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Foundations of Enhanced Problem-Solving Strategies (EPSS): Comprehension Skills and Influence on the Mathematics Performance of Students' Grade 7 in the Philippines

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Abstract

Background and Aim: Poor reading comprehension is a key factor behind the declining mathematics performance among Filipino students, as effective problem-solving requires understanding concepts, relationships, and word problems in addition to numerical operations. At Liloy National High School, challenges in both comprehension and mathematics have prompted this study to examine how Grade 7 students' skills—remembering, understanding, applying, and analyzing—influence their mathematics performance. Ultimately, the study aims to develop Enhanced Problem-Solving Strategies (EPSS) to bridge comprehension gaps and improve academic outcomes.

Materials and Methods: The study employed a descriptive-correlational design involving 127 Grade 7 students. A researcher-made questionnaire, validated by experts and pilot-tested for reliability (Cronbach's Alpha = 0.710), was used to assess students' mathematics comprehension levels. At the same time, their academic performance was measured using their mathematics grades. Data were analyzed using statistical tools such as means, frequency counts, and linear regression to elucidate the relationship between comprehension skills and mathematics performance.

Results: Results indicated that female students generally demonstrated higher comprehension skills and better mathematics performance than their male counterparts. While females attained "satisfactory" ratings in remembering and understanding, males scored "fairly satisfactory" in these areas; both groups performed similarly in applying and analyzing, albeit at lower levels overall. Linear regression analysis confirmed that comprehension skills significantly influence mathematics performance, thus supporting the formulation of EPSS.

Conclusion: In conclusion, the study demonstrates that improved comprehension, particularly higher-order cognitive skills, is associated with enhanced mathematics outcomes, providing a strong basis for adopting EPSS to elevate student performance.

Keywords: Comprehension Skills, Mathematics Performance, Enhanced Problem-Solving Strategy (EPSS)

Introduction

Mathematics education in the Philippines is one of the priority concerns of the Department of Education (DepEd). M athematics plays a vital role in the lives of man. Every citizen should acquire competence and development of power in the use of mathematics procedures in daily living. The deteriorating performance of Filipino students in the national and international mathematics tests for the last decade has become a major challenge to Philippine education. The Department of Education attributed this problem to students' poor reading comprehension (Imam et al, 2013).

Like problem-solving, reading comprehension relies on the reader's recognition and perception of symbols in written language, grammar, cognitive skills, and real-life experiences. The most important requirement for problem-solving and reading comprehension is the transfer of solutions to different situations. Just as problem-solving requires more than performing operations with numbers and using four main operations and symbols, reading comprehension requires more than word recognition and the accurate vocalization of words (Ozsoy et al., 2015). Generally, education at the elementary and secondary levels is the country's major program for the delivery of mass and universal education. It is thus expected that the development of the basics of reading, writing, and arithmetic will enhance learning capabilities that will enable Filipinos to become productive, self-reliant, versatile, civic-minded, physically fit, and consequently totally developed citizens. (Collado, 2000).

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Mathematics is one of the subjects in high school that most students dislike because they often resist solving, interpreting, and analyzing numbers (Ramos et al., 2015; Jaudinez, 2019). Collado (2000) observed that students in Philippine schools frequently lack a complete range of comprehension skills—such as understanding printed words, charts, and graphs—and the ability to solve problems effectively. In line with this, Dagon et al. (2012) found that deficiencies in oral language, critical thinking, and reasoning skills further hinder students' academic performance. These issues are compounded by recent evidence from the Trends in International Mathematics and Science Study (TIMSS, 2019), which indicates that the Philippines ranked last among 58 participating countries in 2019, with Grade 8 students scoring an average of 297 in mathematics—well below the international average of 500. These challenges are evident at Liloy National High School in Liloy, Zamboanga del Norte, where many students struggle not only with basic arithmetic operations but also with comprehending word problems. The Department of Education (DepEd) emphasizes the importance of strong comprehension skills for academic success in its K to 12 guidelines (DepEd, 2016), positing that improved comprehension can lead to better performance in mathematics. Based on these insights and the researcher's observations that many students at this school are unable to add, subtract, multiply, or divide numbers and fail to grasp word problems, this study was conceptualized to assess the student's comprehension skills and determine their mathematics performance. Should the results reveal a correlation between low comprehension and poor math performance, the findings will serve as a basis for proposing enhanced problem-solving strategies (EPSS) that align with national educational standards (DepEd, 2016; Ozsoy et al., 2015).

