Using the Filipino Language in Bilingual Instruction to Enhance Mathematics Learning Among Junior High School Students

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ABSTRACT

This study employed a mixed-methods research design to determine the effectiveness of using the Filipino language in bilingual instruction to enhance Mathematics learning among Grade 7 students in the Zamboanga City Division. The participants were Grade 7 junior high school students at a public secondary school during the 2025–2026 school year, selected through purposive sampling. The study found that Filipino-language bilingual instruction was an effective strategy in improving students' Mathematics learning. Before the intervention, students experienced difficulties in understanding concepts, solving problems, and explaining their mathematical ideas. After using Filipino alongside English during Mathematics lessons, students showed better understanding, increased participation, and greater confidence in performing mathematical tasks. The findings showed that Filipino helped students connect their existing knowledge with new mathematical concepts, making lessons easier to understand and more meaningful. The study also revealed that Filipino bilingual instruction contributed to improving teaching practices and supporting learners' needs. The findings emphasized that the use of Filipino served as a support that helped learners participate actively and express their reasoning more clearly. For researchers, the results provided valuable insights for improving Mathematics instruction through the development of bilingual learning materials, responsive teaching strategies, and approaches that consider students' language backgrounds. Based on the findings of the study, the school may consider adopting Filipino-language bilingual instruction as a complementary strategy in Mathematics classrooms, particularly in addressing language-related learning difficulties. The school may institutionalize regular capacity-building activities, the development of bilingual instructional resources, and collaborative planning among Mathematics teachers to ensure effective implementation. Continuous monitoring and evaluation should be conducted to refine the approach and ensure that Filipino serves as a bridge toward deeper mathematical understanding while maintaining learners' development of English mathematical literacy.

Keywords: Filipino Language, Bilingual Instruction, Mathematics Learning

Context and Rationale

The Philippines' language-in-education framework has long emphasized bilingual competence in both Filipino and English as integral to quality learning and national development. According to the 1987 Policy on Bilingual Education, Filipino and English are designated as co-equal media of instruction in specific subjects to enhance learning and foster national unity, literacy, and global competence (DepEd 1987, secs. 1–2). The corresponding implementing guidelines reaffirm that Filipino and English be used separately but strategically in the classroom, ensuring that content learning is not sacrificed by language transitions (DepEd 1987, sec. 2.1–2.4). These policy provisions, grounded in Article XIV, Section 7 of the 1987 Philippine Constitution, justify the contextual relevance of investigating how Filipino functions within bilingual mathematics instruction in secondary schools.

Despite the legislative push for bilingual proficiency, student achievement in mathematics continues to be a persistent concern in the Philippines, particularly where instruction relies heavily on English. Research on bilingual arithmetic education shows that using students' native languages as mediums of instruction can improve conceptual understanding, problem solving, and engagement compared to English-only instruction (Tawantawan and Aman 2017, 2–3). However, linguistic diversity, limited instructional materials, and varying levels of teacher preparation continue to present challenges that may hinder effective implementation of bilingual mathematics instruction - especially in linguistically heterogeneous regions where many students speak languages other than Filipino or English as their first language.

Recent policy shifts in basic education have further underscored the need to critically examine language practices across grade levels. Changes to the Mother Tongue-Based Multilingual Education (MTB-MLE) framework have modified how the media of instruction are prioritized in the early grades, influencing how Filipino and English are positioned in later years of basic education, including junior high school. These evolving policy directions have generated continuing discussions on the effectiveness of bilingual instruction, particularly in Mathematics where English has traditionally served as the primary medium of instruction. In multilingual settings, however, the language used in teaching extends beyond the English–Filipino dichotomy. This is especially evident in Zamboanga City, where Chavacano functions as the dominant language of daily communication for many learners, while Filipino serves primarily as a second language alongside English. Consequently, Mathematics classrooms often become multilingual spaces in which teachers naturally shift among English, Filipino, and Chavacano to facilitate understanding. This unique sociolinguistic context raises important questions regarding the extent to which Filipino, as part of bilingual Mathematics instruction, supports or limits learners' comprehension compared with the familiar linguistic practices already present in classrooms.

A growing body of Philippine studies supports the pedagogical value of bilingual mathematics instruction in promoting better academic engagement and performance. For example, quasi-experimental research involving Grade 7 learners found that those taught through a bilingual medium (Maranaw–Filipino) demonstrated greater gains in conceptual understanding and mathematics interest than those instructed in English alone (Tawantawan & Aman, 2017). Likewise, previous studies have shown that using learners' familiar languages in Mathematics instruction enhances participation, conceptual understanding, and confidence, although challenges remain in translating mathematical terminology and developing appropriate instructional resources. Despite these findings, there remains a scarcity of localized research examining bilingual Mathematics instruction within the Zamboanga City Division, where linguistic diversity differs markedly from many other regions of the Philippines. Unlike areas where Filipino is the dominant language outside school, many learners in Zamboanga City primarily communicate in Chavacano at home and within their communities. As a result, teachers frequently employ translanguaging practices by integrating English, Filipino, and Chavacano during instruction to make mathematical concepts more comprehensible. However, little empirical evidence exists regarding how Filipino contributes to this multilingual instructional environment and whether its use enhances learners' Mathematics achievement and classroom participation.

Investigating the use of Filipino within bilingual Mathematics instruction therefore holds significant educational and practical implications. Understanding how Filipino functions alongside English within a predominantly Chavacano-speaking community can provide valuable insights into language practices that promote equitable learning opportunities. Greater alignment between instructional language and learners' linguistic backgrounds may reduce Mathematics anxiety, strengthen conceptual understanding, increase classroom participation, and improve academic performance, particularly among learners who experience difficulty with English-only instruction. Moreover, the findings can assist Mathematics teachers, school leaders, curriculum developers, and Department of Education policymakers in designing language-responsive instructional strategies that recognize the multilingual realities of learners in Zamboanga City while remaining consistent with national curriculum standards and language policies.

The primary aim of this study was to examine how the use of Filipino in bilingual Mathematics instruction influenced Grade 7 learners' comprehension, participation, and academic performance in selected secondary schools within the Zamboanga City Division. By generating empirical evidence on the role of instructional language in Mathematics learning within a multilingual educational context, the study sought to contribute to evidence-based language planning, teacher professional development, curriculum enhancement, and classroom practice. More importantly, the study recognized that bilingual instruction in Zamboanga City cannot be fully understood without considering the influence of Chavacano as learners' primary language. The findings therefore provide localized evidence that may help bridge national language policy directives with the actual linguistic realities of Mathematics classrooms in the Division.

This study focused on Grade 7 learners and Mathematics teachers from selected public secondary schools in the Zamboanga City Division during the academic year. While the study examined the implementation of bilingual Mathematics instruction and its influence on learners' academic outcomes, the findings should be interpreted within the unique sociolinguistic context of Zamboanga City, where Chavacano, Filipino, and English coexist in everyday communication and classroom interactions. Consequently, the results may not be directly generalizable to other regions of the Philippines with different linguistic profiles, educational resources, and instructional conditions. Nevertheless, by documenting language practices within one of the country's most linguistically diverse educational settings, the study contributes valuable localized evidence to the growing discourse on multilingual education and language-responsive Mathematics instruction in Philippine secondary schools.

Innovation, Intervention, and Strategy

The innovation centered on the implementation of Bilingual Instruction (BI**)** using the Filipino language in teaching Mathematics to junior high school learners in Zamboanga City. This approach addressed both policy and practical gaps by integrating Filipino as the primary medium for explaining mathematical concepts while retaining English for technical mathematical terms, consistent with the Department of Education's Bilingual Education Policy (DepEd, 1987, secs. 1–2).

The use of Filipino in BI aimed to reduce linguistic barriers that hindered learners' comprehension and participation, thereby fostering a more inclusive and culturally responsive learning environment. Classroom activities under this approach included collaborative problem-solving, guided discussions, the use of visual aids, and bilingual assessments, all of which leveraged learners' familiarity with Filipino to enhance confidence and bridge gaps between conceptual understanding and procedural skills (Tawantawan & Aman, 2017). Classroom observations further revealed that many students experienced difficulty articulating mathematical reasoning in English, underscoring the relevance of Filipino-based BI as a strategy for improving learner engagement and comprehension.

The intervention strategy consisted of structured activities, including pre-assessments, the delivery of Mathematics lessons through Filipino-based bilingual instruction, bilingual formative assessments, teacher reflective logs, and post-assessment evaluations.

Existing literature supported the effectiveness of bilingual instruction through learners' familiar or national language in improving conceptual understanding, increasing classroom participation, and reducing learning anxiety (Bacan, 2025; Tawantawan & Aman, 2017). Although challenges were encountered, such as the translation of mathematical terminology, teacher readiness, and curriculum time constraints, the implementation of Filipino-based BI proved to be an innovative, authentic, and adaptable instructional approach for multilingual classrooms.

By addressing learners' linguistic needs, the intervention was expected to enhance Mathematics performance, promote reflective teaching practices, and generate empirical evidence that could inform curriculum enhancement and the implementation of DepEd language policies in junior high school Mathematics education.

