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Reading comprehension and mathematical problem-solving skills of grade 10 students: A correlational study

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A B S T R A C T

This study aimed to determine the relationship between reading comprehension and the mathematical problem-solving ability of Grade 10 students of Bantay National High School, Ilocos Sur, during the School Year 2025–2026. A review of related studies was conducted to provide a profound insight into these concepts. The study employed a descriptive correlational research design, using frequencies, percentages, and Pearson's r to analyse the data. The sample comprised three sections of 100 Grade 10 students, with data gathered through questionnaires. Findings revealed that students demonstrated satisfactory mastery in identifying main ideas and understanding mathematical vocabulary, but struggled significantly with interpreting multi-step or context-based word problems, with most falling under the Developing and Beginning levels. Overall reading comprehension reflected a moderate level of mastery. In mathematical problem solving, nearly half of the students were at the Basic level, with notably low performance on multi-step problems, resulting in an overall low-mastery classification. Pearson's r correlation indicated a weak but statistically significant positive relationship between reading comprehension and mathematical problem-solving ability, indicating that higher reading comprehension is associated with better problem-solving performance. Although the correlation coefficient indicates a weak association, the significance level confirms that the relationship is not due to chance. In solving mathematical problems, students with stronger reading comprehension tend to perform better, though the effect size is relatively small. The findings therefore provide empirical support for rejecting the null hypothesis and affirm that reading comprehension and mathematical problem-solving ability are significantly related. The study suggests that strengthening instruction in mathematical vocabulary, contextual reading, and multi-step problem interpretation is recommended to improve overall academic performance.

Introduction

Reading comprehension is not only a fundamental skill in language learning but also a crucial tool in understanding and solving mathematical problems. In mathematics, particularly in word problems, students are required to interpret and analyze given information, identify relationships, and determine appropriate operations to arrive at correct solutions. Without strong reading comprehension skills,

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learners may struggle to grasp the problem's meaning, misinterpret key details, or overlook important conditions, leading to errors in reasoning and computation (Bonganciso, 2016). The integration of reading comprehension into mathematical problem-solving empowers students to think critically, make logical connections, and approach problems with confidence. This makes it an essential area of focus for educators aiming to improve both literacy and numeracy skills in the 21st-century learning environment. (De Corte, 2001)

In mathematical problem solving, comprehension errors can lead to incorrect solutions, even when the necessary computational skills are present. For instance, misunderstanding key terms, misinterpreting instructions, or overlooking critical details in a word problem often leads to an incorrect strategy. Therefore, the ability to decode and make sense of mathematical language, symbols, and problem contexts is indispensable, as cited by Hegarty M. (2002).

The Grade 10 level is a crucial stage, as students are expected to consolidate foundational skills in preparation for senior high school, where mathematics becomes more advanced and abstract. Ensuring that students possess both strong reading comprehension and problem-solving skills is therefore vital not only for academic achievement but also for their future studies and everyday decision-making (Camacho, 2015).

The significance of reading comprehension in mathematics extends beyond the classroom, equipping learners to analyze complex, real-world problems in which both numerical reasoning and language understanding are essential (Akin, 2022). In the Philippine context, where national and international assessments reveal persistent challenges in both literacy and numeracy, strengthening the connection between these skills becomes a critical educational priority (Peredo, 1988). The research aims to investigate and emphasize the role of applying reading comprehension in solving mathematical problems, providing insights to guide instructional practices, improve student performance, and foster a more integrated approach to learning across subject areas.

The objective of this study was to investigate the relationship between reading comprehension and mathematics problem-solving among Grade 10 students. By understanding the relationship between these two skills, educators can develop more effective instructional strategies that integrate literacy and numeracy, thereby addressing a root cause of poor performance in mathematics.

Previous research has reported mixed findings regarding the association between reading comprehension and mathematics performance. In the study by Frutas (2019), "Reading Comprehension and Mathematics Problem-Solving Proficiency of Filipino ESL Learners: An Imperative for Bridging the Gap," the study examines the correlation between reading comprehension and mathematics problem-solving skills among third-year Mathematics students at St. Paul University Philippines. The study examined the respondents' reading comprehension and mathematical word-problem-solving skills and determined whether they were significantly correlated. Findings revealed that the overall students' reading comprehension was significantly correlated with mathematics problem-solving skills.

In the study of Simbulas et al. (2015), "Reading Comprehension and Mathematical Problem-Solving Skills of University of the Immaculate Conception Freshmen Students", the results of the study revealed that the level of reading comprehension and problem-solving skills of the students was average, and a significant relationship exists between reading comprehension and problem-solving skills. This underscores the importance of students understanding the problem before they can solve it. Furthermore, vocabulary was the best predictor of students' problem-solving skills.