Objectives

The general objective of this study is to examine the influence of comprehension skills on the mathematics performance of Grade 7 students in the Philippines, specifically at Liloy National High School. Specifically, the study aims to: 1) assess the comprehension skills of Grade 7 students, categorized into cognitive domains of remembering, understanding, applying, and analyzing, and grouped according to sex; 2) evaluate the mathematics performance of Grade 7 students, also classified by sex; 3) analyze whether comprehension skills significantly influence the mathematics performance of Grade 7 students, and; 4) develop and propose an Enhanced Problem-Solving Strategy (EPSS) to improve students' comprehension and ability to solve mathematical word problems effectively.

Literature review

The literature highlights the persistent struggle of Filipino students in mathematics, with poor performance in international (e.g., TIMSS 2003) and national tests (e.g., NAT 2003–2009) linked to difficulties in reading comprehension (Imam et al., 2013). Reading and mathematics share cognitive processes, such as abstract reasoning and symbol decoding, yet many students fail to transfer reading comprehension skills to solving mathematical word problems (Clarkson & Williams, 1994; Greabell & Anderson, 1992). Key factors like vocabulary, symbol sense, and the ability to interpret mathematical text significantly affect mathematics achievement (MacGregor & Price, 1999; Shanahan & Shanahan, 2008). Although Imam et al. (2013) reported no significant overall correlation between reading comprehension and mathematics performance, subsequent studies have highlighted that specific skills—such as understanding vocabulary, identifying main ideas, and making inferences—are related to mathematical success (Imam, 2016; Virgana & Lapasau, 2019). In addition, Jordan and Sunico (2022) observed a significant relationship between students' reading comprehension skills and their ability to solve mathematical problems, suggesting that certain comprehension processes may be critical for tackling word problems. Studies also reveal gender differences, with females outperforming males in reading comprehension and mathematics performance, possibly due to better verbal episodic memory and a more positive attitude toward reading (Association for Psychological Science, 2008; Kesharav & Ashtarian, 2008). Notably, higher problem-solving skills correlate strongly with better mathematics performance, reinforcing the need for targeted strategies to enhance comprehension and cognitive skills (Escuadro et al., 2013; Logan & Johnston, 2009).

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Conceptual Framework

This study highlights the relationship between comprehension skills and mathematics performance, incorporating theories of cognitive development and problem-solving. Based on Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001), the study focuses on cognitive domains—remembering, understanding, applying, and analyzing—as independent variables that influence students' ability to solve mathematical problems. Piaget's theory of cognitive development (1970) underscores the role of formal operational thought, which develops during middle school years, in enabling learners to grasp complex mathematical concepts and solve word problems effectively. Bartlett's schema theory (1932) further explains that activating prior knowledge enhances reading comprehension and problem-solving by connecting new and existing schemas, which is critical for understanding mathematical texts. Sex serves as a moderator variable, reflecting differences in comprehension and performance between male and female students (Association for Psychological Science, 2008). Finally, Polya's Principle of Problem-Solving (1957) anchors the proposed Enhanced Problem-Solving Strategies (EPSS), which include stages of understanding the problem, devising a plan, solving the problem, and evaluating the solution retrospectively.