Statement of the Problem

This action research aimed to determine the effectiveness of using the Filipino language in bilingual instruction to enhance Mathematics learning among Grade 7 students in the Zamboanga City Division.
Specifically, it sought to answer the following questions:

1. What is the level of Mathematics learning of the students before the implementation of Filipino language bilingual instruction?
2. What is the level of Mathematics learning of the students after the implementation of Filipino language bilingual instruction?
3. Is there a significant difference in students' Mathematics learning before and after the use of Filipino language in bilingual instruction?
4. How does the use of Filipino language in bilingual instruction influence students' participation and understanding in Mathematics?
5. What challenges were encountered during the implementation of bilingual instruction using Filipino language?

ACTION RESEARCH METHODS

Research Design

The study utilized a mixed methods research design. For the quantitative component, a quasi-experimental research design was employed through the administration of pretests and posttests in Grade 7 Mathematics during the second and third grading periods. This quantitative approach aimed to determine the effectiveness of using the Filipino language in bilingual instruction in enhancing Mathematics learning among Grade 7 students in the Zamboanga City Division. A quasi-experimental design was appropriate for this action research because it allowed the researchers to examine the effect of the bilingual instruction intervention on learners' Mathematics performance without randomly assigning participants to control and experimental groups. In actual classroom settings, particularly in public and private junior high schools, random assignment is often impractical and may raise ethical concerns, making quasi-experimental designs a suitable alternative for educational research (Campbell & Stanley, 2015).

Quasi-experimental designs, particularly pretest-posttest non-equivalent group designs, were widely utilized in classroom-based interventions to measure changes in learners' performance over time. This design enabled the researchers to determine improvements in students' Mathematics learning after the implementation of Filipino language bilingual instruction. According to Creswell and Guetterman (2021), quasi-experimental designs support the examination of intervention effects by comparing learners' performance before and after an intervention, even when participants are not assigned through randomization.

For the qualitative component, a phenomenological research design was utilized to explore the lived experiences and perceptions of participants regarding the use of Filipino language in bilingual Mathematics instruction. The study examined how Filipino language integration influenced students' participation and understanding of Mathematics, as well as the challenges experienced by teachers during the implementation of the intervention. Phenomenology enabled the researchers to obtain deeper insights into participants' experiences, perspectives, and interpretations of bilingual instruction through interviews and reflective responses. This approach provided a comprehensive understanding of how the use of Filipino affected classroom interactions, learning experiences, and instructional practices.

According to Moustakas (1994), phenomenological research aimed to describe and interpret the meanings of individuals' lived experiences to gain a deeper understanding of a particular phenomenon. Similarly, Creswell (2018) explained that phenomenology was appropriate when researchers sought to explore how individuals

experienced a shared phenomenon and identify the essence of those experiences. Thus, this design was suitable for examining teachers' and students' experiences in using Filipino as a support language in Mathematics instruction and identifying the challenges encountered during the implementation of bilingual instruction.

Participants and Other Sources of Data and Information

The participants in this study were Grade 7 learners enrolled during the School Year 2025–2026 and the Grade 7 Mathematics teachers handling the selected classes. The total population comprised 905 Grade 7 learners distributed across 20 sections in the school.

A purposive sampling technique was employed to select the participants. Specifically, three Grade 7 sections, with 45 learners per section (a total of 135 learners), were intentionally selected based on predetermined criteria. The selected sections were identified as the lowest-performing sections based on the learners' Grade 6 Mathematics average grades, which indicated that they had the greatest number of least-mastered competencies upon entry to Grade 7. These learners were considered appropriate participants because the study sought to determine the effectiveness of bilingual instruction in enhancing the mathematical understanding of students who required additional instructional support.

Furthermore, the selected sections were handled by Grade 7 Mathematics teachers who consistently implemented bilingual instruction during Mathematics lessons and adhered to the same curriculum, learning competencies, and instructional schedule prescribed by the Department of Education. The sample of 135 learners represented approximately 14.9% of the total Grade 7 population (135 out of 905 learners). Although the participants were selected purposively rather than through random sampling, the sample was considered representative of Grade 7 learners with low Mathematics proficiency because the selected sections shared similar academic characteristics, learning needs, and instructional contexts. Consequently, the sample was deemed appropriate for evaluating the effectiveness of bilingual instruction in improving the mathematics performance of learners with identified least mastered skills.

Instrument

The research instrument used in this study was the Rapid Math Assessment (RMA) questionnaire designed for Grade 7 learners. The RMA is a standardized assessment tool developed and validated by the Department of Education (DepEd) to evaluate learners' numeracy, mathematical reasoning, and problem-solving skills. It assesses essential competencies in number sense, operations, algebraic thinking, measurement, geometry, data analysis, and mathematical problem-solving. Aligned with the MATATAG Curriculum learning competencies, the RMA serves as a diagnostic tool for identifying learners' strengths, learning gaps, and least-mastered skills that require targeted instructional interventions. The assessment results are commonly used to support learning recovery programs, remediation initiatives, and evidence-based instructional planning in public schools.

In this study, the RMA was administered twice—as a pretest before the implementation of bilingual instruction using Filipino and as a posttest after the intervention—to measure changes in learners' Mathematics achievement. Using the same standardized instrument before and after the intervention enabled the researchers to objectively compare learners' performance and determine the effectiveness of bilingual instruction in improving numeracy, mathematical reasoning, and problem-solving skills. The use of a DepEd-standardized assessment further strengthened the validity, reliability, and comparability of the study's findings.

For the Mathematics teachers, an interview guide was utilized to gather their insights, experiences, and perspectives regarding the use of Filipino language in bilingual instruction (BI) to enhance Mathematics learning among junior high school students. The interview guide provided a structured framework that allowed teachers to express their views regarding the effectiveness, challenges, and practical application of bilingual instruction in the classroom. Specifically, the interview focused on four key areas: (1) the influence of Filipino use in bilingual instruction on students' engagement and participation in Mathematics lessons; (2) its effect on learners' understanding and comprehension of mathematical concepts; (3) the challenges encountered by teachers during

the implementation of bilingual instruction using Filipino; and (4) the strategies employed by teachers to address these challenges.

The qualitative data gathered from the teacher interviews complemented the quantitative results obtained from the RMA pretests and posttests, providing a deeper understanding of the impact of Filipino bilingual instruction on students' learning outcomes. By examining teachers' reflections and professional experiences, the study identified instructional practices, implementation challenges, and areas requiring support to improve the effectiveness of bilingual Mathematics instruction in junior high school settings.

Data Gathering Procedures

Data gathering commenced after the formal approval of the research proposal. To initiate the process, the researchers secured authorization from the university president through the research coordinator by submitting a formal request letter. The letter sought permission to conduct the study among Grade 7 learners from selected secondary schools in the Zamboanga City Division. Upon receiving approval from the university, the researchers presented the permission letter to the Schools Division Superintendent and the respective school principals to obtain further endorsement, ensuring that the study complied with institutional protocols and local education governance requirements.

During the resumption of classes for the third quarter, the researchers presented the approved documents to the Mathematics teachers to coordinate the implementation of Bilingual Instruction (BI) using Filipino. During this phase, students took a pretest consisting of a 20-item multiple-choice Mathematics assessment designed to determine their baseline knowledge and skills. Before administering the pretest, the researchers explained the purpose of the study, the nature of the students' participation, and the procedures that ensured confidentiality. Consent forms were distributed and collected to obtain informed consent from the learners and their guardians, emphasizing that participation was voluntary and that all information gathered would remain confidential.

After the implementation of the bilingual instruction intervention, a posttest was administered before the beginning of the fourth grading period to determine the effects of the intervention on students' Mathematics learning. The data gathered from the pretest, posttest, and teacher interview responses were systematically organized, tabulated, and analyzed using appropriate statistical and qualitative procedures to determine the impact of using Filipino in bilingual instruction on learners' Mathematics comprehension, participation, and achievement. Finally, the researchers analyzed, interpreted, and discussed the findings in relation to the objectives of the study, providing evidence on the effectiveness of the intervention and developing recommendations for future instructional practices and policy considerations.

Data Analysis

The **Mean** was used to determine the level of Mathematics learning of the students before and after the implementation of Filipino language bilingual instruction.

The **Paired Samples t-test** was utilized to determine the significant difference in students' Mathematics learning before and after the use of Filipino Language in bilingual instruction. This statistical test enabled the researchers to compare students' performance before and after the intervention and determine whether the observed changes in learning outcomes were statistically significant.

Thematic Analysis was employed to analyze the qualitative data gathered from the participants. This method allowed the researchers to identify, analyze, and interpret recurring patterns or themes from the participants' responses regarding how the use of Filipino Language in bilingual instruction influenced students' participation and understanding in Mathematics, as well as the challenges encountered during its implementation. Through systematic coding, categorizing, and interpretation of responses, the researchers identified common experiences

and perspectives related to improved comprehension, increased classroom participation, and difficulties in translating mathematical terms or explaining complex concepts.

According to Braun and Clarke (2006), thematic analysis is a flexible qualitative research method used to systematically identify, organize, and interpret patterns of meaning within qualitative data. Similarly, Creswell (2018) emphasized that thematic analysis enables researchers to group related responses into themes that represent participants' shared experiences and perspectives. Thus, this method was appropriate for examining the influence of Filipino language use in bilingual Mathematics instruction and understanding the challenges encountered by teachers during its implementation.