This study helps identify how well students understand texts and analyze mathematical problems, highlighting their strengths and areas for improvement. The result is expected to enhance teachers' pedagogical skills in reading and mathematics, and, as a result of these capabilities, contribute to better student comprehension.

Review of literature

The literary works examine existing research on the levels of reading comprehension and problem-solving skills in relation to word problems among Grade 10 students, focusing on identifying main ideas and relevant details in problem statements, understanding mathematical vocabulary and symbols, and interpreting multi-step or context-based word problems.

Reading comprehension

According to Grabe (2009), reading comprehension is a complex, interactive process. It includes both bottom-up processes, such as word recognition, decoding, and fluency, and top-down processes, including using background knowledge, making inferences, and predicting. Skilled reading requires automaticity at the lower levels to free cognitive resources for higher-order comprehension**.** Multiple component skills contribute to comprehension. Vocabulary knowledge, syntactic awareness, knowledge of text structure, and discourse organization are all crucial. Weakness in any one of these components can limit comprehension performance. The development of literacy skills is essentially influenced by reading, as literacy encompasses both reading and writing (Akın *et al.*, 2015). When people read, they engage in an interactive experience with the text, actively searching for meaning to improve information reception and avoid misinterpretation. Students can broaden their thoughts by reading, which boosts their ability to think critically and solve problems. In language learning, reading is a vital component that not only enhances cognitive abilities but also broadens perspectives and cultivates critical thinking as students interpret and comprehend texts (Walker, 2016). Furthermore, reading serves as a valuable means for students to acquire an extensive vocabulary and knowledge base (Chung Kai, 2009).

A separate study conducted in the Philippines focused on 200 junior high school (JHS) students who were formally enrolled at Malibud National High School for the 2020–2021 academic year. Respondents were carefully selected, with an emphasis on those whose Reading Efficiency Index scores were primarily classified as "frustrated". A junior high school reading program was developed based on the study, which was conducted within the Research and Development (R&D) framework. The researchers evaluated the participants' reading comprehension levels through a requirements analysis, and the results were used to develop the reading program. Additionally, QDA (Qualitative Document Analysis) was used in the study's assessment phase. This qualitative research method involves the researcher

interpreting documents to gain insights into a specific assessment topic, such as how content is coded in focus groups or interview transcripts (Fernandez, 2021).

Mathematical problem solving

The results indicate that reading comprehension and mental representation abilities should be included in the mathematics education program to help pupils solve mathematical word problems. Since word problems become more semantically complex as students advance in their education—for instance, when they transition to secondary education—paying attention to the semantic-linguistic aspects of word problems is especially important for helping students improve their success in solving word problems. Word problems in secondary school subjects such as geometry, physics, and biology include more verbal information and generally exhibit more complex semantic-linguistic text features (Fernandez, 2021). However, despite their demonstrated significance in earlier research, reading comprehension abilities that enable students to attend to semantic-linguistic difficulties in a word problem seem to be trained less and less explicitly in the instructional practice of RME. This is presumably because teachers may underestimate the importance of reading comprehension skills in solving word problems or be unaware of this importance (Antonio, 2016).

Therefore, it appears that the current method of teaching word problem solving places more emphasis on the development of mental representation skills than it does on the importance of reading comprehension skills. In this respect, the way word problem solving is taught in the RME curriculum does not seem to align with what is currently known from research on the factors involved in effective word problem solving. (Lawson, 2008). The capacity to accurately visualize the issue text is a crucial factor that sets good word problem solvers apart from less successful ones. Asking students to solve comparison issues—especially inconsistent compare problems (see Example 1)—is a good way to find out if they have successfully created an appropriate mental representation of the problem statement, according to earlier research.

The extent to which proficient word problem solvers can overcome challenges in accurately solving marked-inconsistent word problems is linked to their reading comprehension abilities, according to multiple researchers. Translating a marked relational term like ‘less than’ into an addition operation is found to be closely associated with general measures of reading comprehension (Lee et al., 2004). This implies that solving semantically complicated word issues may require both reading comprehension and mental representation skills. Thus, the general reading comprehension skills of the pupils are also included in this study. It has been demonstrated that reading proficiency and math performance are tightly associated. demonstrated, for instance, that the growth of reading skills was linked to math challenges. Moreover, studies focusing on children with learning disabilities have shown that difficulties in reading and in mathematics often co-occur (Geary, 1996).