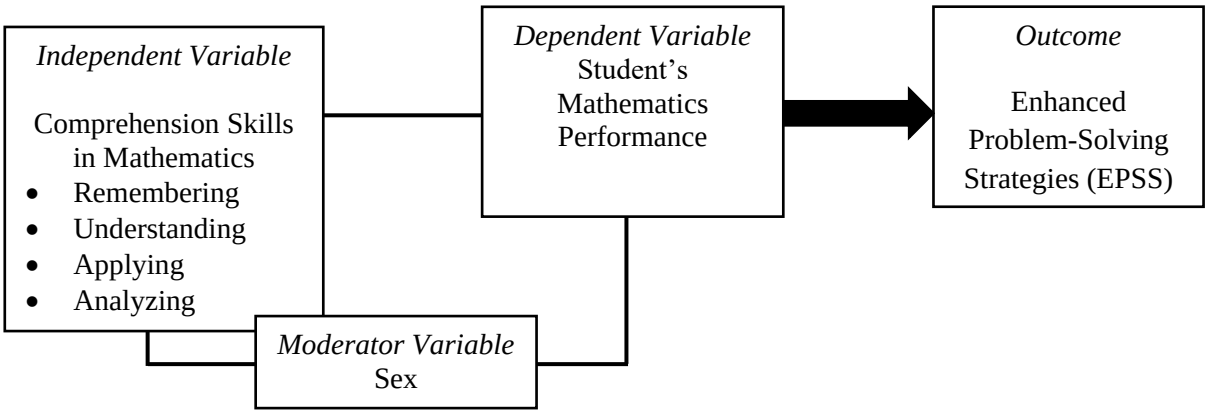

Figure 1*: Conceptual Framework*

Methodology

This study utilized a descriptive-correlational research design to explore the relationship between comprehension skills and mathematics performance among Grade 7 students at Liloy National High School. The descriptive method was used to assess and describe the levels of students' comprehension skills, categorized into remembering, understanding, applying, and analyzing, alongside their mathematics performance. The correlational method aimed to determine the influence of these comprehension skills on the students' mathematics outcomes. This design enabled a comprehensive analysis of the variables and their interrelationships, facilitating meaningful interpretations and recommendations.

The research was conducted at Liloy National High School, the largest school in Zamboanga del Norte in terms of population, offering Junior and Senior High School programs under the Department of Education. The study included all 127 Grade-7 students across three sections in total. Among the participants, 66 were female (51.97%), and 61 were male (48.03%). This ensured that the study captured the entire target population, providing robust and inclusive data.

Data collection was conducted using a researcher-made test questionnaire specifically designed to measure comprehension skills in mathematics. The questionnaire consisted of 40 multiple-choice items, validated by a panel of experts for content suitability and relevance to the research objectives. The instrument initially had 50 items, but after evaluation, 10 items were rejected, and 40 were retained. Pilot testing with 15 students from a similar curriculum yielded a Cronbach's Alpha value of 0.710, confirming the instrument's reliability. Mathematics performance was measured using students' first-quarter grades provided by their subject teachers. These grades served as a standardized measure of academic performance in mathematics.

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Before data collection, permission was obtained from the school principal. The researcher personally administered the test questionnaires, with the supervision of class advisers, and ensured consistency in the data collection process. Students were given one hour to complete the test. After administration, the responses were checked, tallied, and prepared for statistical analysis. Data analysis involved descriptive statistics, such as mean and frequency counts, to describe levels of comprehension skills and mathematics performance. The DepEd performance continuum was utilized to categorize the results into ratings ranging from "Outstanding" to "Did Not Meet Expectations" (DepEd, 2016). Linear regression analysis was conducted to evaluate the influence of comprehension skills on mathematics performance, ensuring a rigorous examination of the research hypotheses. Through this systematic process, the study aimed to produce reliable and meaningful findings that could inform future strategies and interventions in mathematics education.

Results

The findings from this study reveal notable gender differences in the comprehension skills of Grade-7 students at Liloy National High School across the domains of remembering, understanding, applying, and analyzing, as summarized in Table 1. In terms of remembering skills, female students achieved a mean score of 85.33, categorized as "Very Satisfactory," whereas male students garnered a lower mean of 82.67, described as "Satisfactory." These results indicate that females demonstrated stronger abilities to recall mathematical concepts, likely due to higher levels of attention and focus on content-based learning. Research supports this finding, as the Association for Psychological Science (2008) highlights that females excel in episodic memory tasks, such as recalling information, due to their ability to allocate greater cognitive attention than males.

For understanding skills, male students attained a mean score of 78.33, described as "Fairly Satisfactory," while females scored 82.69, categorized as "Satisfactory." This suggests that females are better at comprehending complex mathematical problems and making sense of mathematical terminologies compared to their male counterparts. Previous studies, such as those by Kesharav and Ashtarian (2008), corroborate this observation, emphasizing that females demonstrate superior comprehension of written material, likely due to their more frequent engagement with reading and a positive attitude toward learning.

When examining applying skills, female students scored a mean of 82.56, rated as "Satisfactory," in contrast to males who scored 79.00, categorized as "Fairly Satisfactory." The results highlight the challenges both genders face in applying mathematical concepts to solve word problems, though females performed better overall. This aligns with the findings of Oda et al. (2017), which suggest that females' extensive reading habits contribute to enhanced critical thinking and application of knowledge in problem-solving contexts.

Lastly, for analyzing skills, the results indicate that both male and female students struggle with higher-order comprehension tasks, as evidenced by mean scores of 75.80 and 79.18, respectively, both categorized as "Fairly Satisfactory." While females slightly outperformed males, the overall low performance suggests difficulty in interpreting mathematical texts and analyzing the meaning behind mathematical symbols and phrases. This finding is supported by Shanahan and Shanahan (2008), who emphasized that reading mathematics texts requires advanced cognitive processes, such as analyzing and expanding ideas, rather than simply decoding or summarizing information. Similarly, Cantrell, Burns, and Callaway (2009) noted that many students, regardless of their decoding abilities, often fail to comprehend the deeper meaning of mathematics texts.