RESULTS AND DISCUSSION

Table 1. The level of Mathematics learning of the students before the implementation of Filipino language bilingual instruction

Section	Score	Std. Deviation	Level	Interpretation
G7 - L	7.08	2.17	Emerging	Low Proficient
G7 - M	6.82	2.30	Emerging	Not Proficient
G7 - N	6.54	1.64	Emerging	Not Proficient
Overall Mean	6.81	2.04	Emerging	Not Proficient

Legend:

Score: 0 – 6 = Emerging (Not Proficient)

7 – 13 = Emerging (Low Proficient)
14 – 20 = Developing (Nearly Proficient)
21 – 27 = Transitioning (Proficient)
28 – 33 = At Grade Level (Highly Proficient)

Table 1 presents the level of Mathematics learning of the students before the implementation of Filipino language bilingual instruction. The findings revealed that the students obtained an overall mean score of 6.81 with a standard deviation of 2.04, interpreted as Emerging (Not Proficient). This indicates that before the intervention, the students had limited mastery of the mathematical concepts and skills included in the assessment. Among the three sections, G7-L obtained the highest mean score of 7.08 (SD = 2.17), classified as Emerging (Low Proficient), suggesting that learners in this section demonstrated slightly better performance compared with the other groups. Meanwhile, G7-M recorded a mean score of 6.82 (SD = 2.30) and G7-N obtained a mean score of 6.54 (SD = 1.64), both falling under the Emerging (Not Proficient) level. These results imply that most learners experienced difficulties in demonstrating essential Mathematics competencies before the integration of Filipino language bilingual instruction.

The standard deviation values provide further insight into the distribution of students' performance across sections. The overall standard deviation of 2.04 indicates a moderate variation in students' scores, showing that although the general performance level was low, students differed in their existing mathematical abilities. Specifically, G7-M showed the highest variability (SD = 2.30), suggesting that students in this section had varied

levels of Mathematics readiness, with some learners performing better while others experienced greater difficulties. On the other hand, G7-N obtained the lowest standard deviation (SD = 1.64), indicating that students' performances were more closely grouped around the mean score. These findings suggest that prior to the intervention, students had different levels of mathematical preparedness, requiring an instructional approach that could address diverse learning needs.

The emerging and not proficient performance of the students may be associated with difficulties in understanding mathematical concepts, interpreting problem situations, and following mathematical procedures. Mathematics learning requires not only computational skills but also the ability to understand the language used in presenting concepts, instructions, and mathematical reasoning. According to Cummins (2000), students learn more effectively when instruction builds upon their existing linguistic knowledge because language serves as a foundation for academic development. Therefore, the low pre-intervention performance suggests that students may have encountered challenges in accessing mathematical ideas when the language of instruction was not sufficiently connected to their linguistic experiences.

Furthermore, the findings support the argument of Setati and Adler (2000) that language plays an important role in Mathematics classrooms because learners use language to interpret, discuss, and construct mathematical meanings. When students struggle with the language used in instruction, they may also experience difficulties in explaining their reasoning and solving mathematical tasks. The results of the pre-assessment demonstrate the need for a bilingual instructional approach that allows students to use Filipino as a support language while developing their understanding of English mathematical terminology. Through this approach, learners may become more capable of connecting familiar language expressions with abstract mathematical concepts.

The findings are also consistent with García (2009), who emphasized that bilingual instruction allows learners to utilize their complete linguistic resources to support academic learning. By incorporating Filipino in Mathematics lessons, teachers can provide clearer explanations, reduce language barriers, and create opportunities for students to participate actively in learning activities. Similarly, Moschkovich (2015) explained that mathematical proficiency involves communicating mathematical ideas and reasoning, which requires meaningful language support. Thus, the initial low performance of students highlights the importance of instructional strategies that consider both mathematical and linguistic dimensions of learning.

Overall, the results establish that before the implementation of Filipino language bilingual instruction, students were performing at an Emerging (Not Proficient) level, as reflected by the overall mean score of 6.81 (SD = 2.04). The findings provided evidence that learners needed additional support to improve their Mathematics understanding and performance.

The integration of Filipino as a bilingual instructional strategy was therefore necessary to address language-related difficulties and enhance students' comprehension of mathematical concepts. By providing instruction through a familiar language while maintaining exposure to mathematical terms in English, bilingual instruction has the potential to promote deeper understanding, increased confidence, and improved Mathematics achievement.

Table 2. The level of Mathematics learning of the students after the implementation of Filipino language bilingual instruction

Section	Score	Std. Deviation	Level	Interpretation
G7 - L	22.68	4.58	Transitioning	Proficient
G7 - M	20.38	3.69	Developing	Nearly Proficient

G7 - N	19.40	1.11	Developing	Nearly Proficient
Overall Mean	20.82	33.13	Developing	Nearly Proficient

Legend:

Score: 0 – 6 = Emerging (Not Proficient)

7 – 13 = Emerging (Low Proficient)
14 – 20 = Developing (Nearly Proficient)
21 – 27 = Transitioning (Proficient)
28 – 33 = At Grade Level (Highly Proficient)

Table 2 presents the level of Mathematics learning of the students after the implementation of Filipino language bilingual instruction. The findings revealed a notable improvement in students' Mathematics performance, as reflected by the **overall mean score of 20.82**, interpreted as **Developing (Nearly Proficient)**. Compared with the pre-intervention results, where students obtained an overall mean score of 6.81 interpreted as Emerging (Not Proficient), the post-intervention findings indicate that students demonstrated increased mastery of mathematical concepts and skills after the integration of Filipino language bilingual instruction. Among the three sections, **G7-L obtained the highest mean score of 22.68 (SD = 4.58)**, interpreted as **Transitioning (Proficient)**, suggesting that students in this section achieved a higher level of mathematical understanding after the intervention. Meanwhile, **G7-M obtained a mean score of 20.38 (SD = 3.69)** and **G7-N obtained a mean score of 19.40 (SD = 1.11)**, both classified as **Developing (Nearly Proficient)**. These results indicate that the bilingual approach contributed to improving students' mathematical performance across all sections.

The standard deviation values provide information regarding the consistency of students' performance after the implementation of the intervention. The overall standard deviation of **3.13** indicates moderate variability in students' scores, suggesting that while most students improved, differences in their level of Mathematics achievement remained. Among the sections, **G7-L showed the highest variation (SD = 4.58)**, indicating that students had different levels of progress after the intervention, with some learners achieving higher scores than others. In contrast, **G7-N obtained the lowest standard deviation (SD = 1.11)**, which suggests that students' performances were more consistent and closely grouped. The relatively low variation in scores demonstrates that Filipino language bilingual instruction benefited learners with different levels of mathematical readiness and supported more uniform improvement among students.

The improvement in students' Mathematics learning after the intervention suggests that the use of Filipino as a support language enhanced learners' comprehension of mathematical concepts. Through bilingual instruction, students were provided with explanations using familiar language while still being exposed to essential mathematical terms in English. This finding supports **Cummins (2000)**, who explained that students' first language provides a cognitive foundation that facilitates the development of academic knowledge. When learners can connect new information with their existing linguistic experiences, they are more capable of understanding abstract concepts and applying knowledge in academic tasks.

Furthermore, the findings affirm the importance of language in Mathematics learning, particularly in developing students' problem-solving and reasoning skills. **Setati and Adler (2000)** emphasized that language serves as a tool for learners to construct mathematical meanings and participate in mathematical discourse. The improvement from Emerging (Not Proficient) to Developing (Nearly Proficient) and Transitioning (Proficient) levels suggests that Filipino helped students better understand instructions, interpret mathematical problems, and communicate their solutions. By reducing language barriers, students were able to focus more on mathematical processes rather than struggling with unfamiliar expressions.

The results are also supported by **García (2009)**, who emphasized that bilingual instructional practices allow learners to utilize their complete linguistic resources to improve academic learning. The integration of Filipino created a more accessible and learner-centered environment where students could engage with mathematical concepts more confidently. Similarly, **Moschkovich (2015)** highlighted that mathematical proficiency involves not only solving problems but also explaining and justifying mathematical thinking through language. Therefore, the improved post-intervention scores suggest that Filipino language bilingual instruction supported both conceptual understanding and mathematical communication among learners.

Overall, the findings demonstrate that Filipino language bilingual instruction was effective in improving students' Mathematics learning. The increase from an overall mean score of **6.81 (SD = 2.04) before the intervention** to **20.82 (SD = 3.13) after the intervention** indicates substantial progress in students' mathematical proficiency. The movement of learners from the **Emerging (Not Proficient)** level to the **Developing (Nearly Proficient)** level shows that the intervention addressed language-related challenges and strengthened students' understanding of mathematical concepts. Therefore, the use of Filipino alongside English in Mathematics instruction can be considered an effective strategy for enhancing comprehension, confidence, and achievement among learners.

Testing the Hypothesis

Table 3. Significant difference in students' Mathematics learning before and after the use of Filipino language in bilingual instruction

Section	Mean Scores		t-value	p-value	Decision	Interpretation
	Pretest	Posttest				
G7 – L	7.08	22.68	4.369	0.000*	Reject Ho	Significant
G7 – M	6.82	20.38	1.772	0.000*	Reject Ho	Significant
G7 – N	6.54	19.40	3.923	0.000*	Reject Ho	Significant

*Significant level at α =.05

Table 3 presents the significant difference in students' Mathematics learning before and after the implementation of Filipino language in bilingual instruction. The results revealed that all three sections demonstrated a statistically significant improvement in their Mathematics performance after the intervention. Specifically, G7-L increased its mean score from 7.08 in the pretest to 22.68 in the posttest, with a t-value of 4.369 and p-value of 0.000. Similarly, G7-M improved from a pretest mean score of 6.82 to a posttest mean score of 20.38, obtaining a t-value of 1.772 and p-value of 0.000. Moreover, G7-N increased from 6.54 to 19.40, with a t-value of 3.923 and p-value of 0.000. Since all obtained p-values were lower than the significance level of $\alpha = .05$, the null hypothesis was rejected, indicating that the improvement in students' Mathematics learning after the use of Filipino language in bilingual instruction was statistically significant.