Reading comprehension and the ability to solve mathematical word problems have been linked to general reasoning abilities in earlier studies. The methods for categorizing reading comprehension question types and word problem structures in mathematics have often been used to explore the reasoning strategies underlying these abilities. Mathematical abilities can be assessed by various methods, including, for

example, arithmetic with oral or written instructions (Burris, 2011). Mathematical word problems have long been used as a gauge of mathematical proficiency in educational settings. Typically, children are requested to hear (or listen to) a math tale or problem, write down the mathematical operations required to finish the work, solve the problem, and provide a solution. One way to categorize mathematics word problems has been suggested by Jordan and Hanich (2000). They have divided word problems into four item types: compare, change, and combine. Each kind is determined by the necessary problem-solving technique. It has been further suggested that both mathematics word problem-solving performance and reading comprehension skills are associated with technical reading skills (Fletcher, 2005). For example, technical reading skills (i.e., flexible word recognition and decoding skills and the ability to adjust reading method and reading speed to the text at hand) are connected to reading comprehension skills. Innabi (2007) presented that reading mathematics is different from reading any other text. Reading mathematics, according to him, is the meaningful interpretation of printed symbols, images, charts, graphs, and tables. As a result, to read mathematics, children need to develop the ability to combine fundamental reading skills with other abilities, including computational and cognitive skills. The process of integration can be very challenging.

Buris (2011) conducted an insight case study that explored the real-life application of differentiated instruction in Grades 3 to 5, particularly in Mathematics and Reading. By analyzing classroom observations, teacher interviews, and lesson plans, the study illuminated how teachers adapted their instruction based on student ability levels. The research emphasized the importance of understanding learner differences and applying varied teaching strategies such as tiered assignments and flexible grouping. One of the key findings was that differentiation requires strong classroom management, collaborative planning time, and institutional support to be sustainable. Thus, the study serves as a foundational example of how differentiation can be meaningfully implemented in upper elementary mathematics when the right support structures are in place.

In a similar vein, Lawson D. M. (2018) conducted action research in a third-grade classroom, focusing on how differentiated strategies could be implemented in mathematics instruction. The study introduced diverse learning styles, cooperative groups, and math centers to accommodate varied learners. Notably, manipulative and teacher modeling emerged as powerful tools that enhanced students' conceptual understanding and engagement. The findings showed that students responded positively to tasks that matched their preferred modalities and cognitive levels. By offering tailored instruction and promoting active participation, this research demonstrated that differentiation helps foster deeper mathematical comprehension in young learners. Ultimately, the study confirmed that differentiated instruction leads to better student outcomes when combined with concrete resources and clear instructional design.

Furthermore, Lawson (2018) explored the effectiveness of mathematics stations as a form of differentiated instruction. The study took place in an elementary setting where students rotated through stations focused on different mathematical skills, each designed to match varying readiness levels. These stations allowed for independent learning, peer support, and teacher-guided interventions. Results indicated that students working in these differentiated environments showed measurable improvements in math proficiency, particularly in problem-solving and conceptual understanding. Importantly, the

structured yet flexible format of the stations gave students autonomy while still ensuring targeted learning. This research further reinforces that station-based instruction is a highly effective means of differentiation, especially when aligned with clear learning goals and student data.

Building on these findings, Lestari, Alim, and Noviyanti (2024) conducted a quasi-experimental study in Indonesian elementary schools to evaluate the effects of individualized instruction on pupils' critical and creative thinking in mathematics. The experimental group, which received instruction tailored to readiness and interests, achieved a significantly higher learning gain (61%) compared to the control group (30%). Differentiated strategies included problem-based tasks, varied levels of complexity, and student choice. The study concluded that such methods help students engage more deeply with mathematical content and develop essential higher-order thinking skills. Therefore, the findings offer strong evidence that differentiation not only improves achievement but also builds critical cognitive skills vital for success in Mathematics. Correspondingly, Lestari, Alim, and Noviyanti (2024) explored how the implementation of a new Mathematics curriculum affected teachers' use of differentiated instruction. Through surveys and interviews, they discovered that while educators valued differentiation for its benefits to student engagement, they also faced barriers such as time limitations and curriculum constraints. Many teachers modified lessons slightly instead of fully differentiating instruction due to workload and class size. The study concluded that unless curriculum reforms are supported by practical training and planning tools, differentiation remains an ideal rather than a reality. Hence, the research underscores the need to align curriculum changes with on-the-ground teacher support to ensure the effective application of differentiated practices.