In conclusion, the results demonstrate a consistent trend where females outperform males across most comprehension skills, particularly in remembering, understanding, and applying. However, both genders exhibit low proficiency in analyzing skills, suggesting the need for targeted interventions, such as the development of Enhanced Problem-Solving Strategies (EPSS), to enhance students' overall comprehension and problem-solving abilities in mathematics. These findings align with prior studies that underscore the importance of addressing gender-based disparities and improving critical thinking skills to achieve better academic outcomes.

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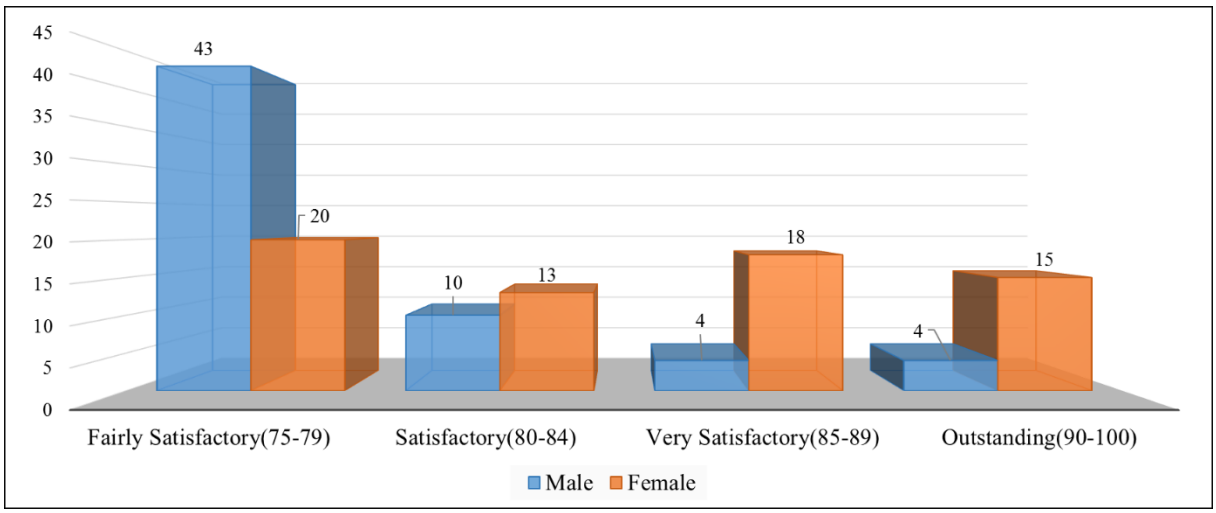
Table 1 *Level of comprehension skills*

Comprehension Skills	***Male***		***Female***	
	$\bar{x}$	Description	$\bar{x}$	Description
Remembering	82.67	Satisfactory	85.33	Very Satisfactory
Understanding	78.33	Fairly Satisfactory	82.69	Satisfactory
Applying	79.00	Fairly Satisfactory	82.56	Satisfactory
Analyzing	75.80	Fairly Satisfactory	79.18	Fairly Satisfactory

Figure 2 presents the mathematics performance of Grade 7 students at Liloy National High School when grouped by sex. Among male students, 34 out of 61 (55.74%) achieved a "Fairly Satisfactory" performance level, while 20 out of 66 (30.30%) female students attained the same rating. Notably, 15 out of 66 (22.73%) female students achieved an "Outstanding" mathematics performance, compared to only 4 out of 61 (6.56%) male students in this category. The mean scores further highlight this disparity, with females achieving an average score of 83.94, categorized as "Satisfactory," whereas males scored an average of 78.57, described as "Fairly Satisfactory."

These results imply that female students exhibit stronger mathematics performance compared to their male counterparts, consistent with prior studies. Mercado (1987), as cited by Barloso (2002), emphasized that male students tend to show weaker arithmetic reasoning and spatial relationship skills, while females often perform better as they advance through higher grade levels. This trend has been further substantiated by consecutive Trends in International Mathematics and Science Study (TIMSS) results, as the International Association for the Evaluation of Educational Achievement (IEA, 1999) and TIMSS (2003) consistently demonstrated that Filipina students outperform Filipino males in mathematics. Factors contributing to these differences may include females' stronger verbal and episodic memory, as well as their higher engagement with learning tasks requiring comprehension and analytical skills.