The significant increase in students' posttest scores demonstrates that Filipino language bilingual instruction contributed to enhancing learners' understanding and achievement in Mathematics. The substantial improvement across all sections suggests that the use of Filipino as a support language enabled students to better comprehend mathematical concepts, follow problem-solving procedures, and interpret mathematical tasks. This finding aligns with Cummins (2021), who emphasized that learners' first language provides a cognitive foundation that supports the development of academic knowledge and facilitates deeper conceptual understanding. When students are allowed to connect new ideas with familiar linguistic structures, they are more likely to process information effectively and demonstrate improved academic performance.

Furthermore, the findings support the perspective of García and Wei (2019), who explained that bilingual learners benefit when teachers strategically utilize their complete linguistic resources during instruction. The significant gains observed among students suggest that Filipino helped bridge the gap between abstract mathematical concepts and students' existing knowledge. Through bilingual instruction, learners were able to access explanations in a language they understood while gradually developing familiarity with English mathematical terminology. This approach may have reduced language-related difficulties, allowing students to focus on mathematical reasoning and application rather than struggling with comprehension barriers.

The results also reinforce recent studies emphasizing the relationship between language support and Mathematics achievement. According to Moschkovich (2022), mathematical learning requires students to engage in language practices such as explaining, justifying, and communicating mathematical ideas. The significant improvement in all sections indicates that Filipino-mediated instruction provided opportunities for students to articulate their mathematical thinking more clearly. By using Filipino to clarify difficult concepts and processes, teachers created opportunities for learners to participate actively and construct mathematical meanings, leading to improved assessment outcomes.

Moreover, the findings reflect the importance of culturally and linguistically responsive teaching practices in improving learner outcomes. Hammond (2015) emphasized that effective instruction should consider students' cultural and linguistic backgrounds to create meaningful learning experiences. Although students continue to develop proficiency in English mathematical vocabulary, the strategic use of Filipino allowed teachers to provide scaffolding that supported comprehension and confidence. The consistent significant differences among G7-L, G7-M, and G7-N indicate that the intervention was beneficial across different groups of learners, regardless of their initial level of Mathematics performance.

Overall, the hypothesis testing confirms that the use of Filipino language in bilingual Mathematics instruction significantly improved students' learning outcomes. The rejection of the null hypothesis provides empirical evidence that the intervention contributed to increased Mathematics achievement among the students. The movement from low pretest performance to substantially higher posttest scores demonstrates that language plays a critical role in facilitating mathematical understanding. Therefore, Filipino language bilingual instruction may be considered an effective pedagogical strategy for supporting learners' comprehension, participation, and achievement in Mathematics, particularly in multilingual classroom contexts.

The use of Filipino language in bilingual instruction influence students' participation and understanding in Mathematics

When asked, "How does using Filipino in Math class affect students' participation?" the participants' responses emerged into this theme:

Theme 1. Increased Student Participation Through the Use of Filipino

The teachers consistently reported that the integration of Filipino during Mathematics instruction had a positive effect on students' classroom participation. Teacher 1 observed that learners became more willing to respond when lessons were explained in Filipino, while Teacher 2 shared that even reserved students participated actively because they were able to understand the questions more clearly. Similarly, Teacher 3 noted an increase in the number of students who volunteered answers and participated in discussions. Teacher 4 further observed that students asked more questions when Filipino was used, suggesting that learners became more comfortable seeking clarification and engaging in classroom interactions.

Furthermore, the use of Filipino contributed to students' confidence in expressing their thoughts and mathematical ideas. Teacher 5 explained that "They become more confident in sharing their ideas because they are comfortable with the language." Likewise, Teacher 6 stated that "Class participation improved because students were not afraid

of making mistakes." These responses indicate that using a familiar language created a supportive classroom atmosphere where students felt less anxious and more willing to communicate their understanding. In addition, Teacher 7 observed increased interaction among students during group activities, while Teacher 8 noted that learners responded more quickly when instructions were delivered in Filipino.

Similarly, the teachers emphasized that Filipino encouraged greater involvement in Mathematics learning activities. Teacher 9 observed that students became more active in solving problems on the board, reflecting their increased willingness to participate in mathematical tasks. Supporting this observation, Teacher 10 stated, "Using Filipino encourages students to express their answers without hesitation." These findings suggest that bilingual instruction using Filipino promotes a classroom environment where learners feel confident in sharing their ideas, participating in discussions, and engaging in mathematical activities. Overall, the teachers' responses demonstrate that Filipino integration enhances students' confidence, participation, and meaningful involvement in Mathematics learning.

The findings revealed that Filipino language use in bilingual Mathematics instruction positively influenced students' classroom engagement. Teachers observed that learners were more willing to answer questions, participate in discussions, seek clarification, collaborate with peers, and engage in problem-solving activities when Filipino was used alongside English. The familiarity of the language helped increase students' confidence and reduced their hesitation in expressing their ideas. This finding supports Cummins (2000), who emphasized that learners develop stronger academic engagement and comprehension when instruction builds on their existing linguistic knowledge and experiences. Similarly, García (2009) explained that the strategic use of familiar languages in bilingual classrooms encourages active participation and facilitates deeper learning.

Additionally, the findings suggest that Filipino served as a bridge that enabled students to communicate their mathematical thinking more effectively. When learners understood the language used in explaining concepts, they became more confident in presenting solutions and participating in mathematical conversations. This supports the findings of Setati and Adler (2000), who emphasized that access to familiar languages during Mathematics instruction enhances classroom interaction and supports the construction of mathematical meaning. In the Philippine educational context, this finding aligns with the principles of Mother Tongue-Based Multilingual Education (MTB-MLE), which recognizes the importance of familiar languages in improving learner participation and comprehension (Department of Education, 2013).

Indeed, the integration of Filipino in bilingual Mathematics instruction contributes to the development of a more inclusive, supportive, and learner-centered classroom environment. Although teachers may encounter challenges in balancing Filipino and English mathematical terms, their experiences demonstrate that Filipino serves as an effective scaffold that strengthens students' confidence, communication, and engagement. Therefore, the purposeful integration of Filipino in Mathematics instruction may serve as an effective strategy for encouraging active participation and enhancing students' overall learning experiences in Mathematics.

When asked, "*How does using Filipino in Math class help students understand the lesson?",* The participants' responses emerged into this theme:

Theme 2. Enhanced Understanding of Mathematical Concepts Through Filipino-Mediated Instruction

The findings revealed that the use of Filipino in bilingual Mathematics instruction enhanced students' understanding of mathematical concepts, particularly in explaining complex ideas, problem-solving processes, and mathematical procedures. Teachers observed that students understood difficult concepts better when lessons were explained using Filipino. Teacher 1 shared that students understood lessons more effectively when concepts were presented in Filipino, while Teacher 3 emphasized that learners easily understood examples because these were explained using their own language. Similarly, Teacher 4 observed that students asked fewer questions

because the explanations became clearer. These responses suggest that Filipino served as a support language that helped students process mathematical ideas more effectively and develop clearer understanding of lessons.

Moreover, the teachers emphasized that Filipino improved students' ability to follow solution procedures, interpret mathematical problems, and communicate their reasoning. Teacher 2 explained that "Using Filipino helps students follow the steps in solving Math problems," highlighting the role of familiar language in guiding learners through mathematical processes. In addition, Teacher 5 noted that Filipino helped students understand the meaning of word problems, while Teacher 6 shared that students remembered lessons better when Filipino was used together with English mathematical terms. These findings indicate that bilingual instruction allowed students to connect mathematical concepts with familiar language, making abstract ideas more understandable and accessible.

Furthermore, the teachers reported that Filipino contributed to students' confidence and accuracy in Mathematics. Teacher 7 observed that students were able to explain their solutions more clearly after the lesson, while Teacher 8 noted that students made fewer mistakes because they understood the instructions.

Supporting these observations, Teacher 9 stated, "Using Filipino makes difficult Math concepts easier to understand," and Teacher 10 added, "Students become more confident in solving problems because they understand the lesson." Collectively, these responses demonstrate that Filipino integration reduced learning difficulties, strengthened comprehension, and encouraged students to participate more confidently in mathematical activities.

The findings further indicate that Filipino functioned as a bridge between students' prior knowledge and new mathematical concepts. By using a familiar language, teachers were able to clarify difficult topics, support problem-solving processes, and provide opportunities for students to express their mathematical thinking more effectively. This finding supports Cummins (2000), who explained that learners develop stronger academic understanding when instruction builds on their existing linguistic knowledge and experiences. Similarly, García (2009) emphasized that bilingual practices that strategically utilize learners' familiar languages promote deeper comprehension and meaningful participation in academic tasks.