Likewise, Zalazar (2024) conducted a mixed-methods study in Taiwan that examined how professional development affects the adoption of differentiated instruction in Mathematics. Teachers who participated in coaching sessions and ongoing feedback programs reported increased confidence in using differentiated strategies such as flexible grouping and tiered assignments. Students in these classrooms showed improvements not only in math achievement but also in their motivation and participation. The study emphasized that consistent professional learning opportunities allow educators to refine their differentiation practices and respond effectively to diverse student needs. Consequently, the research supports the idea that well-structured teacher development is a key driver of successful differentiated instruction. It has been demonstrated that reading comprehension and math performance are tightly related and that math challenges are linked to the development of reading skills. Jordan et al. (2002) found in a two-year longitudinal study that reading disabilities predicted children's progress in reading. According to genetic research, there is no association between reading impairments and mathematical skills, and the correlation ranges from 0.47 to 0.76. Reading comprehension and math problem-solving are positively correlated. Students with higher reading comprehension scores performed significantly better in solving mathematics word problems. Reading comprehension explained a substantial portion of the variance in students' math problem-solving performance. Difficulty stems from misunderstanding the problem text. Students with low comprehension often misinterpret keywords, relationships, and operations in math problems, leading to incorrect solutions. Inferential comprehension strongly predicts success**.** The ability to make inferences and integrate information across sentences was the strongest predictor of accurate problem solving. Vocabulary knowledge mediates comprehension and problem-

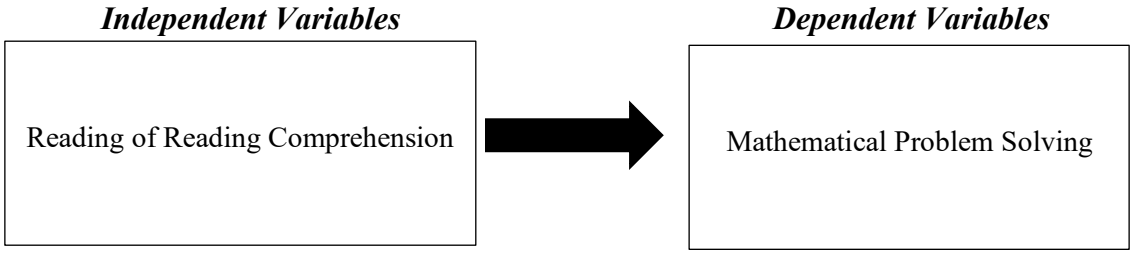
solving. Students who lacked content-specific vocabulary struggled with both understanding the problem and choosing the correct strategy to solve it.

Enhancing reading comprehension performance through contextualized

Incorporating reading comprehension instruction into real-life situations enhances learners' interaction with the material and deepens their understanding of its importance (Walker, 2017). To do this, reading activities and lessons must be tailored to students' interests and environments. The Reading Program helped address respondents' comprehension issues by examining how Contextualized Teaching and Learning affected students' reading comprehension. Following the intervention, the learners' reading comprehension performance improved from the lowest rank of the Frustration, Prast, E. et al. (2018). Up to the level of instruction. Assessing one's comprehension of both literal and inferential elements, critical thinking abilities, text structure recognition, vocabulary knowledge, and question-answering skills are all part of evaluating reading comprehension. The Phil-IRI assessment tool measures a reader's proficiency in comprehending texts through a variety of techniques, including instructor observations and standardized examinations. This tool likely considers factors such as contextual awareness, comprehension strategies, and text complexity when assessing a reader's skills. These skills are typically categorized into frustration, instructional, and independent levels (Mercado, 2018).

Conceptual framework

The study examined the relationship between students' reading comprehension and their ability to solve mathematical problems.



Statement of the problems

Specifically, it addressed the following questions;

1. What is the level of reading comprehension of Grade 10 students in terms of;
    a. identifying main ideas and relevant details in problem statements;
    b. identifying main ideas and relevant details in problem statements, and
    c. interpreting multi- step or context- based word problems?

2. What is the degree of mathematical problem-solving abilities of students in Grade 10 regarding word problems?

3. Are the students' reading comprehension skills significantly correlated with their performance in mathematical problem solving?

Hypothesis

Reading comprehension is not only a fundamental skill in language learning but also a crucial tool in understanding and solving mathematical problems. Buris (2011) highlighted that mathematics word problem-solving performance and reading comprehension skills are both related to overall reasoning skills. Building on these findings, the current study hypothesizes that the ability to solve mathematical problems is correlated with reading comprehension.

Scope and delimitation of the study

The study focuses on reading comprehension, specifically examining the key areas of identifying main ideas and relevant details in problem statements, understanding mathematical vocabulary and symbols, and interpreting multi-step or context-based word problems. It also explores problem-solving skills. The research is confined to the three sections of Grade 10 students of the Bantay National High School, Bantay, Ilocos Sur.