The observed gender-based differences in mathematics performance underscore the need for targeted interventions that address weaknesses among male students, particularly in areas requiring higher cognitive skills such as arithmetic reasoning and problem-solving. Strategies like Enhanced Problem-Solving Strategies (EPSS) could be employed to close the performance gap and ensure equitable development of mathematics skills among students regardless of sex. Such efforts would align with broader educational goals aimed at improving national performance in mathematics and achieving global standards.



Mean: Male = 78.57 (Fairly Satisfactory) *Female = 83.94 (Satisfactory)*

Figure 2 *Mathematics Performance of Grade-7 Students in Liloy National High School in terms of Sex*

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Table 2.0 presents the linear regression analysis of the influence of comprehension skills on the mathematics performance of Grade-7 students in Liloy National High School. The results indicate a strong positive relationship between comprehension skills (predictor variable) and mathematics performance (dependent variable), as evidenced by an R-value of 0.951. This finding signifies that higher comprehension skills are associated with higher mathematics performance, while lower comprehension skills correspond to poorer performance. The relationship highlights the critical role comprehension skills play in students' ability to succeed in mathematics.

The r^2-value of 0.904 and adjusted r^2-value of 0.903 further indicate that 90.3% of the variance in mathematics performance can be attributed to students' comprehension skills. The remaining 9.7% of the variance is influenced by other factors not included in this study, such as teaching methods, students' motivation, or external resources. Additionally, the analysis yields an F-value of 1171.426 and a beta coefficient of 0.951, with a t-value of 34.226 and a p-value of 0.000. The p-value is less than the standard α-level of 0.05, confirming that comprehension skills significantly influence the mathematics performance of Grade-7 students at Liloy National High School. Consequently, the null hypothesis, which states that comprehension skills do not significantly influence mathematics performance, is rejected.

The results underscore the importance of comprehension skills—specifically the cognitive domains of remembering, understanding, applying, and analyzing—as strong predictors of mathematics success. This suggests that students who exhibit higher comprehension abilities are more adept at solving mathematical problems. To enhance mathematics performance, students must develop these critical cognitive skills, particularly in solving word problems that require higher-order thinking. This finding aligns with MacGregor and Price (1999), who emphasized the essential role of vocabulary, number sense, and symbol processing in mathematics achievement. They argued that the ability to derive meaning from mathematical symbols and connect language to mathematical concepts is a key factor in success.

Overall, these results indicate that comprehension skills are a fundamental prerequisite for academic success in mathematics. Therefore, targeted interventions, such as instructional strategies focusing on the improvement of comprehension skills, should be implemented to foster students' abilities in remembering, understanding, applying, and analyzing mathematical concepts. By equipping students with these cognitive tools, they will be better prepared to tackle mathematical challenges and achieve higher levels of academic performance.

Table 2 *Linear Regression Analysis on the Influence of Comprehension Skills on Mathematics Performance*

Predictor	R-value	R^2-value	Adjusted R^2 – value	F- value	Beta	T-value	P-value	Interpretation (α 0.05)
Comprehension Skills	0.951	0.904	.903	1171.426	0.951	34.226	0.000	Significant

**Dependent: Mathematics Performance*

The study proposed Enhanced Problem-Solving Strategies (EPSS) to improve students' comprehension skills in understanding word problems, particularly in analyzing, which received "fairly satisfactory" ratings (75.80 for males and 79.18 for females). Anchored on Polya's Principle of Problem-Solving, the EPSS includes four stages presented in Table 3: (1) comprehending the problem by identifying unknowns, data, and conditions, (2) deciding on an appropriate problem-solving technique through tools like diagrams or patterns, (3) solving the problem using structured and clear steps, and (4) retrospecting solutions by reflecting on accuracy and strategies used. These strategies aim to strengthen students' comprehension and problem-solving abilities, addressing gaps in mathematical analysis and ensuring a more effective approach to tackling word problems.