In addition, the findings are consistent with Setati and Adler (2000), who highlighted that the use of familiar languages enables learners to construct mathematical meanings and actively participate in mathematical discourse. Likewise, Moschkovich (2015) emphasized that effective Mathematics learning requires support for students' language resources to communicate, explain, and reason mathematically. The improvement in students' understanding, confidence, and problem-solving abilities suggests that Filipino provided the necessary linguistic support for learners to engage with mathematical concepts more meaningfully.

Overall, the findings conclude that the use of Filipino in bilingual Mathematics instruction positively influenced students' comprehension, confidence, and engagement in learning Mathematics. Filipino served not only as a medium of communication but also as an instructional scaffold that helped students understand complex mathematical ideas, follow solution processes, and express their mathematical reasoning.

Therefore, integrating Filipino alongside English in Mathematics instruction can contribute to a more inclusive and meaningful learning environment where students are supported in developing both conceptual understanding and mathematical competence.

The challenges that were encountered during the implementation of bilingual instruction using the Filipino language

When asked, *"What challenges did teachers encounter when using Filipino in Math instruction?"* the responses of the participants emerged into this theme:

Theme 3. Challenges in Balancing Language Use and Instructional Resources in Filipino Bilingual Mathematics Instruction

The findings revealed that teachers encountered challenges in implementing Filipino language bilingual instruction in Mathematics, particularly in translating mathematical terms, maintaining accurate terminology, and balancing the use of Filipino and English. While Filipino helped students understand mathematical concepts, teachers experienced difficulty in explaining technical terms without losing their original meaning. Teacher 1 shared that "Some Math terms are difficult to translate into Filipino," while Teacher 2 emphasized that students still needed to learn the English Math terms found in textbooks. These findings suggest that bilingual Mathematics instruction requires careful integration of both languages to develop students' conceptual understanding while maintaining familiarity with academic mathematical vocabulary. This supports Cenoz and Gorter (2021), who emphasized that multilingual education requires strategic language practices that maximize learners' linguistic resources while ensuring access to academic language development.

The teachers also identified that shifting between Filipino and English during Mathematics instruction required additional time, careful planning, and effective classroom management. Teacher 3 stated that "Switching between Filipino and English takes more time during the lesson," highlighting the complexity of managing two languages while achieving lesson objectives. Similarly, Teacher 5 observed that some students became confused when they encountered different terms in Filipino and English, indicating the need for consistent explanations and clear connections between languages. Teacher 6 further explained that "It is difficult to find the right Filipino words for some mathematical concepts," emphasizing the challenge of translating abstract mathematical ideas while preserving accuracy. This finding is consistent with García and Wei (2019), who explained that effective bilingual instruction requires flexible language practices where teachers strategically use available languages to support meaning-making. Likewise, Cummins (2021) noted that while first-language support enhances learning, teachers need appropriate strategies to bridge students from familiar language structures toward academic language proficiency.

Moreover, the findings revealed challenges related to instructional resources, lesson preparation, and teacher readiness. Teachers reported limited bilingual learning materials, additional time required in preparing instructional resources, and the need for more training in implementing bilingual strategies effectively. These concerns indicate that successful bilingual instruction requires institutional support and professional development opportunities. This supports Lucas and Villegas (2013), who emphasized that teachers in linguistically diverse classrooms need specialized knowledge and skills to effectively integrate students' languages into instruction. Furthermore, De Jong (2022) highlighted that effective multilingual education depends on teacher capacity-building, supportive policies, and the availability of culturally and linguistically responsive learning resources.

The findings further showed that maintaining accurate mathematical communication remained a significant concern among teachers because Mathematics involves specialized terms, symbols, and representations. The difficulty of selecting appropriate Filipino equivalents may affect the clarity of mathematical explanations if not carefully managed. Teacher 6's response, "It is difficult to find the right Filipino words for some mathematical concepts," reflects the challenge of preserving mathematical meaning while using a familiar language. This finding supports Moschkovich (2022), who emphasized that language plays a central role in mathematical reasoning because students need opportunities to interpret, explain, and communicate mathematical ideas using meaningful discourse. Therefore, bilingual Mathematics instruction requires careful language choices to prevent misconceptions and strengthen students' understanding.

Furthermore, balancing Filipino and English emerged as one of the major challenges experienced by teachers. Teacher 10 emphasized that "Balancing Filipino and English while teaching Math is the biggest challenge," demonstrating the difficulty of maintaining students' comprehension while ensuring continued development of English mathematical vocabulary. This finding aligns with Celic and Seltzer (2022), who explained that multilingual classrooms require intentional planning to help learners benefit from their home language while

developing proficiency in the language of academic communication. Hence, teachers need continuous training, collaborative lesson planning, and adequate bilingual resources to effectively manage language integration in Mathematics instruction.

Overall, the findings demonstrate that although Filipino language bilingual instruction serves as a valuable support for improving students' Mathematics learning, its implementation involves challenges related to translation, language balancing, instructional materials, and teacher preparation. The teachers' experiences highlight that effective bilingual Mathematics instruction requires more than simply using Filipino; it demands systematic planning, professional support, and appropriate resources. Addressing these challenges will allow teachers to maximize Filipino as a learning scaffold while ensuring that students continue to develop essential English mathematical vocabulary and competencies, thereby promoting a more inclusive and effective Mathematics learning environment.

CONCLUSION AND RECOMMENDATION

The study concluded that Filipino-language bilingual instruction was an effective and appropriate innovation in addressing students' difficulties in mathematics learning. Before the implementation of the intervention, learners experienced challenges in understanding mathematical concepts, interpreting problems, and communicating their solutions. After the integration of Filipino alongside English, students demonstrated improved comprehension, increased participation, and greater confidence in engaging with mathematical tasks. The findings revealed that Filipino served as a meaningful linguistic support that enabled learners to connect their prior knowledge and experiences with new mathematical concepts. The significant improvement in students' learning outcomes and the positive experiences shared by teachers confirm that bilingual instruction effectively addressed language-related barriers that hindered Mathematics learning.

The study further concludes that the use of Filipino in Mathematics instruction contributes to both theoretical understanding and educational practice. The findings support the view that language plays an essential role in knowledge construction, particularly in subjects such as Mathematics where learners need to interpret, explain, and reason about abstract concepts. The innovation contributes to existing knowledge by demonstrating that the strategic integration of Filipino can function as a scaffold that promotes deeper understanding, active participation, and meaningful mathematical communication. In terms of practice, the study highlights the importance of developing learner-centered instructional approaches that recognize students' linguistic backgrounds. As researchers, the findings provide valuable insights that will guide the continuous improvement of teaching practices by encouraging the development of contextualized bilingual materials, reflective teaching strategies, and classroom approaches responsive to learners' language needs. Based on the findings of the study, the school may consider adopting Filipino language bilingual instruction as a complementary strategy in Mathematics classrooms, particularly in addressing language-related learning difficulties. The school may institutionalize regular capacity-building activities, development of bilingual instructional resources, and collaborative planning among Mathematics teachers to ensure effective implementation. Continuous monitoring and evaluation should be conducted to refine the approach and ensure that Filipino serves as a bridge toward deeper mathematical understanding while maintaining learners' development of English mathematical literacy.

Action Plan for the Implementation and Sustainability of Filipino Language Bilingual Instruction in Mathematics

Implementation Phase	Key Activities/Strategies	Objectives	Persons Involved	Timeline	Expected Output
Phase 1: Pre-Implementation –	1. Conduct baseline assessment of learners'	• Establish learners' baseline performance and	Mathematics Teachers, Master	Before the implementation of BI	• Baseline assessmen t results.

Planning and Assessment	Mathematics proficiency and language comprehension. 2. Identify Mathematics competencies and concepts requiring Filipino language support. 3. Prepare bilingual lesson plans, contextualized instructional materials, and visual aids integrating Filipino explanations and English mathematical terms.	language needs. • Ensure that instructional content is responsive to learners' linguistic backgrounds. • Prepare appropriate resources for effective bilingual instruction.	Teachers, School Head, Researchers		• Bilingual lesson plans and instructional materials. • Identified Mathematics concepts requiring language support.
Phase 2: BI Lesson Delivery – Concept Introduction	1. Deliver Mathematics lessons using Filipino as a support language for explaining concepts. 2. Introduce and reinforce English mathematical terminology, formulas, and symbols. 3. Utilize interactive strategies such as guided discussions, examples, visual representations, and contextualized explanations.	• Improve students' understanding of mathematical concepts through familiar language. • Increase learner confidence and participation during Mathematics lessons. • Bridge Filipino explanations with English mathematical vocabulary.	Mathematics Teachers and Grade 7 Learners	During the intervention period	• Implemented Filipino-based bilingual Mathematics lessons. • Increased learner engagement and participation.
Phase 3: Collaborative	1. Facilitate group activities and problem-solving tasks using	• Develop students' problem-solving and reasoning	Mathematics Teachers and Learners	Throughout the implementation of BI	• Collaborative problem-