Methods of research

This uses a quantitative methodology with a correlational research design and a descriptive evaluation. The study is conducted at the researcher's organization, with a total population of 100 respondents, all of whom are Grade 10 students. which was purposively sampled. The questionnaire was content validated by experts, and its reliability was assessed. Questionnaires are used to gather data, which are then analyzed using both descriptive and inferential statistics, including Pearson r, frequencies, and percentages. To facilitate the gathering, the researcher obtained approval from the heads of the Department in the DepEd via a formal letter to distribute the questionnaires, and personally supervised data collection to ensure uniformity and clarify instructions as needed. An ethical review was considered, but given that the study does not involve sensitive human issues, the review was waived to describe the level of students' mathematics problem-solving performance, these measures reading comprehension in math problem contexts across three sub-domains: identifying main ideas & relevant details in problem statements; understanding mathematical vocabulary & symbols; interpreting multi-step / context-based word problems.

Score	Descriptive Rating	Frequency	Percentage
9 – 10	Excellent		
7 – 8	Proficient		
5 – 6	Satisfactory		
3 – 4	Developing		
0 – 2	Beginning		
Total		**100**	**100%**

For overall performance level:

Score Range	Description Rating	Overall Description Rating

90 – 100%	Excellent	Very High Proficiency Level
75 – 89%	Proficient	High Proficiency Level
50 – 74%	Satisfactory	Moderate Proficiency Level
25 – 49%	Developing	Low Proficiency level
0 – 24%	Beginning	Very low proficiency level

Data presentation and analysis

The presentation of the data, obtained through research questionnaires and statistically analyzed, reflects the study's goals.

Problem 1: What is the level of reading comprehension of Grade 10 students in terms of;

- ***a. Identifying main ideas and relevant details in problem statements***
- ***b. understanding mathematical vocabulary and symbols, and***
- ***c. interpreting multi- step or context- based word problems?***

Table 1: ***Level of reading comprehension of grade 10 students in identifying main ideas and relevant details***

Score	Descriptive Rating	Frequency	Percentage
9 – 10	Excellent	4	4%
7 – 8	Proficient	58	58%
5 – 6	Satisfactory	27	27%
3 – 4	Developing	11	11%
0 – 2	Beginning	0	0
Total		**100**	**100%**

Source: Pascua (2026)

Legend: DR- *Descriptive Rating- Excellent, Proficient, Satisfactory, Developing, Beginning*

Based on the data presented, the findings show that Grade 10 students generally demonstrate a functional level of reading comprehension in identifying main ideas and relevant details, as evidenced by most learners falling within the Proficient (58%) and Satisfactory (27%) categories. This indicates that most students have developed essential comprehension skills needed for academic reading tasks. However, the 11% of students at the Developing level suggests that a portion of learners still require structured support, guided reading activities, and explicit instruction in recognizing key ideas and supporting information. Moreover, the small percentage of students in the Excellent level (4%) highlights the need for enrichment activities and higher-order comprehension tasks to help more learners achieve advanced proficiency. Overall, the results underscore the importance of differentiated instruction and continuous literacy development in strengthening comprehension skills across varying ability levels. This is corroborated by Llaneza's (2008) study, which found that the reading comprehension of fourth-year students in cluster I of the Division of Abra was “satisfactory”.

Table 2. ***Level of reading comprehension of grade 10 students in understanding mathematical vocabulary and symbols***

Score	Descriptive Rating	Frequency	Percentage
9 – 10	Excellent	11	11%
7 – 8	Proficient	25	25%
5 – 6	Satisfactory	27	27%
3 – 4	Developing	21	21%
0 – 2	Beginning	16	16%
Total		**100**	**100%**

Source: Pascua (2026)

Legend: DR- *Descriptive Rating- Excellent, Proficient, Satisfactory, Developing, Beginning*

As indicated by the table data on Grade 10 students' reading comprehension of mathematical vocabulary and symbols, the results show varied levels of reading comprehension. While some learners demonstrate strong skills, as reflected in the Excellent (11%) and Proficient (25%) categories, a significant portion of students fall under the Satisfactory (27%)**,** Developing (21%)**,** and Beginning (16%) levels. This distribution suggests that many students have trouble interpreting mathematical stems and symbolic language, which may hinder their ability to comprehend problem statements and apply appropriate solutions (Palacio, 2022).

Table 3. ***Level of reading comprehension of grade 10 students in interpreting multi-step or context-based word problems***

Score	Descriptive Rating	Frequency	Percentage
9 - 10	Excellent	0	0%
7 - 8	Proficient	1	1%
5 - 6	Satisfactory	12	12%
3 - 4	Developing	60	60%
0 - 2	Beginning	27	27%
Total		**100**	**100%**

Source: Pascua (2026)

Legend: DR- *Descriptive Rating- Excellent, Proficient, Satisfactory, Developing, Beginning*

As indicated by the table, Grade 10 students face considerable difficulty interpreting multi-step or context-based word problems, as evidenced by the large proportion of learners at the Developing (60%) and Beginning (27%) levels. The absence of students in the Excellent category (0%) and the very small percentage in the Proficient level (1%) indicates limited mastery of higher-order reading comprehension skills required to analyze complex mathematical situations. These findings suggest that many students struggle to understand problem contexts, follow sequential instructions, and identify relevant information needed for problem-solving. Antonio, M. (2016).