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Table 3 *Matrix for the Proposed Enhanced Problem-Solving Strategies (EPSS)*

Strategies	Guide Questions	Procedures
Comprehending the problem.	• What is the unknown variable in the problem? • What data or information is provided? • What conditions or constraints exist in the problem? • Do you fully understand the terminology and phrasing used to state the problem? • Can you rephrase the problem to ensure better understanding?	• Identify and list any numerical values presented in the problem, assigning appropriate labels to them. • Familiarize yourself with the nature and significance of the given data. • Locate and analyze keywords or phrases that suggest operations required to solve the problem, such as addition, subtraction, or specific formulas.
Deciding appropriate problem-solving techniques.	• Is it possible to create a visual representation (e.g., diagram or chart) to clarify the problem? • Can you identify a formula or method to solve the problem? If so, what is it? • Is direct reasoning or logical deduction feasible? Test it. • Can you predict the solution intuitively? • Are all data and conditions relevant for solving the problem?	• Develop diagrams, figures, or concept maps to outline the problem visually. • Convert mathematical terms, phrases, or sentences into symbolic notation to simplify calculations. • Explore trial-and-error approaches to evaluate possible solutions. • Organize information systematically by creating ordered lists. • Search for patterns or recurring elements within the problem. • Solve simplified sub-problems to build toward the final solution. • Utilize models or frameworks to guide understanding. • Work backward from the desired outcome to determine intermediate steps. • Refer to similar problems as examples, noting similarities and differences to aid comprehension.
Solving the problem.	• Which problem-solving approach will you employ? • How will you execute the solution using your chosen method? • Are you following the necessary step-by-step procedures to ensure accuracy?	• Apply the technique or approach you find most straightforward and practical for solving the problem. • Verify the correctness of each step taken during the solution process. • Document your solution clearly and logically, ensuring it is understandable to yourself and others. • If a particular strategy proves ineffective, discard it and explore alternative methods. Keep in mind that there are multiple ways to approach a problem.

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Strategies	Guide Questions	Procedures
Retrospecting solutions.	• Did your chosen strategy successfully lead to the correct answer? • Was the technique you employed efficient and effective? • Can the strategy be applied to future or similar problems?	• Reflect critically on the solutions you developed and assess their validity. • Review the problem-solving process step-by-step to identify successful approaches and areas for improvement. • Consider which methods and strategies were most helpful and applicable to other challenges. • Build confidence in your final answer by cross-verifying its accuracy.

Discussion

The study presents several advantages that are crucial for understanding the dynamics between comprehension skills and mathematics performance. One notable strength is the identification of female students' consistent academic advantages in remembering, understanding, and applying skills. This finding sheds light on gender-based differences in cognitive abilities and highlights the importance of leveraging these strengths to design instructional strategies that benefit all learners. Additionally, the study underscores the significant predictive power of comprehension skills, with regression analysis showing that these skills account for 90.3% of the variance in mathematics performance. This strong relationship emphasizes the vital role of comprehension in academic success, particularly in mathematics, and validates its inclusion in educational interventions. Furthermore, the study offers a practical solution by proposing Enhanced Problem-Solving Strategies (EPSS), which align with Polya's principles and provide a clear framework for addressing comprehension deficiencies and improving mathematical outcomes.

However, the findings also expose several limitations and challenges that warrant attention. Both male and female students displayed notable struggles with analyzing skills, a domain requiring higher-order thinking and problem-solving capabilities. This indicates a gap in their ability to interpret and process complex mathematical texts, which needs targeted intervention. The consistent underperformance of male students across all cognitive domains and mathematics performance highlights a gender disparity that calls for tailored support to address their specific learning needs. Moreover, while comprehension skills were shown to be strong predictors of mathematics performance, the remaining 9.7% of unexplained variance points to other influencing factors, such as teaching strategies, classroom dynamics, or motivational aspects, that were not covered in the study. Finally, although the EPSS framework holds promise, its actual effectiveness remains theoretical without practical validation in real classroom settings or longitudinal assessment to measure its impact over time.

These insights reinforce the importance of a balanced approach—one that recognizes and capitalizes on strengths while addressing persistent challenges and gaps in comprehension and mathematics performance. By refining teaching methodologies and exploring additional factors, educators can create more inclusive and effective learning environments.