Practice and Application	bilingual instructions. 2. Encourage students to explain mathematical solutions using Filipino while incorporating appropriate English terms. 3. Provide scaffolding and guided support for challenging mathematical tasks.	skills. • Encourage mathematical communication and peer learning. • Strengthen understanding through collaborative learning.			solving activities. • Improved student interaction and mathematical communication.
Phase 4: Formative Assessment and Feedback	1. Administer quizzes, worksheets, and oral activities using Filipino bilingual instruction. 2. Monitor students' comprehension, participation, and learning difficulties. 3. Provide immediate feedback and additional explanations when needed.	• Monitor students' progress and identify learning gaps. • Reinforce mathematical concepts and correct misconceptions. • Support learners in explaining mathematical reasoning using both languages.	Mathematics Teachers and Learners	During and after each lesson	• Assessment records and monitoring reports. • Documented learner progress and feedback.
Phase 5: Reflection and Teacher Logs	1. Maintain teacher reflection logs regarding lesson effectiveness, learner responses, and challenges encountered. 2. Discuss experiences and strategies through collaborative meetings or Learning Action	• Enhance teachers' competence in bilingual Mathematics instruction. • Identify effective strategies and address implementation challenges.	Mathematics Teachers, Master Teachers, LAC Facilitators	Throughout the implementation period	• Teacher reflection logs. • Improved bilingual teaching strategies. • Revised instruction

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	Cell (LAC) sessions. 3. Revise teaching approaches and instructional materials based on reflections.	• Promote continuous improvement of teaching practices.			al resources.
Phase 6: Post-Implementation Assessment and Evaluation	1. Administer post-assessment to determine changes in Mathematics learning outcomes. 2. Compare pre- and post-assessment results to evaluate the effectiveness of Filipino BI. 3. Conduct analysis of teacher feedback and prepare recommendations for future implementation.	• Determine the effectiveness of Filipino bilingual instruction. • Generate evidence-based recommendations for teaching practices and policies. • Support curriculum planning and language policy implementation.	Researchers, Mathematics Teachers, School Administrators	After the completion of the intervention	• Evaluation report of BI implementation. • Recommendations for sustaining bilingual Mathematics instruction. • Inputs for school-based policies and instructional improvement.

Work Plan and Timelines

Calendar of Activities	Mar	Apr	May	Jun	Jul	Aug
Conceptualization of the Action Research						
Writing the Action Research Proposal						
Application and Submission of an Action Research Protocol to the University Research Center						

Data Gathering						
Data Analysis						
Submission of an Action Research						

Cost Estimates

A. Supplies and Materials					
ITEMS	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL AMOUNT
1	10	Reams	A4 size S20 Bond Paper	325.00	3,250.00
2	2	Reams	Short Bond Papers	320.00	640.00
3	5	Set	Cannon Computer Ink	1500.00	7,500.00
4			Binding Expenses	2,000.00	2,000.00
B. Expenses					
5			Data Gathering Expenses		5,000.00
6			Miscellaneous		5,000.00
Total					**Php23,390.00**

Plans for Dissemination and Utilization

The results of this action research will be disseminated to various stakeholders in order to share the findings and promote the effective use of Filipino language in bilingual instruction in Mathematics. The researchers will present the results during school-based activities such as Learning Action Cell (LAC) sessions, In-Service Training (INSET), and departmental meetings to inform teachers about the impact of bilingual instruction on students' learning, participation, and understanding in Mathematics. The findings may also be presented during division research conferences, seminars, or research congresses in the Department of Education to contribute to the improvement of instructional practices in the Zamboanga City Division. Furthermore, copies of the completed research will be provided to school administrators, mathematics teachers, and the school library for reference and future studies.

In terms of utilization, the findings of the study will serve as a basis for improving teaching strategies in Mathematics through the integration of Filipino language in bilingual instruction. Teachers may use the results to develop more effective instructional approaches that support learners' comprehension and active participation during mathematics lessons. School administrators may also utilize the findings to strengthen instructional support, provide appropriate training for teachers, and encourage the use of bilingual strategies in mathematics classrooms. Additionally, the results may guide curriculum planners and educators in designing programs and interventions that promote better understanding of mathematical concepts among learners. Ultimately, the study aims to contribute to the improvement of Mathematics teaching and learning by providing practical insights on the implementation of bilingual instruction in the classroom.

REFERENCES

1. Bacan, Maria L. 2025. Bilingual Instruction in Mathematics: Classroom Practices and Learning Outcomes in Philippine Secondary Schools. Manila: Educational Research Press.
2. Braun, Virginia, and Victoria Clarke. 2006. "Using Thematic Analysis in Psychology." Qualitative Research in Psychology 3, no. 2: 77–101. https://doi.org/10.1191/1478088706qp063oa.

3. Campbell, Donald T., and Julian C. Stanley. 2015. Experimental and Quasi-Experimental Designs for Research. Boston: Houghton Mifflin. (Original work published 1963).
4. Celic, Christina, and Kate Seltzer. 2022. Translanguaging: A CUNY-NYSIEB Guide for Educators. New York: CUNY-NYS Initiative on Emergent Bilinguals.
5. Cenoz, Jasone, and Durk Gorter. 2021. Pedagogical Translanguaging. Cambridge: Cambridge University Press.
6. Creswell, John W. 2018. Qualitative Inquiry and Research Design: Choosing Among Five Approaches. 4th ed. Thousand Oaks, CA: Sage Publications.
7. Creswell, John W., and Timothy C. Guetterman. 2021. Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research. 7th ed. Boston: Pearson.
8. Cummins, Jim. 2000. Language, Power and Pedagogy: Bilingual Children in the Crossfire. Clevedon: Multilingual Matters.
9. Cummins, Jim. 2021. Rethinking the Education of Multilingual Learners: A Critical Analysis of Theoretical Concepts. Bristol: Multilingual Matters.
10. De Jong, Ester J. 2022. Foundations for Multilingualism in Education: From Principles to Practice. 2nd ed. Philadelphia: Caslon Publishing.
11. Department of Education. 1987. Policy on Bilingual Education. Manila, Philippines: Department of Education.
12. Department of Education. 2013. DepEd Order No. 16, s. 2012: Guidelines on the Implementation of the Mother Tongue-Based Multilingual Education (MTB-MLE). Pasig City: Department of Education, Philippines.
13. Donald T. Campbell, and Julian C. Stanley. 2015. Experimental and Quasi-Experimental Designs for Research. Boston: Houghton Mifflin Company.
14. García, Ofelia, and Li Wei. 2019. Translanguaging: Language, Bilingualism and Education. London: Palgrave Macmillan.
15. García, Ofelia. 2009. Bilingual Education in the 21st Century: A Global Perspective. Malden, MA: Wiley-Blackwell.
16. Hammond, Zaretta. 2015. Culturally Responsive Teaching and the Brain: Promoting Authentic Engagement and Rigor Among Culturally and Linguistically Diverse Students. Thousand Oaks, CA: Corwin.
17. Lucas, Tamara, and Ana Maria Villegas. 2013. "Preparing Linguistically Responsive Teachers: Laying the Foundation in Preservice Teacher Education." Theory Into Practice 52, no. 2: 98–109. https://doi.org/10.1080/00405841.2013.770327.
18. Moschkovich, Judit N. 2015. "Academic Literacy in Mathematics for English Learners." The Journal of Mathematical Behavior 40: 43–62. https://doi.org/10.1016/j.jmathb.2015.01.005.
19. Moschkovich, Judit N. 2022. "Language and Mathematics Education: Multiple Perspectives and Directions for Research." ZDM–Mathematics Education 54: 1–12.
20. Moustakas, Clark. 1994. Phenomenological Research Methods. Thousand Oaks, CA: Sage Publications.
21. Setati, Mamokgethi, and Jill Adler. 2000. "Between Languages and Discourses: Language Practices in Primary Multilingual Mathematics Classrooms in South Africa." Educational Studies in Mathematics 43: 243–269. https://doi.org/10.1023/A:1011996002062.
22. Tawantawan, Sutthida and Abdulrahman Aman. 2017. "Bilingual Arithmetic Education and Students' Conceptual Understanding in Mathematics." International Journal of Educational Studies 9 (2): 1–8.

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Informed Consent Form

Republic of the Philippines

Department of Education

REGION IX, ZAMBOANGA PENINSULA

SCHOOLS DIVISION OF ZAMBOANGA CITY

March 16, 2026

Dear Respondent,

Greetings!

We are currently writing an action Research study with the title: "Using the Filipino Language in Bilingual Instruction to Enhance Mathematics Learning Among Junior High School Students in the Zamboanga City Division." You are invited to take part in this research. It is our hope that this study will benefit you as a learner or as teacher. The objective of this study aims to determine the effectiveness of using the Filipino language in bilingual instruction to enhance Mathematics learning among Grade 7 students in the Zamboanga City Division. There are no identified risks from participating in this research. There are no costs and no monetary compensation to you for your participation in this study.

Your participation in this research is completely voluntary, and you may refuse to participate without consequence. Responses to the survey will only be reported in aggregated form to protect your identity. The collected data will be treated with utmost confidentiality.

Sincerely yours,

DEBORAH E. BANDAHALA, PhD — Proponent 1

HELEN C. MANANGAN, PhD — Proponent 2

CONSENT:

By signing this consent form, I confirm that I have read and understood the information and have had the opportunity to ask question/s. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I voluntarily agree to take part in this study.