Table 4. ***Overall Reading Comprehension Performance Level (30 items)***

Score	Descriptive Rating	Frequency	Percentage
25 - 30	Excellent	0	0%
19 - 24	Proficient	27	27%
13 - 18	Satisfactory	49	49%
7 – 12	Developing	22	22%
0 – 6	Beginning	2	2%
Total		**100**	**100%**

Source: Pascua (2026)

Legend: DR- *Descriptive Rating- Excellent, Proficient, Satisfactory, Developing, Beginning*

Looking at the data in the table, the overall reading comprehension performance of Grade 10 students indicates a moderate level of proficiency, with most learners classified under Satisfactory (49%) and Proficient (27%) levels. This suggests that most students possess basic comprehension skills and can understand general information from texts; however, many may still struggle with more complex reading tasks that require deeper analysis, inference, and critical thinking. The presence of 22% at the Developing level and 2% at the Beginning level highlights the need for continuous support through differentiated instruction, remedial reading programs, and targeted literacy interventions. Furthermore, the absence of students in the Excellent level (0%) implies that enrichment strategies and higher-order reading activities should be integrated into instruction to promote advanced comprehension skills and improve overall literacy performance, Dao-Ayan, A. (2005).

Table 5. ***Performance level of each domain in reading comprehension***

Domain	Mean Score	Percentage Score	DR
Identifying main ideas and relevant details in problem statements;	6.75	67.50%	Satisfactory
Understanding mathematical vocabulary and symbols; and	5.40	54.00%	Satisfactory
Interpreting multi- step or context- based word problems	3.19	31.90%	Developing
Overall Performance level	**5.11**	**51.10%**	**Moderate level of Mastery**

Source: Pascua (2026)

Norms:

Score Range	Description Rating	Overall Description Rating
90 – 100%	Excellent	Very High Proficiency level
75 – 89%	Proficient	High Proficiency level
50 – 74%	Satisfactory	Moderate Proficiency level
25 – 49%	Developing	Low Proficiency level
0 – 24%	Beginning	Very low proficiency level

The data in the table indicate that Grade 10 students demonstrate a moderate level of mastery in reading comprehension (51.10%)**,** suggesting that learners possess foundational comprehension skills but require further development to achieve higher proficiency. Students performed best in identifying main ideas and relevant details (67.50%, Satisfactory)**,** indicating that they can generally extract essential information from problem statements. Similarly, their performance in understanding mathematical vocabulary and symbols (54.00%, Satisfactory) reflects a basic grasp of mathematical language, though continued reinforcement is necessary to strengthen accuracy and confidence. However, the notably low performance in interpreting multi-step or context-based word problems (31.90%, Developing) highlights a significant gap in higher-order comprehension and analytical skills. This suggests that students struggle to interpret complex problems, integrate multiple pieces of information, and reason sequentially (Bowen, G., 2009).

The findings imply that Grade 10 students possess adequate foundational reading comprehension skills, particularly in identifying main ideas and understanding basic mathematical vocabulary. This indicates that current instruction supports surface-level comprehension and allows learners to extract essential information from texts. However, the overall moderate level of mastery suggests that these skills are not yet fully developed to support more advanced academic demands.

Problem 2: What is the degree of mathematical problem-solving abilities of students in Grade 10 in relation to word problems?

Table 6. ***Level of mathematical problem-solving ability (40 items)***

Score	Descriptive Rating	Frequency	Percentage
33 – 40	Advanced	0	0%
25 – 32	Proficient	27	27%
17 – 24	Basic	49	49%
9- 16	Developing	22	22%
0 – 8	Beginning	2	2%
Total		**100**	**100%**

Source: Pascua (2026)

The findings revealed that the majority of learners were classified at the Basic (49%) and Developing (22%) levels, indicating that many students still demonstrate only foundational mathematical problem-solving abilities and may experience difficulty with complex or multi-step tasks. The absence of learners in the Advanced category (0%), together with the relatively small proportion at the Proficient level (27%), highlights the need for more effective instructional approaches that foster higher-order thinking, analytical reasoning, and the practical application of mathematical concepts in authentic situations. To address these gaps, teachers may need to employ differentiated instruction, explicit problem-solving techniques, and regular formative assessments to help students progress from basic understanding toward higher levels of competence and proficiency (Salazar, 2025). In addition, remediation programs and enrichment activities may further support learners in addressing learning difficulties while promoting deeper conceptual understanding. These findings are consistent with the study of Diaz (2022).