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Knowledge Contribution

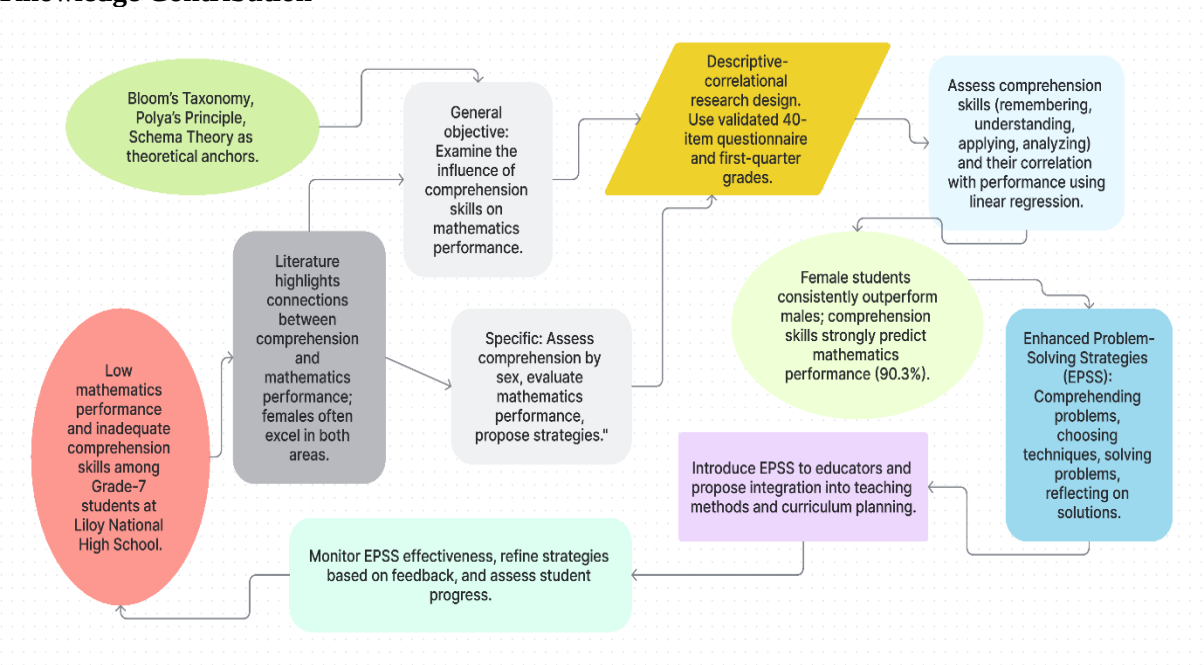

Figure 2 *Knowledge Contribution Pathway*

The diagram illustrates how this research contributes to knowledge by addressing the influence of comprehension skills on mathematics performance among Grade-7 students. Starting with problem identification, the study recognizes the challenges in student performance and comprehension gaps, followed by a review of existing literature linking comprehension to mathematics achievement. Clear objectives set the foundation for a methodical approach utilizing validated tools and theoretical frameworks such as Bloom's Taxonomy and Polya's Principle. The study identifies key findings through data collection and rigorous linear regression analysis, such as gender differences in performance and the substantial predictive value of comprehension skills. Based on these insights, the Enhanced Problem-Solving Strategies (EPSS) is proposed as a practical solution to elevate student outcomes. The pathway concludes with disseminating results to educators and a reflective cycle for continuous refinement of strategies, ensuring that the contribution remains impactful and applicable to educational practices.

Recommendation

Based on the findings, it is recommended that teachers innovate and localize instructional materials while integrating strategic teaching techniques, including the Enhanced Problem-Solving Strategy (EPSS), to strengthen students' comprehension and analytical skills in solving mathematical word problems. Parents are encouraged to actively support their children's learning process by mentoring and motivating them to improve their mathematics performance. At the same time, educators should utilize educational technology to create engaging and interactive lessons. DepEd officials should design programs specifically aimed at enhancing the mathematical and comprehension skills of students to address existing gaps in performance. Furthermore, it is advised that future studies expand the scope to include other grade levels or schools, providing broader insights into the relationship between comprehension and mathematics performance. A focus on developing comprehensive frameworks to refine cognitive skills, particularly analyzing, would also be beneficial to achieve lasting improvements in student outcomes.

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References

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, NY: Longman.

Association for Psychological Science. (2008). Sex differences in memory: Women better than men at remembering everyday events. *ScienceDaily*.

Barloso, A. B. (2002). *Reading comprehension and problem-solving in mathematics of grade six pupils in Tampilisan district* [Master's thesis, Saint Vincent's College, Dipolog City]. Unpublished.

Bartlett, F. C. (1932). *Remembering: A study in experimental and social psychology*. Cambridge University Press.

Cantrell, S. C., Burns, L. D., & Callaway, P. (2009). Middle- and high-school content area teachers' perceptions about literacy teaching and learning. *Literacy Research and Instruction, 48*(1), 76–94. https://doi.org/10.1080/19388070802434899 *(Note: Full reference inferred)*

Clarkson, S. P., & Williams, W. H. (1994). Are you assessing reading or mathematics? *Conference Paper ED393666*.

Collado, J. L. (2000). Improving pupils' performance in reading comprehension. *The Modern Teacher*.