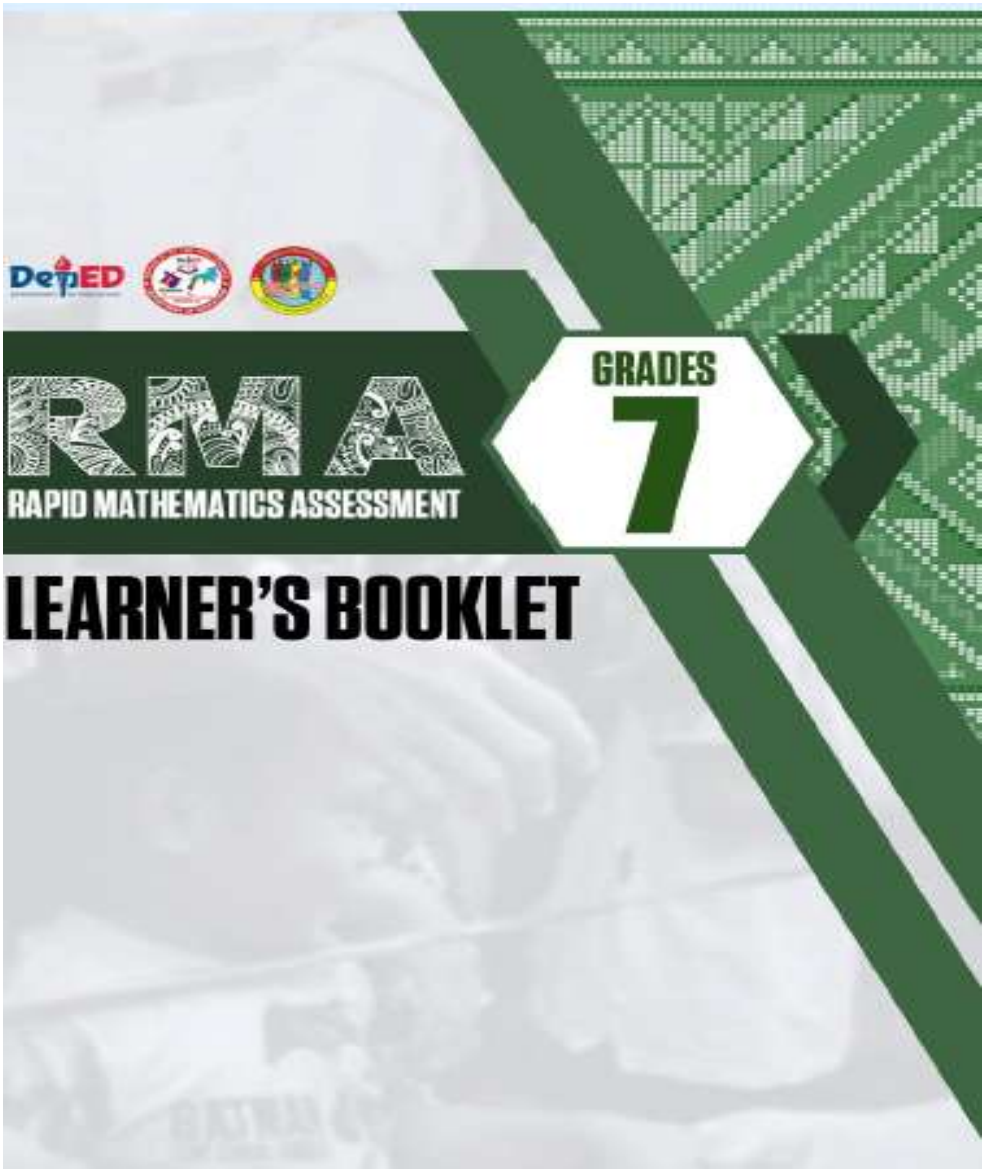
_____

Respondent's Signature over Printed Name

Questionnaires

Research Instrument

Pat I. Rapid Mathematics Assessment



Rapid Mathematics Assessment for Grades 7 to 10

Assessment Instructions:

Your score on this test will help your teacher determine your readiness to learn the mathematics required at your grade level. You have ninety (90) minutes to complete this test.

Only the Questionnaire and Answer Sheet provided to you should be on your desk. Write all your solutions and answers, including any scratch work, directly on the Answer Sheet.

Before answering each question, double-check that the question numbers on your Answer Sheet match those on the Questionnaire to avoid misplaced answers. Please review your answers carefully before submitting your paper.

i. For multiple-choice questions:

- Some multiple-choice questions may require selecting more than one answer. In such cases, write the letters of all your chosen options.

ii. For short-answer questions:

Provide clear and complete answers in the designated space provided on the Answer Sheet. Show all necessary calculations or explanations. You may write your explanations in English, Filipino, or Taglish.

Formulas you may find helpful:

- Perimeter of a triangle: $P = a + b + c$
- Area of a triangle: $A = \frac{1}{2} \times base \times height$
- Circumference of a circle: $C = 2\pi r$
- Area of a circle: $A = \pi r^2$
- Volume of a cylinder: $V = (area\ of\ the\ base) \times height$

Refer to the number expressions in Box 1 to answer items 1 to 5.

Box 1

Number Expressions
$2\times2-3\times1$
$3\times3-4\times2$
$4\times4-5\times3$
$5\times5-6\times4$

1. Your classmate said that each of the four expressions in *Box 1* is equivalent to 1. Verify what your classmate said by showing your computation for the number expression $4\times4-5\times3$.
2. What must be the **next** number expression to $5\times5-6\times4$ in *Box 1*?

The powers of 2 are given in Table 1. Use this information to answer items 6 to 8.

Table 1

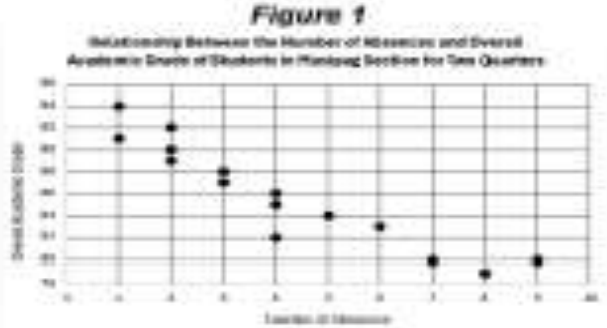
Exponential Form	Expanded Form	Power of 2
2^2	2×2	4
2^3	$2\times2\times2$	8
2^4	$2\times2\times2\times2$	16
2^5	$2\times2\times2\times2\times2$	32

6. Show that 1024 is a power of 2. [*Refer to Table 1*]
7. Write the exponential form of 1024.
9. Is there a number between 0.998 and 0.999? If YES, give one example. If NO, explain why you think so.
10. Show how you will subtract 0.998 from 0.999.
11. Is there a fraction that is greater than $\frac{3}{4}$ but less than 1? If YES, give one example. If NO, explain why you think so.

Refer to the following information to answer items 12 to 14.

The graph shows the relationship between student absences and overall academic grade across all subjects in the Masipag section, a special class for arts and design, for two academic quarters. Each point on the graph represents an individual student.

Figure 1



12. How many students had an overall academic grade below 84? *[Refer to Figure 1]*

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13. Explain why you think your answer in *Item 12* is correct based on the information shown in the graph in Figure 1.

14. Which of the following can be a correct interpretation of the data presented in the graph in *Figure 1*?
    a. As the number of absences increases, the overall academic grade also increases.
    b. As the number of absences decreases, the overall academic grade increases.
    c. As the number of absences increases, the overall academic grade decreases.
    d. As the number of absences decreases, the overall academic grade also decreases.

Refer to Table 2 below to answer items 17 to 20.

Malaya High School organized music and sports activities to celebrate the school's foundation day. *Table 2* shows the participation of the Grade 7 students.

Table 2

	Participated in sports activity	**Did not participate** in sports activity	**Total**
Participated in music activity	18	31	49
Did not participate in music activity	42	19	61
Total	60	50	110

17. How many students participated in the music activity?

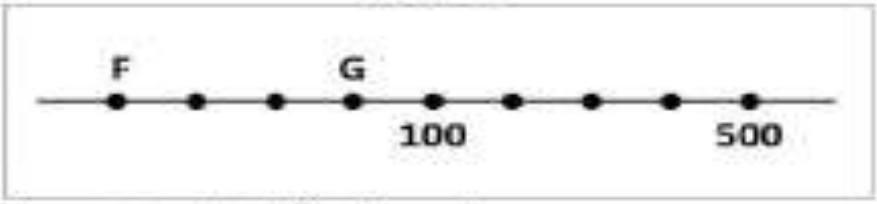
18. How many students did not participate in any of the two activities?

20. Write a question that can be answered using the information in *Table 2*.

Refer to Figure 3 to answer items 21 to 22.

A number describes the position of a point on a number line. The picture below is part of a number line.

Figure 3



22. What is the position of point *G* in *Figure 3*?

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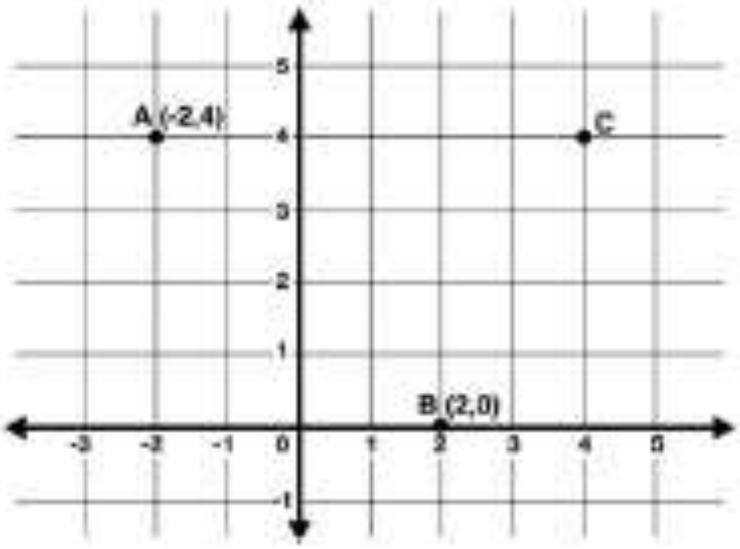
Use the following information to answer items 23 to 28.