The results further suggest that many Grade 10 students remain in the early stages of developing mathematical problem-solving skills. Although learners may be able to understand simple mathematical concepts, they continue to struggle with complex, multi-step, real-world problems that require deeper interpretation, analysis, and reasoning.

Table 7. ***Performance level of mathematical problem-solving ability***

Domain	**Mean Score**	**Percentage Score**	**DR**
Single-Step Word Problem	6.27	41.80%	Developing
Multi-step Word Problem	4.50	18.00%	Beginning
Overall Performance level		**29.90%**	**Low level of Mastery**

Source: Pascua (2026)

Norms:

Score Range	**Description Rating**	**Overall Description Rating**
90 – 100%	Excellent	Very High Proficiency level
75 – 89%	Proficient	High Proficiency level
50 – 74%	Satisfactory	Moderate Proficiency level
25 – 49%	Developing	Low Proficiency level
0 – 24%	Beginning	Very low Proficiency level

The data indicate that learners demonstrate a Developing level of performance in single-step word problems (41.80%) and a Beginning level in multi-step word problems (18.00%), resulting in an overall Low Level of Mastery (29.90%) in mathematical problem-solving ability. The students possess a partial understanding of basic problem structures; they experience significant difficulty when tasks require multiple processes, higher-order thinking, and sustained reasoning. Instruction may need to focus on strengthening comprehension of problem statements, step-by-step analytical strategies, and the integration of mathematical concepts across procedures, Lestari, F. et al. (2024).

Problem 3: Are the students' reading comprehension skills significantly correlated with their performance in mathematical problem solving?

Table 8: The correlation between mathematical problem-solving ability and reading comprehension

Reading Comprehension	**Pearson's r**	**Interpretation**	**p-value**	**Interpretation**	**Decision**(H_0)
Mathematical Problem-solving Ability	0.242	Weak relationship	0.015	Significant	Reject

Note. * p < .05, ** p < .01, *** p < .001

The table's data shows the analysis of the relationship between mathematical problem-solving ability and reading comprehension, in which the findings reveal a weak but significant relationship ($r = 0.242$, $p = 0.015$) between reading comprehension and mathematical problem-solving ability, indicating that students' capacity to understand written texts has a measurable influence on their performance in solving mathematical problems. Although the strength of the relationship is low, its statistical significance suggests that improving reading comprehension skills can contribute positively to mathematical problem-solving outcomes. This implies that mathematics instruction should incorporate literacy-based strategies such as explicit teaching of mathematical vocabulary, guided interpretation of problem statements, and comprehension-focused activities (Fernandez, R., 2021). This implies that students with higher reading comprehension typically perform better on mathematical word problems, though the effect size is relatively small (Ocampo D. et al., 2020). The findings therefore provide empirical support for rejecting the null hypothesis and affirm that reading comprehension and mathematical problem-solving ability are significantly related.

Results and discussion

The findings revealed that most Grade 10 students demonstrated satisfactory to proficient performance in identifying main ideas and relevant details in mathematical problem statements. This suggests that learners generally possess the foundational comprehension skills necessary to understand mathematical texts and instructions. However, the limited number of students who reached advanced proficiency indicates that higher-order analytical reading skills still require further development. These findings support educational research emphasizing that learners typically acquire basic comprehension abilities before mastering deeper analytical and interpretive skills (Akin, 2022). Studies also show that secondary learners can often identify general ideas but may struggle to extract precise supporting details without guided practice and scaffolded instruction (Antonio et al., 2016). Consistent exposure to structured reading activities, therefore, contributes positively to foundational comprehension, although continued intervention remains necessary to help learners progress toward advanced analytical skills, consistent with Burris (2011).

The study further revealed that many students performed at the developing and beginning levels in understanding mathematical vocabulary and symbols, indicating that mathematical language remains a significant barrier to comprehension and mathematical performance. These findings align with studies emphasizing the important role of mathematical literacy in students' comprehension and problem-solving abilities (Prast et al., 2018). Difficulties in interpreting mathematical terminology and symbols often lead to errors in understanding instructions and mathematical reasoning. Previous research also highlights that learners benefit from explicit vocabulary instruction, contextualized examples, visual representations, and guided practice in mathematical language development (Antonio et al., 2016; Barton, 2002). The findings therefore reinforce the importance of integrating literacy-based approaches into mathematics instruction to strengthen students' comprehension and interpretation skills.