Dagon, M. L., Gulagula, A. O., & Rebonido, O. M. (2012). *Cognitive skills and mathematics performance of the students in the College of Education in Jose Rizal Memorial State University – Tampilisan Campus*. Unpublished research study.

Department of Education (DepEd). (2016). *DepEd Order No. 36, s. 2016: Policy guidelines on awards and recognition for the K to 12 basic education program*.

Escuadro, D. P., Guiron, A. D., & Mantangan, E. M. (2013). *Problem-solving skills and mathematics performance of sophomore high school students of JRMSU-TC Laboratory High School*. Unpublished manuscript.

Greabell, L. C., & Anderson, N. A. (1992). Applying strategies from the directed reading activity to a directed mathematics activity. *School Science and Mathematics, 92*(3), 142.

IEA. (1999). *TIMSS 1999 international mathematics and science report: Findings from IEA's repeat of the Third International Mathematics and Science Study at the eighth grade*. Boston College, TIMSS & PIRLS International Study Center.

Imam, O. A. (2016). Effects of reading skills on students' performance in science and mathematics in public and private secondary schools. *Journal of Education and Learning (EduLearn), 10*(2), 177–186. https://doi.org/10.11591/edulearn.v10i2.3430

Imam, O. A., Abas-Matsura, M., & Jamil, H. (2013). Correlation between reading comprehension skills and students' performance in mathematics. *International Journal of Evaluation and Research in Education, 2*(1), 1–8.

International Association for the Evaluation of Educational Achievement (IEA). (1999). *TIMSS 1999 international mathematics and science report: Findings from IEA's repeat of the Third International Mathematics and Science Study at the eighth grade*. Boston College, TIMSS & PIRLS International Study Center.

Jaudinez, A. S. (2019). Teaching senior high school mathematics: Problems and interventions. *Pedagogical Research, 4*(2), em0031. https://doi.org/10.29333/pr/5779

Jordan, M. J. B., & Sunico, E. A. (2022). An integrative reading comprehension approach and mathematical problem-solving approach to enhance students' performance of grade 7. *International Journal of Research Publications, 105*(1), 14-20.

Kesharav, H., & Ashtarian, S. (2008). The relationship between Iranians' gender and reading comprehension of three different types of text. *Iranian Journal of Applied Linguistics, 11*(1). Retrieved from https://www.sid.ir

Logan, S., & Johnston, R. (2009). Gender differences in reading ability and attitude: Examining where these differences lie. *Journal of Research in Reading, 32*(2), 199–214.

MacGregor, M., & Price, E. (1999). An exploration of aspects of language proficiency and algebra learning. *Journal for Research in Mathematics Education, 30*(4), 449–467. https://doi.org/10.2307/749709

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Mercado, L. S. (1987). *What Filipino youth should know about Philippine society*. National Book Store.

Oda, A. H., & Abdul-Kadhim, M. R. (2017). The relationship between gender and reading comprehension at college level. *Journal of Basrah Research: The Humanities Sciences*, *42*(6), 426–442.

Ozsoy, G., Kuruyer, H. G., & Cakiroglu, A. (2015). Evaluation of students' mathematical problem-solving skills in relation to their reading levels. *International Electronic Journal of Elementary Education*, *8*(1), 113–132.

Piaget, J. (1970). Piaget's theory (G. Gellerier & J. Langer, Trans.). In P. H. Mussen (Ed.), *Carmichael's manual of child psychology* (3rd ed., Vol. 1). Wiley.

Polya, G. (1957). *How to solve it*. Doubleday and Co.

Ramos, R., Baking, E., Quiambao, D., Nicdao, R., Nuqui, A., & Cruz, R. (2015). The reading comprehension and mathematics proficiency level of high school students and their correlates. *Journal of Business & Management Studies*, *1*(2), 1–7.

Shanahan, T., & Shanahan, C. (2008). Teaching disciplinary literacy to adolescents: Rethinking content-area literacy. *Harvard Educational Review*, *78*(1), 40–59.

TIMSS. (2003). *Trends in International Mathematics and Science Study (TIMSS) 2003 results*. International Association for the Evaluation of Educational Achievement (IEA). https://timss.bc.edu/timss2003.html

TIMSS. (2019). *TIMSS 2019 international results in mathematics and science*. International Association for the Evaluation of Educational Achievement (IEA). https://timss2019.org/reports/

Virgana, V., & Lapasau, M. (2019, October). The influence of vocabulary mastery and reading comprehension towards performance of students in mathematics. In *Journal of Physics: Conference Series, 1360*(1), 012001. IOP Publishing. https://doi.org/10.1088/1742-6596/1360/1/012001

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