An **ordered pair of numbers** describes the position of a point on a Cartesian plane. This position is called the coordinates of the point. The first number in the ordered pair is called the *x*-coordinate and the second number is called the *y*-coordinate.

Figure 4



26. In *Figure 4*, connecting the points *A*, *B* and *C* will form a triangle, called triangle *ABC*. What is the **area** of triangle *ABC*? Show your method for getting the area.

27. A point represents position. Suppose in *Figure 4*, point *A* represents the position of your house, point *B* represents the position of your school and point *C* represents the position of the barangay hall. There is a straight road that you can take to the school and the barangay hall from your house. Which is the shorter walk from your house, going to the school or to the barangay hall?

28. Show or explain how you determined your answer in *item 27*.

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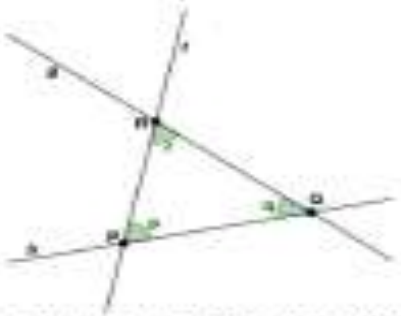
Use the information below to answer items 38 to 40.

Lines *f*, *g*, and *h* intersect at points *P*, *Q* and *R*, forming a triangle. The measures of the angles in degrees are represented by *p*, *q* and *r*. The picture below is part of the plane that shows the triangle *PQR*.

Figure 6



39. In *Figure 6*, if the measure of angle R is 60 degrees (that is, r = 60) and the measure of the exterior angle at Q is 130, what is true about the values of p and q? Choose at least one true statement about p and q.

    NOTE: *The exterior angle of a triangle forms a 180-degree angle with the adjacent interior angle.*

    a. The sum of p and q is 130.
    b. p and q can have several values.
    c. The value of p is 70 and the value of q is 50.
    d. The value of p is 50 and the value of q is 70.
    e. The value of r plus p is 130.

Use the following information to answer items 41 to 43.

Carlos built a house for his dog, Brownie. The lower part of the dog house serves as a sleeping area, while a small portion on top is used for toy storage. The base of the toy storage, which measures 25 centimeters, is parallel to the floor. The dog house is triangular with sides in the ratio of 3:3:2. The shortest side measures 1 meter.

Figure 7

41. What are the lengths of the other two sides of the triangular dog house? *[Refer to Figure 7]*

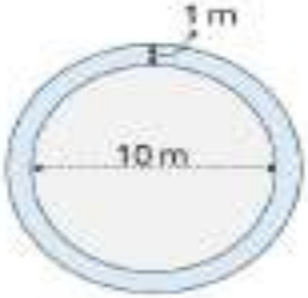
    a. The other two sides are 1.5 meters each.
    b. The other two sides are 2 meters and 3 meters.
    c. The other two sides are 3 meters each.
    d. The other two sides are 4 meters and 6 meters.

Use the information below to answer items 44 to 45.

Circumference of a circle: $C = 2\pi r$

Area of a circle: $A = \pi r^2$

Figure 8 (top view of the pool)

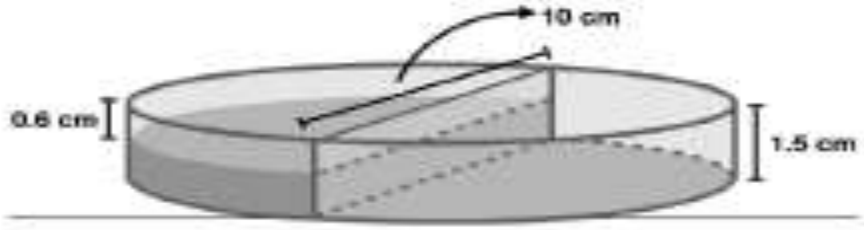


A public park has a circular pool with a diameter of 10 meters. The park management decided to build a sidewalk around the pool to allow people to walk around it safely. The sidewalk has a uniform width of 1 meter all around the pool.

44. What is the area of the sidewalk in square meters surrounding the pool? Show your solution. *[Refer to Figure 8]*

Use pi = 3.14.

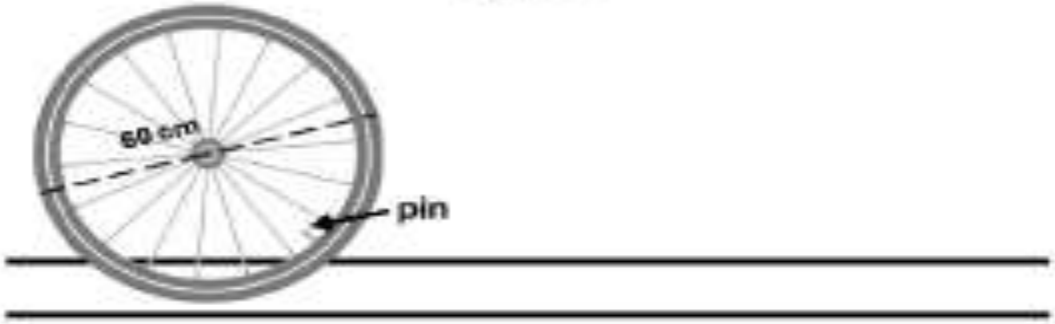
Figure 9 (auxiliary view of the pool)



Refer to the information below to answer items 46 to 47.

A wheel with a diameter of 60 cm is rolled along a straight path.

Figure 10



46. The wheel in *Figure 10* is rolled exactly 5 times. Show how you can compute the distance travelled by the wheel.

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Part II. Guide Questions

1. How does the use of Filipino language in bilingual instruction influence students' participation and understanding in Mathematics?
    a. How does using Filipino in Math class affect students' participation?
    b. How does using Filipino in Math class help students understand the lesson?
2. What challenges were encountered during the implementation of bilingual instruction using Filipino language?
    a. What challenges did teachers encounter when using Filipino in Math instruction?

Responses

Table 1. *How does using Filipino in Math class affect students' participation?*

Teacher	Verbatim Response
Teacher 1	"Students are more willing to answer when I explain the lesson in Filipino."
Teacher 2	"Even the shy students participate because they understand the questions better."
Teacher 3	"More students raise their hands and join the discussion."
Teacher 4	"Students ask more questions when Filipino is used during the lesson."
Teacher 5	"They become more confident in sharing their ideas because they are comfortable with the language."
Teacher 6	"Class participation improved because students were not afraid of making mistakes."
Teacher 7	"Students interact more with their classmates during group activities."
Teacher 8	"They respond faster when instructions are given in Filipino."
Teacher 9	"Students are more active in solving problems on the board."
Teacher 10	"Using Filipino encourages students to express their answers without hesitation."

Table 2. *How does using Filipino in Math class help students understand the lesson?*

Teacher	**Verbatim Response**
Teacher 1	"Students understand the lesson better when I explain difficult concepts in Filipino."
Teacher 2	"Using Filipino helps students follow the steps in solving Math problems."

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Teacher 3	"They easily understand the examples because they are explained in their own language."
Teacher 4	"Students ask fewer questions because the explanations are already clear."
Teacher 5	"Filipino helps students understand the meaning of word problems."
Teacher 6	"Students remember the lesson better when I use Filipino together with English terms."
Teacher 7	"They can explain their solutions more clearly after the lesson."
Teacher 8	"Students make fewer mistakes because they understand the instructions."
Teacher 9	"Using Filipino makes difficult Math concepts easier to understand."
Teacher 10	"Students become more confident in solving problems because they understand the lesson."

Table 3. *What challenges did teachers encounter when using Filipino in Math instruction?*

Teacher	Verbatim Response
Teacher 1	"Some Math terms are difficult to translate into Filipino."
Teacher 2	"Students still need to learn the English Math terms found in the textbook."
Teacher 3	"Switching between Filipino and English takes more time during the lesson."
Teacher 4	"There are limited bilingual teaching materials available."
Teacher 5	"Some students become confused when they hear different terms in Filipino and English."
Teacher 6	"It is difficult to find the right Filipino words for some mathematical concepts."
Teacher 7	"I need more training on using bilingual instruction effectively."
Teacher 8	"Some assessments are written in English, so students still need English vocabulary."
Teacher 9	"Preparing bilingual lesson materials requires extra time."
Teacher 10	"Balancing Filipino and English while teaching Math is the biggest challenge."

Legend: Score

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Levelling of Learners	Grade Level			
	Grade 7	Grade 8	Grade 9	Grade 10
Emerging (Not Proficient)	0-6	0-15	0-27	0-29
Emerging (Low Proficient)	7-13	16-30	28-55	30-59
Developing (Nearly Proficient)	14-20	31-43	56-60	60-64
Transitioning (Proficient)	21-27	44-52	61-65	65-68
At Grade Level (Highly Proficient)	28-33	53-59	66-69	69-72