The results also showed that students experienced difficulty interpreting multi-step and context-based word problems, with many remaining at the developing and beginning proficiency levels. This suggests weaknesses in analytical reading, contextual interpretation, and strategic reasoning. The findings are

consistent with research indicating that multi-step word problems require higher-order literacy and critical-thinking skills beyond basic comprehension (Bowen, 2009). Learners are often challenged by lengthy problem statements that require them to identify relevant information, connect concepts, and interpret real-life situations mathematically. Previous studies further suggest that students with limited exposure to structured problem-solving frameworks and academic vocabulary tend to perform poorly in complex mathematical tasks (Bonganciso, 2016). These findings highlight the need for scaffolded instruction, guided questioning, and contextualized problem-analysis activities to improve learners' analytical and problem-solving abilities.

In terms of overall reading comprehension, the findings suggest that Grade 10 students generally demonstrate functional rather than advanced comprehension skills. While many learners were able to understand basic texts and problem statements, difficulties remained evident in analytical and interpretive tasks. These findings support studies showing that secondary learners often possess foundational literacy skills but continue to encounter challenges when analyzing complex texts and applying critical-thinking strategies (Diaz, 2022). Educational literature likewise emphasizes that structured reading activities and explicit comprehension instruction contribute significantly to improved reading performance and academic achievement (Fernandez, 2021).

The findings further revealed that students generally demonstrated developing levels of mathematical problem-solving ability, particularly in solving complex and multi-step problems. Although many learners showed competence in basic computational tasks, they struggled with non-routine problems requiring interpretation, planning, and sequential reasoning. These results are consistent with studies emphasizing that learners often perform better in procedural computation than in conceptual and analytical problem-solving tasks (Llaneza, 2008). Previous research also associates low problem-solving proficiency with limited conceptual understanding, weak strategic reasoning, and difficulties in interpreting mathematical language (Fernandez, 2021). Moreover, studies indicate that multi-step problems demand higher cognitive processing involving interpretation, planning, and contextual analysis (Palacio, 2022). The findings therefore support the need for scaffolded instruction, explicit modeling, contextualized learning experiences, and collaborative problem-solving activities.

Finally, the findings revealed a weak yet statistically significant relationship between reading comprehension and mathematical problem-solving ability. This suggests that students with stronger reading comprehension skills are generally more capable of understanding and solving mathematical problems, particularly those involving contextualized and multi-step tasks. These findings support literature emphasizing the close relationship between literacy skills and mathematics achievement (Manzano, 2008; Ocampo et al., 2020). Students who struggle with reading comprehension often experience difficulty interpreting mathematical language, identifying relevant information, and understanding problem procedures. Although the relationship was relatively weak, its statistical significance suggests that reading comprehension remains an important factor influencing mathematical achievement. The findings therefore reinforce the importance of integrating literacy-based strategies into mathematics instruction to support students' comprehension, interpretation, and problem-solving development (Fernandez, 2021; Ocampo et al., 2020).

Conclusion

The study aimed to examine the relationship between students' reading comprehension and their mathematical problem-solving ability. The findings revealed that while most Grade 10 students demonstrate adequate foundational skills in both reading comprehension and mathematics, many continue to struggle when tasks require deeper analysis, interpretation, and multi-step processing. The significant relationship between reading comprehension and mathematical problem-solving highlights the important role of literacy skills in understanding and solving mathematical problems. This suggests that improving students' comprehension abilities may also strengthen their overall mathematical performance.

The results further showed that students generally performed well in identifying main ideas and relevant details, with most learners classified under the Proficient and Satisfactory levels. This indicates that students can recognize key information presented in mathematical problem statements. However, performance declined in more complex areas of comprehension. Many students experienced difficulty understanding mathematical vocabulary and symbols, with a considerable number remaining at the Developing and Beginning levels. This implies that interpreting mathematical language and symbolic representations remains a challenge for many learners.

The greatest difficulty was observed in interpreting multi-step and context-based word problems. Most students performed at the Developing and Beginning levels, suggesting challenges in analyzing sequential information, connecting ideas, and understanding problem structure. These findings point to weaknesses in higher-order comprehension and analytical thinking skills that are necessary for advanced mathematical reasoning and effective problem-solving.

Overall, the findings suggest that although students possess moderate mastery of basic comprehension skills, they still require support in developing deeper interpretive and analytical abilities needed for complex mathematical tasks. The study, therefore, highlights the need for targeted instructional strategies that strengthen mathematical vocabulary, improve comprehension of multi-step problems, and integrate literacy-based approaches into mathematics instruction to enhance both reading comprehension and mathematical problem-solving performance.

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