they need to review and clarify the language used in conducting MMC.

School Administrators may give follow-up and intensive support to the teachers. They may provide some review materials that can be used for review purposes. Training sessions on the Metrobank-MTAP-DepEd Math Challenge may be conducted to improve the skills of teachers and pupils. Teachers need to conduct a comprehensive review. They may use more of their vacant time. A Saturday review may also be utilized, with permission from parents and school administrators. Attending to training pieces regarding the Metrobank-MTAP-DepEd Math Challenge (if available) may also be a good choice. They may also provide pupils with ample review materials, which can help them enhance their knowledge and competencies.

Pupils may engage in learning activities related to mathematics to enhance their skills and competencies. Furthermore, they may utilize available learning materials, which could help improve their study skills and habits.

References

- Aliñab, J. M., Prudente, M. S., & Aguja, S. E. (2018). Teachers' perceptions on using MTB-MLE in teaching grade 3 mathematics. *Advanced Science Letters*, 24(11), 8039–8042. <https://doi.org/10.1166/asl.2018.12486>
- Aparicio, F. F. (2014). Remedial Program and Student's Mathematics Performance. Unpublished. Faculty of the College of Advanced Studies, Bohol Island State University-Main Campus, Tagbilaran City.
- Baker, L., Labuschagne, P., Katende, J., Kariv, J., Weitbrecht, J., & Aloui, K. (2022). Mathematical competitions in Africa: their prevalence and relevance to students and teachers. *ZDM: The International Journal on Mathematics Education*, 54(5), 1027–1042. <https://doi.org/10.1007/s11858-022-01347-5>
- Casinillo, F. D. (2022) Effectiveness of Mother Tongue Based (MTB) Instruction in the Performance of Grade I Pupils in Math. *International Journal of Advanced Multidisciplinary Studies*, 2, 18-29.
- Cummins, J. (2001). Bilingual Children's Mother Tongue: Why is it Important to Education? <https://moominls.com/en/miksi-aidinkieli-on-niin-tarkeaa/>
- Cummins, J. (2016). Reflections on Cummins (1980), "The Cross-Lingual Dimensions of Language Proficiency: Implications for Bilingual Education and the Optimal Age Issue." *TESOL Quarterly*, 50(4), 940–944. <https://www.jstor.org/stable/44984725>
- Dalziel, J. (2012). *Learning Design: Conceptualizing a Framework for Teaching and Learning Online*. New York and London, Routledge, Taylor and Francis Group.
- Devi, B., Lepcha, N., & Basnet, S. (2023). Application Of Correlational Research Design in Nursing and Medical Research. *Xi'an Shiyou Daxue Xuebao (Ziran Kexue Ban)/Journal of Xi'an Shiyou University* 65(11):60-69. <http://dx.doi.org/10.17605/OSF.IO/YRZ68>
- Fromkin, V., Rodman, R., & Hyams, N. (2014). *Introduction to Language*, Tenth Edition. South Melbourne, Victoria Australia, Cengage Learning.
- Galleto, P. G. (2017). Exploratory Analysis of Teachers' Variables Characterizing Students' Performance in Mathematics Challenge. *International Review for Social History*, 5(9), 458–467. https://www.researchgate.net/profile/Patrick-Galleto/publication/320621469_Exploratory_Analysis_of_Teachers
- Gerber, A., Engelbrecht, J., Harding, A., & Rogan, J. (2005). The influence of second language teaching on undergraduate mathematics performance. *Mathematics Education Research Journal*, 17(3), 3–21. <https://doi.org/10.1007/bf03217419>
- Irvine, J. (2019). Relationship between teaching experience and teacher effectiveness: implications for policy decisions. <https://files.eric.ed.gov/fulltext/EJ1216895.pdf>
- Laroda, G. R. (2015). Readiness of Multigrade Teachers on Teaching Mother Tongue – Based Multilingual Education and Pupils' Performance. Unpublished. Faculty of the College of Advanced Studies, Bohol Island State University-Main Campus, Tagbilaran City.
- Lim, C. (2017). Reasons Why Participating in Competitions is not a Waste of Time. Date Retrieved: February 2, 2019. Time: 10:45 PM. Site: <https://studentcompetitions.com/posts/reasons-why-participating-in-competitions-is-not-a-waste-of-time>
- Mula, R. S., & Bucar, J. D. (2023). Department of Education Computerization Program (DCP): Its Effectiveness and Problems Encountered in School Personnel's Computer Literacy. 4(4), 1221–1250. <https://doi.org/10.11594/ijmaber.04.04.19>
- Prasad, T. (2012). *A Course in Linguistics*, Second Edition. New Delhi, PHI Learning Private Limited.



Ramlan, S. N., Abashah, A., Abu Samah, I. H., Abd Rashid, I. M., & Wan Muhamad Radzi, W. N. (2018). The impact of language barrier and communication style in organizational culture on expatriate's working performance. *Management Science Letters*, 659–666. <https://doi.org/10.5267/j.msl.2018.4.025>

Ricablanca, J. D. (2014). Effectiveness of Mother Tongue-Based Instruction on Pupils' Achievement in Mathematics. *Academia.edu*. Retrieved July 1, 2024, from <https://www.academia.edu/download/36455449/JOURNAL.pdf>

Scott, S., & Palincsar, A. (2013). *Sociocultural Theory*. The Gale Group. https://www.dr-hatfield.com/theorists/resources/sociocultural_theory.pdf

Siniguian, M. (2014). Students' Difficulty in Solving Mathematical Problems. *Academia.edu*. http://www.academia.edu/9066326/Students_Difficulty_in_Solving_Mathematical_Problems

Sweller, J. (2011). Cognitive Load Theory. *Psychology of Learning and Motivation*, 55(1), 37–76. <https://doi.org/10.1016/B978-0-12-387691-1.00002-8>

Walker, Tim (2016). Does Teaching Experience Matter? Let's Count the Ways. <http://neatoday.org/2016/06/06.does-teaching-experience-matter/>

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